ANNUAL RATES OF SUBSCRIPTION.—Farmers, Graziers, Horticulturists, and Schools of Arts, **One Shilling,** members of Agricultural Societies, **Five Shillings,** including postage. General Public, **Ten Shillings,** including postage.

Vol. LII. 1 OCTOBER, 1939 Part 4

Event and Comment

Rural Industry in Other Lands.

WHILE abroad on his recent mission of investigation, the Minister for Agriculture and Stock, Hon. Frank W. Bulcock, observed many things of interest to Queensland farmers. In the course of a recent address, he reviewed very interestingly some of his impressions of rural industry in countries where conditions of primary production resemble our own.

Making Durban, South Africa, his starting point, Mr. Bulcock commenced a tour through Natal and the other provinces of the Union. The sugar industry in Natal impressed him with its high standard of technical efficiency, patterned largely on the Australian model. In Johannesburg he was amazed at the high prices realised at auction for cattle of inferior quality. The explanation was that huge quantities of meat were required for the labourers in the surrounding gold mines. South Africa, he said, was endeavouring to build up a chilled beef trade and the authorities there were doing all in their power to foster the

project. The Government of the Union subsidised chilled meat export, but he regarded it as doubtful whether many growers would be attracted by the prospects of an industry governed by international price levels, and for which grain feeding of stock was advocated.

Probably the most impressive agricultural institution in South Africa, he said, was the Onderstepoort Animal Research Station, near Pretoria. There a complete and complex series of experiments was being carried on, together with research work on an elaborate scale. Probably at that institution there was assembled the greatest number of agricultural science workers in any similar organisation in any part of the world. The reason for this was the nature of the task with which the South African stockowner is confronted, for major animal disease problems constitute a producer's nightmare. Australians, in Mr. Bulcock's opinion, are very fortunate in their comparative freedom from the necessity of having to contend with similar problems. Continuing, he said that agricultural education in South Africa extended over a wide field, and was provided for by universities and agricultural colleges, all of a high standard in respect of staffs, equipment, and achievement. The universities also were associated with field research and experiment work, and several of them had their own farms for the practical application of scientific developments and discoveries, from which important results had been obtained and which had had, in many cases, far reaching effects on the welfare and progress of rural industry throughout the Union and neighbouring countries.

To an Australian, the merino wool industry in the Union was of special interest, but it was, apparently, beset with serious difficulties, including limitation of the size of grazing areas in relation to economic production; absence of timber and shade; low pasture values; soil erosion; smallness of stud flocks and consequent limitation of selection; and difficulty in obtaining new blood. All these factors had led to the conclusion that South Africa was not likely to become a serious competitor with Australia in the production of merino sheep and wool. Many stud masters were, however, doing excellent work in co-operation with a progressive and well-equipped Department of Agriculture. A fat lamb industry also was being developed along sound lines and largely on a Dorset Horn foundation.

South Africa, too, had realised that production without organised marketing would be an incomplete agricultural structure, and so the economics of rural industry had become an important part of the rural policy of the Union.

The next country visited by Mr. Bulcock was Argentina, which he found to be a land amazingly rich in agricultural and pastoral resources. The magnificence of its capital, Buenos Aires, with its population of 3½ millions, and its air of solid prosperity, was evidence

of the wealth of its rural industries, for that country lived almost entirely on primary production. Argentina impressed him as probably one of the greatest developed agricultural countries in the world, with a diversity of production which few could equal. Cattle raising was the chief industry, and his first introduction to it was at a quarantine station where nearly 200 bulls were housed. These animals, all showing exceptional quality, were British importations, averaging £800 sterling in purchase price. Another bull he saw was a huge Hereford, which carried a reserve price of £3,400 sterling. The Argentine cattle breeder paid a high price for sires, he knew just what he wanted, and went out to get it. "It is need, not price, that determines his purchases," added the Minister. The stud stock importing policy of the Argentinian had resulted in the transformation of cattle to super-beef cattle, with, under favourable conditions, early maturing qualities. A visit to a meatworks showed how successful had been the aims of the breeders. The carcases were all even and strictly graded as to quality. No one could fail to be impressed with the general efficiency of the meatworks of the Argentine, in which hygiene and cleanliness were regarded as matters of supreme importance.

In Argentina the line of demarcation between the breeding and feeding side of the beef cattle industry was as sharply drawn as was the line separating the beef and dairy cattle in Queensland. Stockowners were convinced that it did not pay to breed and feed on the one place. Generally, in Argentina, the breeding lands were the poorer cattle holdings, and from these properties young stock were removed to pastures situated in probably the richest belt of agricultural country in the world. This region, a thousand or so miles long, and 400 miles wide, was a real paradise for the cattle fattener. In this vast region practically no reliance was placed on indigenous pasture, and cereals alternated with lucerne to provide adequate grazing pastures for beasts for the abattoir at not more than two years of age. There was even a tendency to decrease this slaughter age. Probably the best established axiom amongst the cattle men of the Argentine was "Weaners must be well weaned," meaning thereby that they must go on to good pastures, preserve their calf flesh, and continue to grow without any check in development.

Holdings for the raising of fats were highly improved and well managed. Labour conditions on many holdings were not of a high standard, said Mr. Bulcock, although he did visit some places where the stockmen were well cared for. One of the problems of the cattle industry in Argentina was the absence of trees, and to overcome that, extensive shade groves of Australian gums had been planted and had thrived in their new environment. The scent of these gums recalled to the wandering Australian memories of his home land.

Generally, Mr. Bulcock remarked, in conclusion, Australia had much to learn from the countries he had visited, but the volume and quality of agriculture in this country would not suffer by comparison.

Root Distribution of the Banana.

W. A. T. SUMMERVILLE, M.Sc., Senior Research Officer.

WITHIN the past twelve months an extensive programme of research covering many aspects of the culture of the banana in Queensland has been initiated. Though it is desirable that many of the problems be solved as quickly as possible, it is also necessary that, if the results are to have real and lasting value, they be based on as complete a knowledge of the fundamentals as it is practicable to obtain. Thus in connection with fertilizer treatments and soil management problems it is essential that the normal habit of rooting be understood, and to this end a study is being made of the rooting systems of Cavendish bananas growing on a variety of soil types. Whilst this study is, as yet, far from complete, it is felt that some of the information which has been obtained may be of immediate interest and value to banana growers.

TECHNIQUE.

Though it is quite practicable to examine the root system of an individual plant in considerable detail, when it becomes necessary to obtain data from many types of soil and under several other environmental conditions such as different slopes of land, aspects and cultivation methods, it is essential to devise methods which allow of fairly fast work without sacrifice of essential accuracy.

For the purpose of collecting the data here presented three methods have been employed, and the type of information obtained from each may be most readily understood by reading the following descriptions in conjunction with the accompanying diagrams. These methods were adopted following preliminary survey work which gave leads as to the distance from plants and the depths at which roots might be expected to occur.

First Method.

The initial step in the first method is the preparation of a soil profile by digging a trench 2 feet deep in a predetermined position relative to the plant. In each case the trench is dug so that its length is parallel to one row of plants, and this, of course, means that it runs at right angles to the cross rows. The position of the trench is such that if a line be drawn between the bases of the two adjacent plants, this line will bisect the trench. The length of the trench is varied according to local conditions, but generally in practice a trench 8 feet long is dug when the stools are planted on the 9 feet by 9 feet system, and 6 feet long in cases of closer plantings.

When the profile has been carefully prepared the various horizons of soil are noted. At this stage, in most soils, especially if there be an appreciable amount of moisture present, the cut ends of the roots are obscured by smears of soil, and in order to locate each root it is necessary to pick away the soil very carefully, and in small amounts at a time, so that gradually each root in turn may be exposed. Care must be taken to ensure that roots from other plants such as weeds are not confused with those of the banana. After a little practice this does not offer any great difficulty. The position of each is plotted on squared paper and the root then removed to avoid confusion and to facilitate the search.

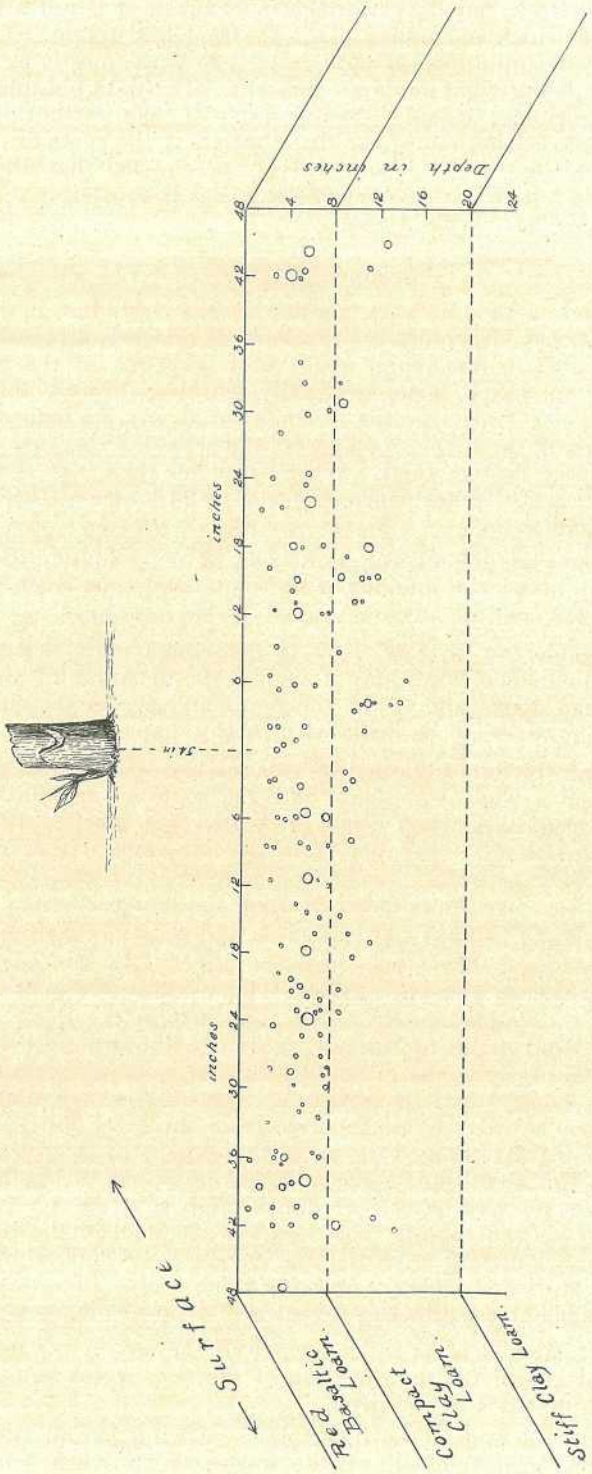

Depth in inches
4
8
12
16
20
24
inches
Surface
Red Basaltic Loam.
Compact Clay Loam.
Stiff Clay Loam.

Plate 161.

This method has one disadvantage in so far as it is not always easy to decide from which particular plant the root has grown. That, however, is relatively unimportant with respect to most questions, the point which matters being what roots are present. The data obtained by this method may, perhaps, be said to be indicative of the distribution of roots in a plantation, rather than of the distribution of the roots of one plant. Under practical conditions, it can scarcely be claimed that all roots are found, but it is felt that, provided due care has been exercised, a reasonably true picture has been obtained.

Second Method.

The second method is very similar to the first, but in this, what amounts to a series of profiles is prepared. To do this a trench 9 inches wide is excavated, commencing about half way out in the row. The trench is dug in 6-inch series gradually working directly towards the base of the plant. Thus a profile is smoothed at, say, 54 inches from the base of the plant and the roots carefully exposed in just the same manner as in the first method. When work on that face is completed the trench is taken 6 inches nearer the plant and a second face prepared at 48 inches, and so on.

This method has the advantage of making it possible to identify the plant of origin of a large number of the roots, and thus more exact data on the rooting system of any one plant may be prepared.

It is possible too, in this way, to determine more accurately the rooting habits on steep slopes, for it enables the detection of amount and depth of spread above and below the plant and across the slope. This phase is not, however, to be dealt with in this paper.

In plotting the data obtained by this method it is necessary to make records in such a way as to show how the roots occur relative to one another, and to do this, when a root is located it is marked at its depth, and at the same time its distance from the left-hand side of the face is recorded.

Third Method.

In this method a tightly fitting box is built so that the sides may be removed with ease. The cracks between the boards are covered with paper mulch so as to prevent any loss of soil when excess water percolates through it. Following this a hole, as nearly as possible equal to the length, width, and depth of the box, is dug in the ground. In digging this hole the soil is removed in shallow layers, never exceeding 2 inches in depth, and bagged as it is removed. This soil is then placed in the box in the reverse order of its removal from the hole, and the contents of each bag carefully tamped down, so that finally it occupies the same length, width, and depth in the box as it did *in situ* in the field. At each 4 inches a strip of wire netting of 1-inch mesh is stretched horizontally across the box, so that finally when the soil is removed the root cannot move more than 1 inch in any direction except at its end, which portion, of course, could drop 4 inches. Actually roots of any importance in this work have sufficient rigidity to prevent any drop of moment.

Planting material is set in the centre of the box at the usual planting depth and grown for the duration of the test, water being supplied in moderate quantities as required.

Finally, at the end of the determined growing period two opposite sides of the box are removed and the soil carefully washed out with a

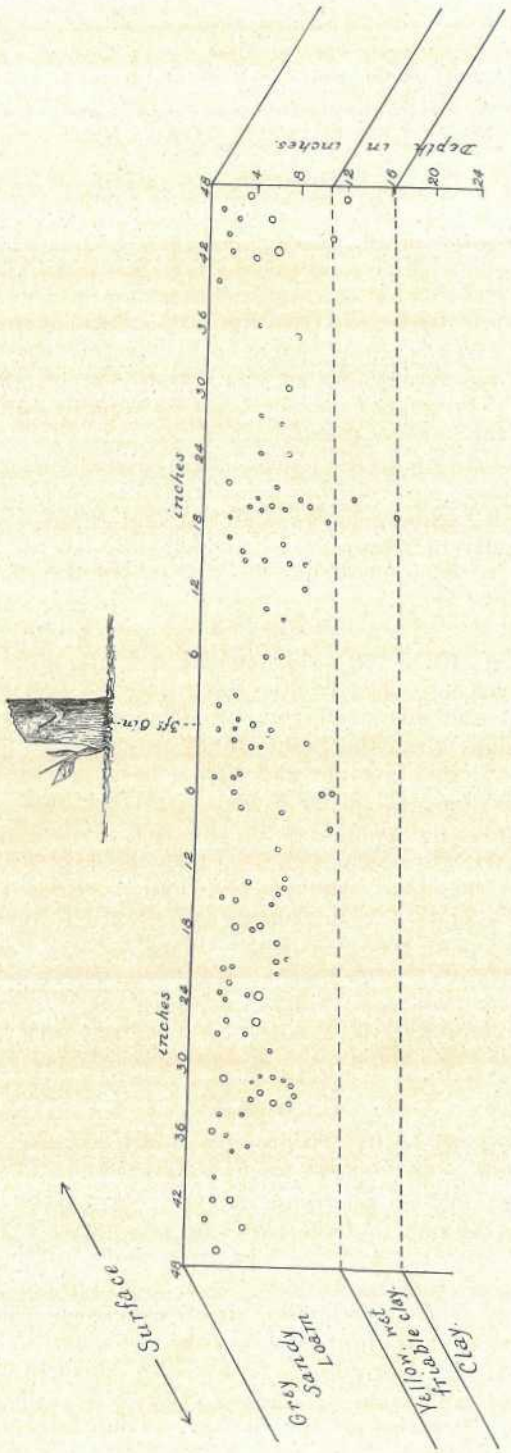

Depth in inches
0
4
8
12
16
20
24
Inches
42
36
30
24
18
12
6
0
3ft. 0in.
Surface
Grey Sandy Loam
Yellow, wet friable clay
Clay

Plate 162.

garden hose, using a low pressure of water. The time taken to remove the soil depends on its type. In the example case this operation involved ten hours' patient work to ensure that there should be a minimum breaking and displacement.

EXPLANATION OF DIAGRAMS.

Diagram 1.

This diagram (Plate 161) represents a profile exposed at Buderim Mountain on a plantation on almost level land with but a slight tilt to the north-east. The plants were approximately twelve months old and the nearest stool was 38 inches high, with a base 19 inches in circumference. The planting was 9 feet by 9 feet and two dressings of fertilizer had been applied, one four months and the other three months previous to the root survey, which was carried out on 14th December, 1938. The size of the marks may be taken as roughly indicative of the relative sizes of the various roots.

It is to be noted that 139 roots were located at the site of this profile which, at its nearest point, is 4 feet 6 inches from a stool. The land was given shallow cultivation prior to planting and thereafter the surface chipped periodically to remove weed growth. It may be of interest to note that in this instance more than 75 per cent. of the roots are located in the top 8 inches.

Diagram 2.

This specimen (Plate 162) was exposed at Eudlo on a medium slope with a westerly aspect. The profile was located 3 feet 6 inches from the nearest plant and due west from it. That is to say it exposed the roots down the slope from the plant chiefly concerned. This plant was ten months old, 33 inches high, and had a basal circumference of 19 inches. The planting was on an 8 feet by 8 feet basis. This soil is very different from that portrayed in Diagram 1, though the cultural methods employed were essentially the same in both cases. Here 113 roots were found, of which about 80 per cent. were within 8 inches of the surface. The clay, which appears at about 12 inches from the surface, though of high maximum field capacity for water, is pervious and not a serious bar to drainage. It appears, however, to be uncongenial, though apparently not fatal, to banana roots. Here again the size of the marks is roughly indicative of the relative sizes of the various roots. This profile was exposed on 5th September, 1938.

Diagram 3.

This diagram (Plate 163) represents a third, quite different, soil type. This example, which was exposed on 31st October, 1938, was taken from the Eudlo district on a medium slope of north-easterly aspect on a plantation set in December of the previous year on an 8 feet by 8 feet 6 inches system. The soil was hand dug to a depth of 10 inches before planting and again hand dug to about the same depth in the following July. The profile was dug almost half way between plants, running south-east to north-west at right angles to the slope, and the nearest stool was 38 inches high with a base approximately 18 inches in circumference. It will be seen that 102 roots were found, and of these less than 50 per cent. were within 10 inches of the surface. There are, of course, less roots shown here than in the previous diagrams, but it is to be noted that

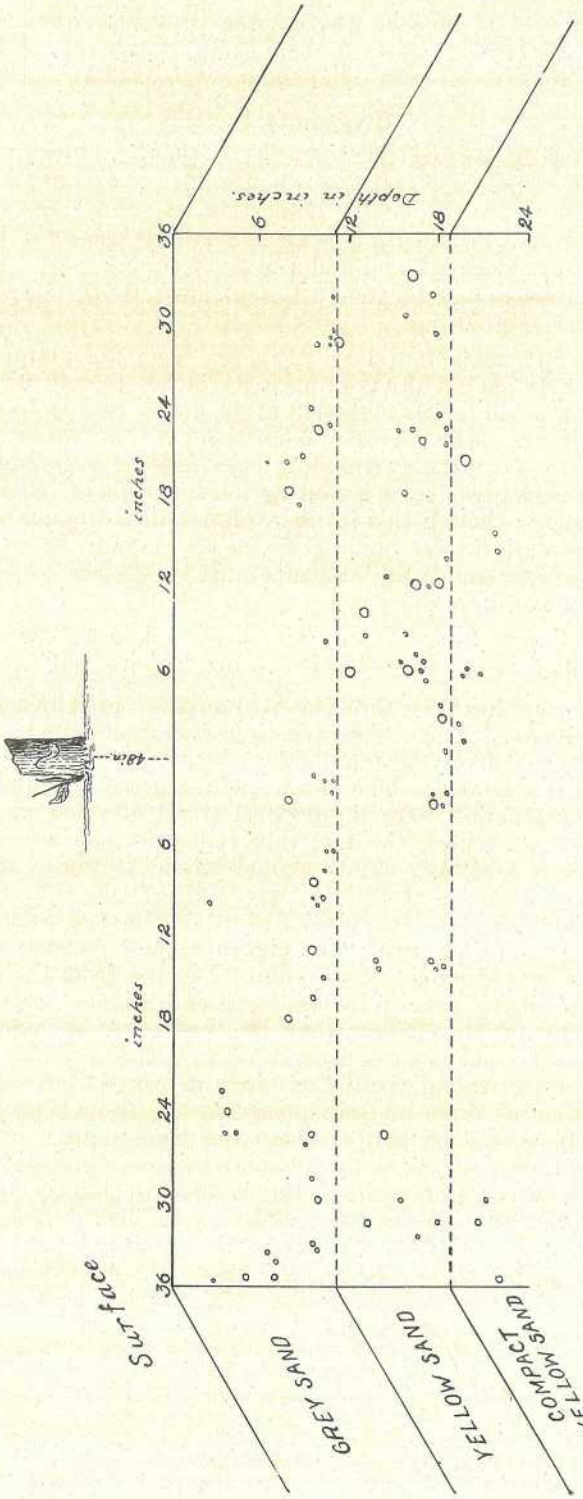

Depth in inches.
6
12
18
24
36
30
24
18
12
6
6
12
18
24
30
36
inches
inches
48in.
Surface
GREY SAND
YELLOW SAND
COMPACT YELLOW SAND

Plate 163.

this profile is 6 feet in length, whereas the previous two were 2 feet longer, so that the total number of roots compares quite well with that of the others. Relative root size is again shown as before.

Diagram 4.

This diagram (Plate 164) portrays the series of profiles prepared as outlined in the second method described under "Technique." This example is taken from a Woombye plantation set on a 9 feet by 9 feet basis on a slope of medium grade with a northerly aspect. The plant concerned was 44 inches high and had a basal circumference of 26 inches. The examination was made on the 12th September, 1938, approximately twelve months after planting.

The number of roots found at 12 inches from the plant base was twenty-seven, at 18 inches thirty-two, at 24 inches twenty-three, at 30 inches seventeen, at 36 inches eighteen, at 42 inches twenty-four, and at 48 inches twenty-six. The increase in numbers in the two most remote profiles mentioned over the two middle ones may be accounted for by branching, and perhaps to some extent by the intrusion of roots from the neighbouring plant; though this latter explanation is discounted by the fact that only seventeen were found at 54 inches. It must be remembered that the roots diverge somewhat, and this must be allowed for in making deductions from the data.

The small index figure beside the depth marking indicates the distance from the left-hand side of the profile, which was 9 inches wide.

On this diagram has been superimposed an attempt at reconstruction of the root system. This reconstruction was attempted after the information obtained from the plant shown in the plates and mapped in Diagram 6 was available. The main points kept in mind in this theoretical reconstruction were the general trend of roots as found by the third method described, the fact that root crossings are very rare, and the divergence generally at but a small angle, so that a root which appears at, say, 3 inches from the left side of the 12-inch profile would almost certainly not be represented at the 18-inch profile by any index above four or below two. The eighth highest reconstructed root may be taken as an example. At the point 12 inches from the plant this is found at between the 5 and 6 inches depth and 2 inches from the left-hand side of the profile. From what has been said of points to be observed, its continuance must be looked for at 1, 2, or 3 inches from the left-hand side and at round about the 6-inch depth. It has accordingly been visualised as the same root as appears at the 18-inch profile at the same distance from the left and at about the same depth. It could, of course, have been represented at this distance by one of those roots which appeared 1 inch from the left side of the profile and slightly deeper, but taking everything into consideration this is considered less probable. Continuing on, it is traced as dipping rather sharply between the 24-inch and the 30-inch profiles, and again between the 42-inch and 48-inch profiles. It thus corresponds roughly to the position marked for four roots in the third tier in Diagram 6.

Diagram 5.

This diagram (Plate 165) represents the same data as shown in Diagram 4 with each profile set down as a separate entity under the same system as was used in Diagrams 1, 2, and 3. This is rather more easily followed and, apart from this, serves to bring out the points

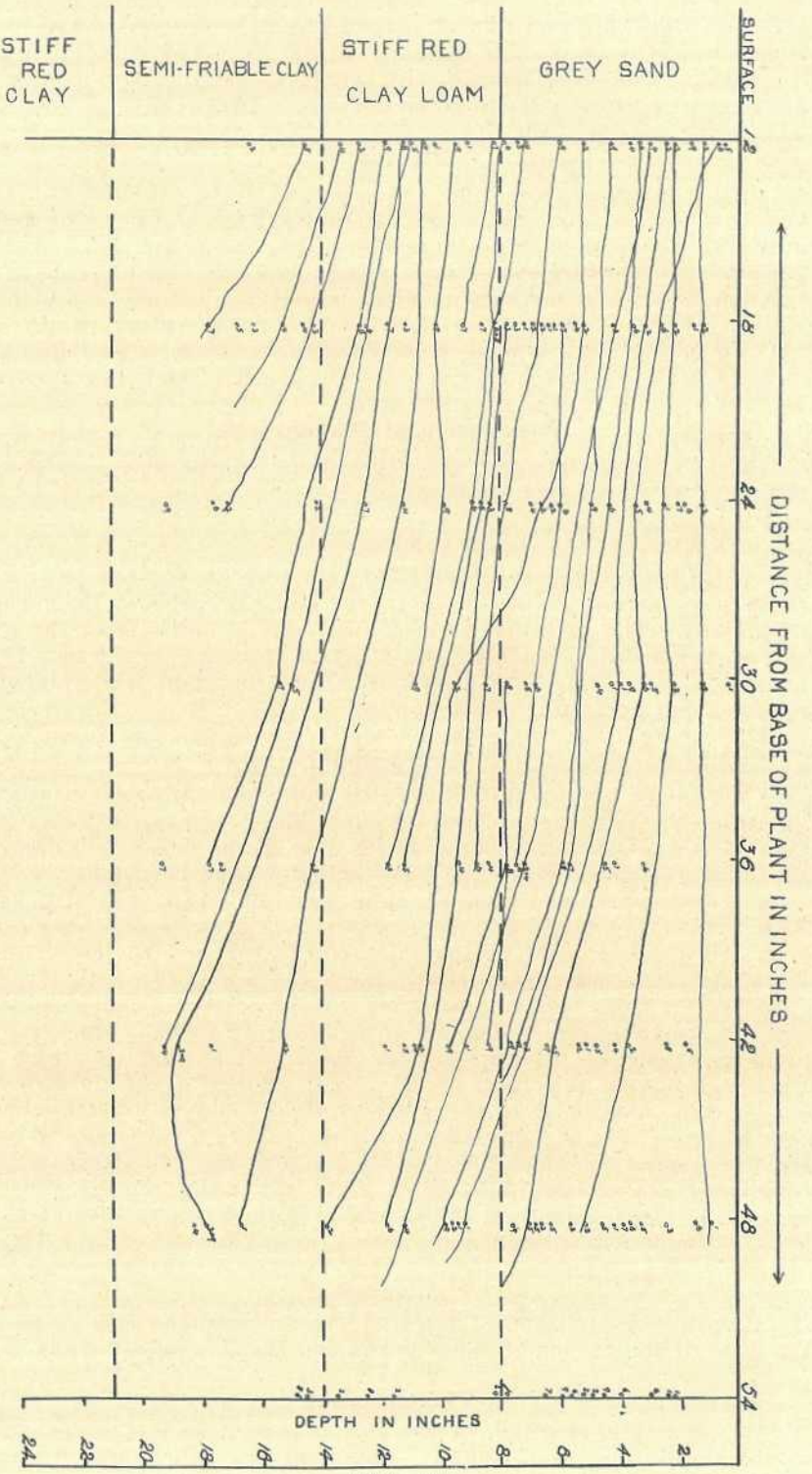

STIFF RED CLAY
SEMI-FRIABLE CLAY
STIFF RED CLAY LOAM
GREY SAND
SURFACE
12
18
24
30
36
42
48
54
DISTANCE FROM BASE OF PLANT IN INCHES
DEPTH IN INCHES
24
22
20
18
16
14
12
10
8
6
4
2

Plate 164.

which have just been mentioned as requiring to be observed when reconstruction is attempted. The same root as was instanced in the discussion in Diagram 4 has been marked with a cross to identify it in Diagram 5 and thus its position relative to the left side of the profile is clearly seen.

Diagram 6.

This diagram (Plate 166) requires very little explanation. It is merely a map of one-quarter of the root system of the plant grown under the controlled conditions described under the third method and which is shown in the photographs. It must be remembered that in this map on a plane surface are shown roots which occur in a volume of soil measuring roughly 24 inches square by 30 inches deep. The numbers marked indicate the number of roots which were found conforming to the general course indicated by the line below that number.

Description of Photographs.

These photographs are all explanatory of the third method of technique which has been described.

Photograph 1.

In the first photograph (Plate 167) is shown the plant in position in the box on the completion of its growth and just prior to the removal of the soil. The planting material used was a "bit" from the corm of a sucker about 3 feet high and weighed approximately 1 and 1½ lb. at the time of setting. As mentioned above, the plant was watered as required, but no fertilizer was applied.

Photograph 2.

The second photograph (Plate 168) shows the soil profile in the box immediately after the removal of one side. It may be noted that portion of the soil has adhered to the side of the box, particularly in the subsoil sections, where the clay content was rather high. A large number of loose ends of roots are to be seen, and their vertically downward growth is apparent. As, however, this vertically downward growth has taken place at the sides of the box and therefore under definitely unnatural conditions, these loose ends were subsequently cut off at the point of emergence from the soil. Although the conditions which caused the branching and this downward growth are certainly artificial, it may be that this gives a clue as to what happens when the banana roots come into contact with a large stone or similar obstruction in the soil. The depth of the soil was approximately 29 inches. The top soil to a depth of approximately 5 inches was a fairly heavy loam, the dark colour of which was due to the presence of a large amount of humus. This rested on a yellow, compact loamy subsoil, the clay content of which imperceptibly increased with depth so that at about 2 feet it could be described more correctly as a somewhat friable clay.

Photograph 3.

The third photograph (Plate 169) gives a comprehensive view after the sides of the box had been removed and the soil washed away.

Photograph 4.

The fourth photograph (Plate 170) is one of the root system taken at the shortest practical range. The plant has fallen approximately

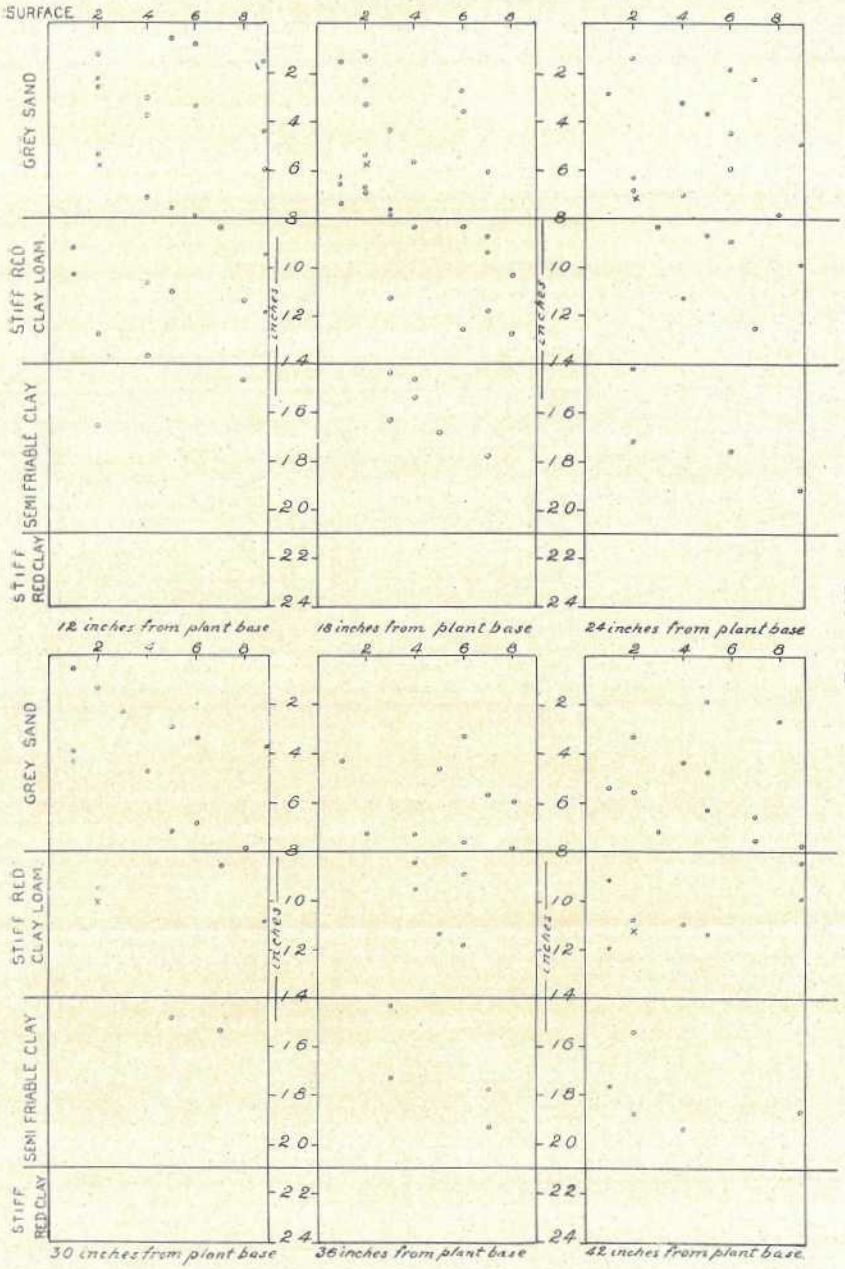

SURFACE
2 4 6 8
GREY SAND
STIFF RED CLAY LOAM
SEMI FRIABLE CLAY
STIFF RED CLAY
inches
2 4 6 8 10 12 14 16 18 20 22 24
12 inches from plant base
18 inches from plant base
24 inches from plant base
30 inches from plant base
36 inches from plant base
42 inches from plant base

Plate 165.

5 inches following the removal of the soil, and this has reduced somewhat the apparent angle of the roots to the stem. It will be noted that the rooting system may be described as forming something in the nature of a hollow cone. Though a number of roots which originate close to the surface of the soil radiate out gaining no great depth, it is to be

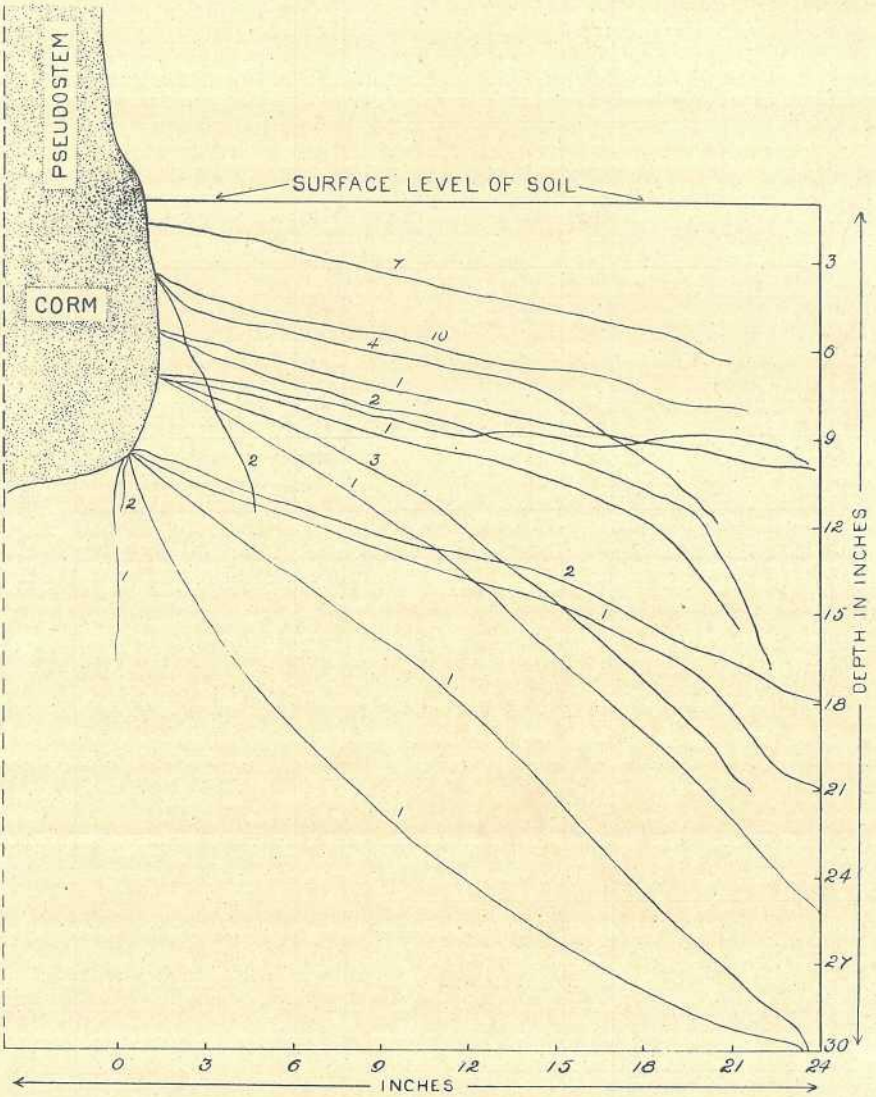


Plate 166.

noted that a large proportion of those roots which arise at a lower level on the corm penetrate the soil at a rather acute angle. This plant was, of course, only six months old and therefore by no means fully grown, so that apart from other considerations the actual length of the shorter roots may not mean a great deal. It will be seen, however, that

Plate 167.

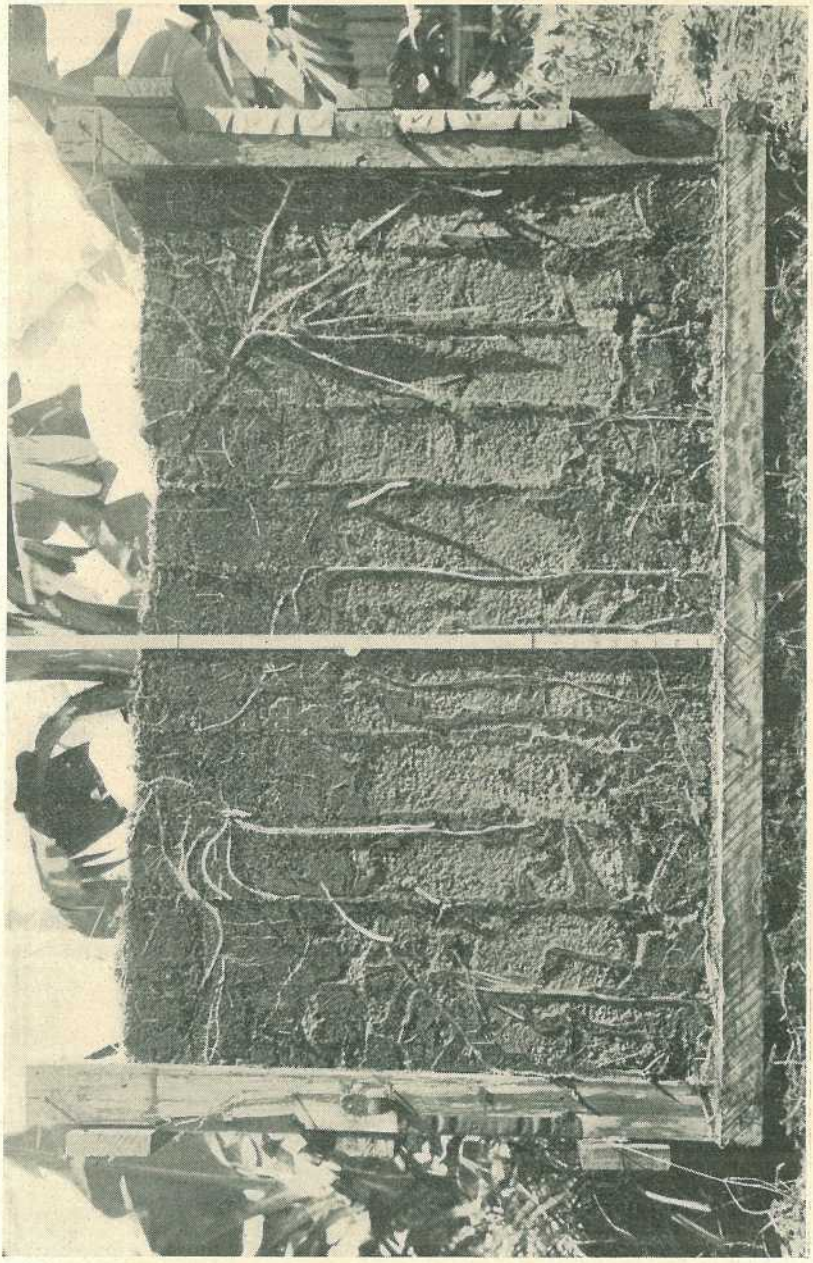


Plate 168.

several roots have reached the bottom of the box or, in other words, almost 2 feet 6 inches below the surface into the clayey subsoil. The angle at which these roots grew was approximately 45 degrees. This is a good deal steeper than the average, but at the same time it may be said that the general tendency of all but the surface laterals was to penetrate the soil at an angle of between 60 and 70 degrees to the vertical.

It may be of interest to note that this plant at the time of being photographed was carrying more than 130 main roots; of these, forty-two would be classified as surface laterals. Very deep roots penetrating at an angle of less than 60 degrees to the vertical also numbered forty-two, whilst the remaining forty-six were found between those limits. Thus each of the three general categories into which the roots of this plant fall are of approximately the same numerical strength.

In order to grasp the full significance of this photograph, reference should be made to Diagram 6 (Plate 166).

DEDUCTIONS.

Whilst it is possible to make quite a number of theoretical deductions from the data given, it is felt that before arriving at and stating many definite conclusions it is essential to have a great deal more knowledge than is at present possessed, even though the data which have been presented in this article are but a small part of what has so far been obtained. It is quite impossible to publish all the results, and therefore a few representative diagrams only have been used. These have been chosen as being reasonably representative of the types of soil so far examined, and at the same time have been selected to show the points over a wide range of soils.

The only definite point which can be made is that the practice of fertilizing close to the base of the plant so commonly seen in this State has nothing to commend it. The profiles taken approximately half way between the rows on 9 feet by 9 feet plantings show prolific root occurrence in that region, and it is very evident that fertilizer could with profit be spread over the whole area, except that there is little to be said in favour of any of the material being placed very close to the corm. Whilst on this feature, it is to be noted that there is little branching of the roots within 2 feet of the plant and that by far the greatest density and numbers of the small feeder roots are towards the ends of the main roots, and that the number close to the plant under normal conditions is really surprisingly small for a plant of this type. It may be mentioned that at times there has been confusion between the hair roots, as the smaller subsidiary roots are termed, and the root hairs through which the food material is absorbed into the plant. The root hairs are of microscopic size and accordingly are not known to growers. They are to be found on banana roots of all sizes and are much more numerous along the main roots than might reasonably be expected.

Study of the diagrams and photographs shows that when the soil is of open texture and well aerated the roots will penetrate it to a considerable depth. Diagram 3 shows what is, perhaps, an approach towards the ideal root distribution in soils of the general type portrayed, for such roots would have access to a very large volume of soil, and at the same time it would be expected that the effects of drought would be less quickly and less intensely felt than if the roots were allowed or encouraged to remain near the surface.

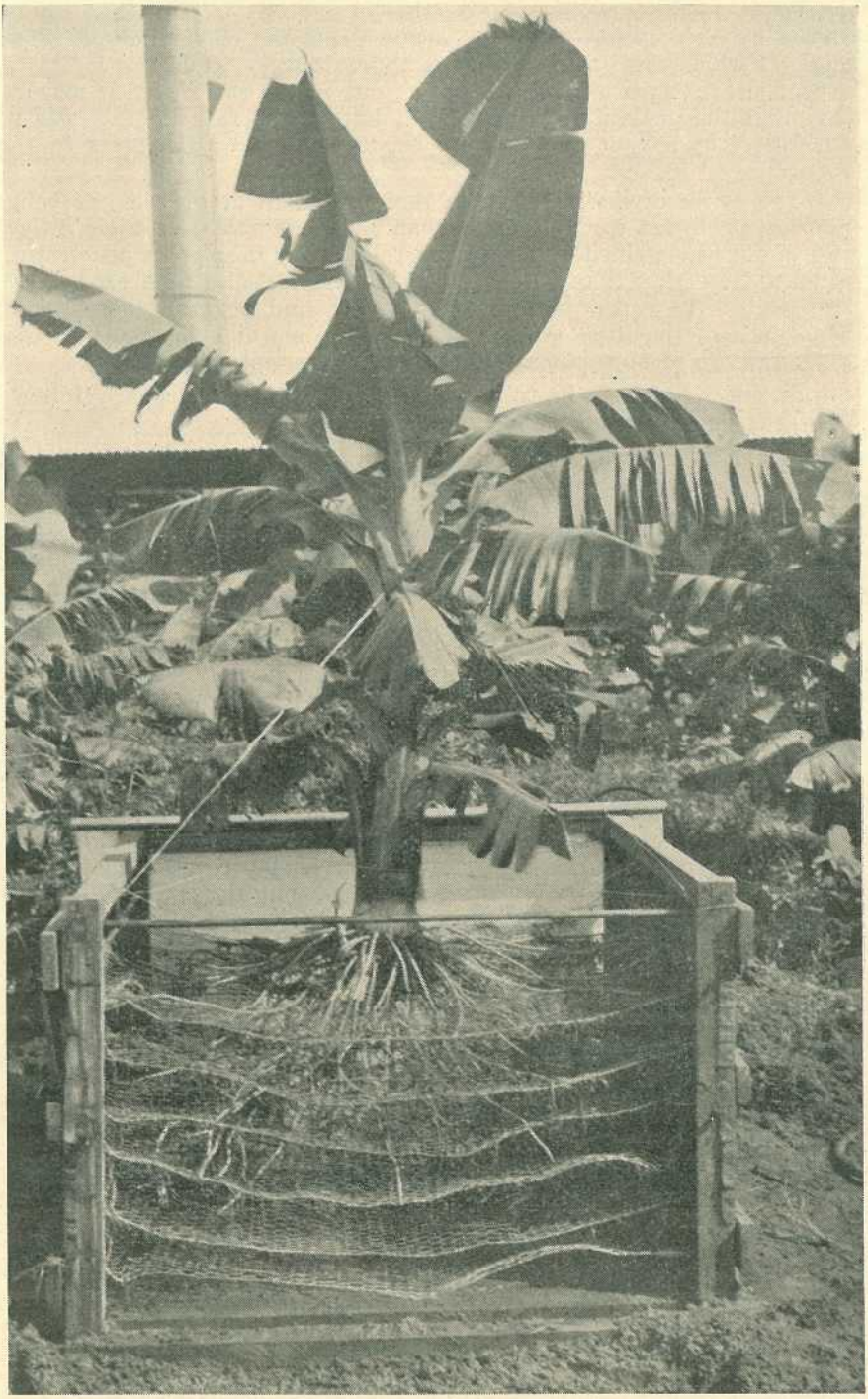


Plate 169.

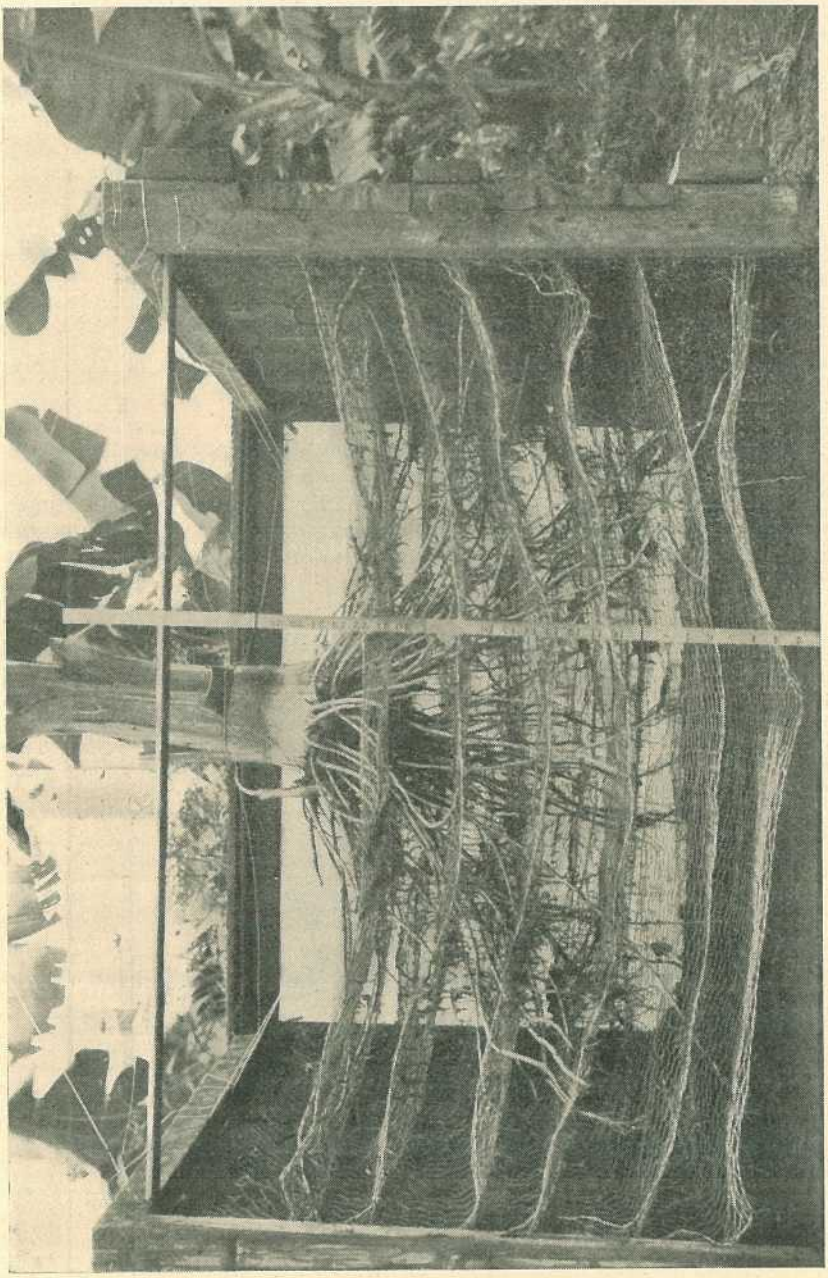


Plate 170.

Care must be taken in comparing any two soil types. For example, in the type of soil shown in Diagram 2, if deep cultivation were practised continually it would probably have disastrous effects, for either a large proportion of the roots would be cut frequently or they would be forced down into the uncongenial wet clay. It must be emphasised that this soil was not a badly drained one.

The correct cultivation of the soil portrayed in Diagram 1 is open to question, but, as basaltic loams of this type are apt to dry out very quickly, it seems at least possible that a very deep initial working would be beneficial.

However, it is not proposed to formulate any definite recommendations at this stage, other than to point out the necessity for each grower to learn as much about his soil formation as he is able. Until further work has been carried out it can only be suggested that, as the roots of the banana can be readily forced down, the grower should take steps to do this to as great an extent as his soil formation suggests is desirable.

ACKNOWLEDGMENT.

Much of the field work which has been done in connection with banana root distribution was, through the courtesy of the Director of Fruit Culture, carried out by the late Mr. E. L. Miles, and a tribute must be paid for the painstaking care which was a feature of this and all other work which Mr. Miles did in association with the writer.

A BUSH WHEELBARROW.

Select a fork of suitable size and shape, and saw it down the centre to give you the two sides of the frame. Trim the handgrips and bore two auger-holes for the crosspieces, which are wedged in position as when fitting a hammer handle. Two long bolts passing through from side to side make the frame firm and solid. Two blocks of wood are bolted on for the axle to run in, and a bitumen drum in one piece forms the body.

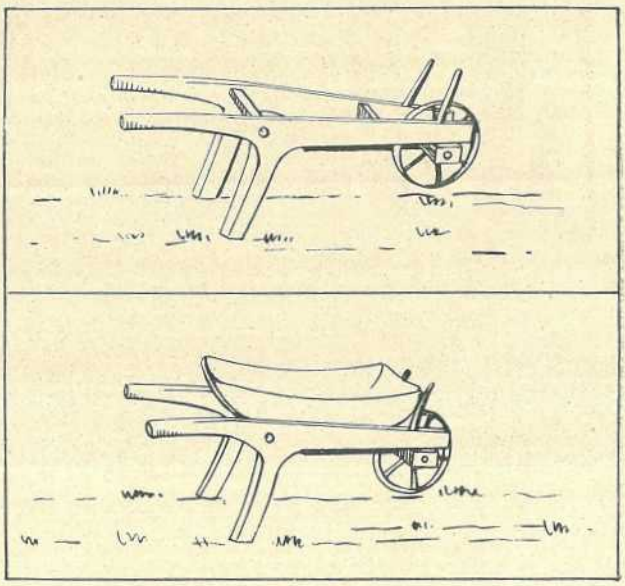


Plate 171.

Bean Fly Control in Southern Queensland.

N. E. H. CALDWELL, M.Sc.Agr., Assistant Research Officer.

THE bean fly* has been known as a pest of cultivated beans in Queensland since the early part of the present century and is almost certainly an indigenous insect which has transferred its attention from native hosts to cultivated varieties of beans. In the coastal areas, this pest has been largely responsible for the restriction of the bean-growing season to the cooler months of the year. Even then, however, serious losses have sometimes been experienced. Control measures have previously been unsatisfactory, but recent investigations in New South Wales and Queensland have improved matters considerably.

Description, Life History and Habits.

The adult is a very small black fly (Plate 172; fig. 5) which can be easily detected when resting when on the leaves of bean plants. The females lay minute colourless eggs through small punctures made in the upper surface of the leaf. These punctures (Plate 172; figs. 1 and 2) are usually concentrated near the base of the leaf and may be very numerous, but normally only a comparatively small number of them contain eggs. On hatching, the very small and almost colourless larvae tunnel through the leaf tissue to the leaf stalk. In young plants, the larvae (Plate 172; figs. 3, 6, and 8) travel thence into the main stem of the plant, where they become fully fed, and finally pupate at about ground level; in older plants, development may be completed in the leaf stalk and stalk joints. The pupal cases (Plate 172; fig. 4) containing pupae are about one-tenth of an inch in length and occur just beneath the surface of the stem. They are at first cream coloured but gradually turn brown with age.

The eggs hatch in two to four days in warm weather. The larvae take one to two days to mine through the leaf into the stalk and feed for another seven days in the leaf stalk and the stem before pupating. The flies emerge nine or ten days later. In cool weather development is much slower.

Seasonal Importance.

Probably at no period of the year are beans completely free from infestation. Normally, however, the pest is destructive only during the warmer months of the bean season. Both early crops, planted in January and February, and main season crops, planted in March, April, and May, may suffer, but attacks usually diminish towards the end of May and are of little importance in later sowings, except in a mild winter. In the absence of bean crops in spring, the fly population remains low until planting begins in January and February. Populations then build up rapidly as the acreage under crop increases, and mid-season crops are, therefore, most liable to severe bean-fly attack. If all the year round planting is attempted, early crops may suffer just as severely as those planted in mid-season.

Injury to the Plant.

The first symptom of acute bean-fly infestation in young plants is a characteristic drooping of the first two leaves. Death frequently follows, but if the plants survive, the stems burst at or just above ground level, where the larvae and pupae are concentrated, and large rusty-red calloused areas develop. Such plants may remain unthrifty or they

* *Agromyza phaseoli* Coq.

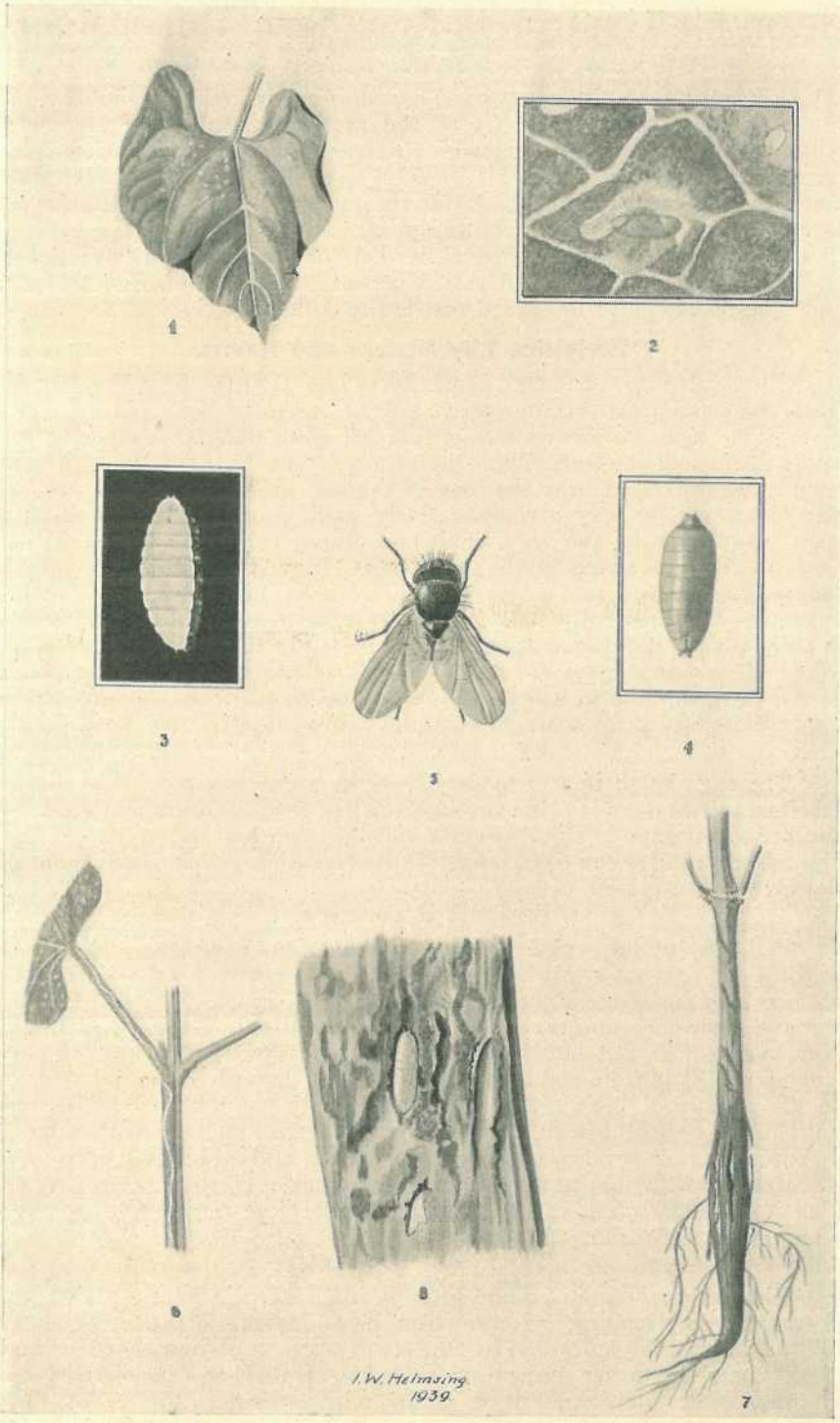


Plate 172.
Bean Fly.

may, if growing conditions are good, develop secondary roots at or above the calloused region of the stems and partially recover to bear a crop. If the attack is slight, the plants may not show any external symptoms, but the fly pupae can be exposed by peeling away the surface tissue of the stems.

In older plants, infestation is usually accompanied by a discoloured swelling at the leaf joints. This appears to have little effect on cropping capacity, but undoubtedly predisposes the plants to wind damage and to breakage during picking operations.

Control Measures.

Spray Formulae.—Satisfactory control can be achieved by the use of a spray consisting of 1 part of nicotine sulphate, 8 parts of white oil, and 800 parts of water. Convenient formulae are as follows:—

	(1)	(2)
Nicotine sulphate	1 fl. oz.	¼ pint
White oil	8 fl. oz.	2 pints
Water	5 gal.	25 gallons

Spray Schedule.—The spray should be applied three days after beans first appear above ground and thereafter at intervals of four days.

The number of applications will depend on the time of the year and the prevalence of the fly. In 1938 two sprayings gave good protection to beans planted in mid-April. In 1939 four sprayings were necessary for late February and two for late March plantings. Four to six sprayings are usually required for mid and late summer, and two to four for autumn and early winter plantings. Owing to the variation in fly attack from year to year the precise number of spray applications needed for any particular planting must be decided by the grower after taking into account the following factors:—

(*a*) The actual prevalence of adult flies on the crop. If flies are obviously abundant, a greater number of spray applications is indicated.

(*b*) The incidence of damage elsewhere in the district. If losses are common on adjacent properties, it would be sound policy, even though the flies are not actually abundant on the grower's own crop, to use a greater number of sprays than indicated by (*a*).

(*c*) The rate at which the crop is growing. Slow growing plants require more spray protection than those in a rapidly growing crop.

Spraying Method and Quantity of Spray Necessary.—Only the top surface of the leaves need be thoroughly sprayed. A double nozzle should be fitted to the ordinary knapsack pump. The single nozzle may use less spray but thorough treatment is difficult and single nozzle treat-

DESCRIPTION OF PLATE 172.

Bean Fly.

Fig. 1. Leaf with egg-laying punctures, ½ natural size. Fig. 2. Egg inside leaf tissue x 20. Fig. 3. Larva x 10. Fig. 4. Pupal case x 10. Fig. 5. Adult fly x 10. Fig. 6. Portion of plant showing larval path from leaf to stem, ½ natural size. Fig. 7. Stem with injury at ground level, ½ natural size. Fig. 8. Stem cut open to show larvæ in injured tissues x 5.

ments frequently result in inefficient application and thus unsatisfactory control. The quantity of spray necessary will vary from 30 to 50 gallons per acre, depending on the planting distance.

Action of Spray.—The spray kills the eggs and young larvae in the leaf, but once in the leaf stalk or plant stem, the larvae are unaffected. The spray residue on the leaves repels the flies for at least twenty-four hours after treatment, and eggs laid in leaves within forty-eight hours after spraying may not hatch normally. Each treatment thus protects the crop only for a short period, but when the spray schedule is completed, the plants are much less susceptible to damage. They have also become less attractive to the adult flies than younger plants. Because of this the current practice among growers of planting small areas at about fortnightly intervals throughout the main season diverts the insect to the younger crops, which are, in turn, protected by sprays.

Spraying Precautions.—The spray formula devised after careful trials in New South Wales and checked in Queensland should not be varied in any way. Slight burning of the leaves may occur but is of no importance. Increasing the concentration of the spray ingredients, however, introduces a definite risk of serious plant injury. On the other hand a reduction in the amount of oil, for instance, considerably reduces the repellant action of the spray residue against adult flies.

The interval between sprays is based on a thorough study of the insect's life history and should also be followed as closely as possible.

Rain soon after spraying may considerably reduce the kill of eggs and larvae, but once the spray has dried on the leaves its efficiency in this respect is not seriously affected. An extra spraying may, therefore, be well worth while if rain falls very shortly after a previous application. Continuous rain over several days—a not uncommon occurrence—will, of course, render spraying impracticable, but under such conditions bean-fly activity is somewhat lessened and the ill effects of any such interference with the spraying schedule are less than might be expected.

Fresh spray should be prepared for each day's application as the mixture deteriorates very rapidly if held in open containers for any length of time.

Cost of Spraying.—The cost of the spray materials should not exceed six shillings per acre per spraying. Labour costs will vary with the type of country on which the crop is growing, but under average conditions one man should be able to spray at least 2 acres per day, provided spray mixing is well organised.

Important Cultural Considerations.—Vigorous, rapidly growing beans are much better able to withstand fly attack than slow growing plants. Proper cultural methods are, therefore, an important aid in bean-fly control.

The effects of bean-fly attacks are frequently more marked in a dry season when growth is retarded. Thus, although none of the common varieties possess any actual immunity from attack, those which are hardy and least affected by adverse growing conditions are best fitted to escape serious damage.

Hilling up the plants encourages the growth of roots from the stems and is, therefore, an essential cultural measure. It is particularly important in infested crops, for the secondary roots which then grow at or above the region of serious stem damage compensate for the original roots, which have more or less ceased to function.

Yellow Daisy (*Wedelia asperrima*)—A Plant Toxic to Sheep.

C. R. MULHEARN, B.V.Sc.

IN the autumn of 1934 Maunder and Francis, of the Queensland Department of Agriculture and Stock, carried out a series of investigations into mortalities amongst rams, which had recently arrived in North-western Queensland from New South Wales. They ascertained that 194 deaths occurred amongst 415 rams on several different properties within a fortnight of being untrucked, and they were of the opinion that the cause was dietetic. The Yellow Daisy (*Wedelia asperrima*), amongst other plants, came under suspicion.

Serious mortalities amongst rams and other sheep, either whilst or shortly after being travelled, have occurred every year since. A history of the animals having had access to the Yellow Daisy a short time before death was frequently recorded from these cases. In one of the most recent mortalities 300 deaths occurred in a mob of 4,000 sheep over a period of a few days. This mortality was investigated by Mr. D. C. Clifford, Inspector of Stock at Julia Creek, who reported: "The feed was light where the sheep entered the paddock, little else but Yellow Daisy growing. When affected sheep went down froth and blood-stained mucous issued from the mouth. The rumen contained much daisy and daisy seed." In a second mortality investigated by Mr. Clifford this year, over 300 sheep died overnight following feeding "on a heavy stand of Flinders Grass with a fair proportion of *Wedelia asperrima* mixed with it." The owner who conducted postmortem examination reported that he noticed little except that the abdominal cavity contained a large amount of fluid the colour of virus.

Description of the Plant.

The Yellow Daisy (*Wedelia asperrima*) grows over a wide area of country in North Queensland extending from the Hughenden to the Cloncurry district. The plant is an annual, and appears each year shortly after the onset of the wet season. It grows to a height of about 18 inches, and is rough to touch, due to a clothing of short stiff hairs. The leaves are opposite and usually toothed on the edges, and are about 2 inches long. The flowers are yellow and somewhat like those of a small sunflower. After the flowers mature seed-heads containing blackish brown fusiform seeds, about one-eighth of an inch long, remain. The flowers usually appear in the autumn, and it is in the autumn and early winter that mortalities in the field occur.

Field Mortalities.

Under normal circumstances the plant would appear to be very unpalatable to stock, for not only have attempts to induce animals to take it voluntarily failed, but reports also indicate that it is seldom if ever, eaten in its natural state by sheep which have been bred on country over which it grows. Most of the mortalities which are considered to have been caused by this plant have occurred in travelling stock, or in stock which have been moved from their usual habitat and placed in a new environment.

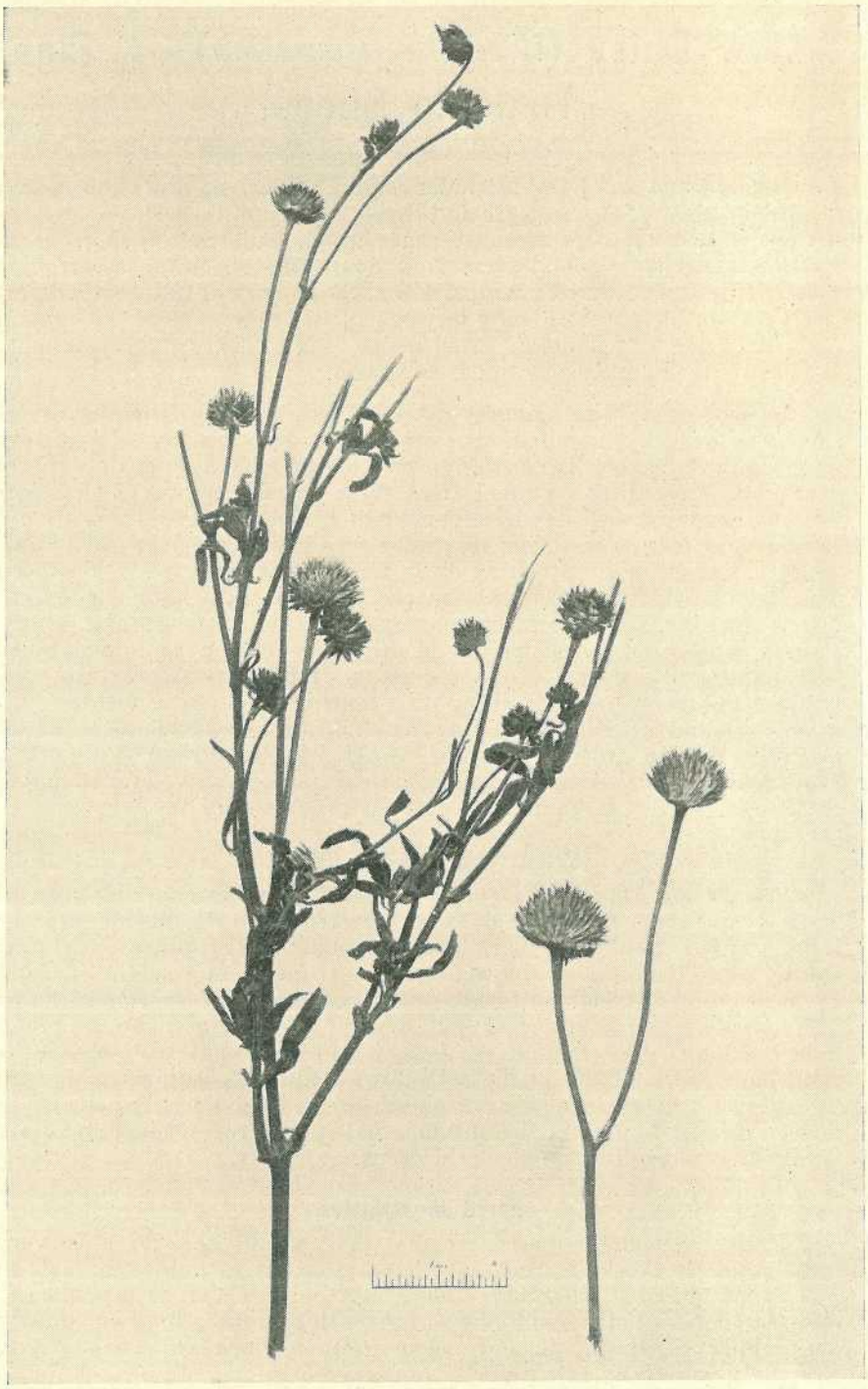


Plate 173.
YELLOW DAISY (Wedelia asperrima).

A large percentage of the mortalities have occurred in rams, but this does not suggest that rams are more susceptible than other sheep. Rather it is due to the fact that the rams were recently introduced into a district where the plant was growing. Serious mortalities have also occurred amongst mixed travelling sheep when taken on to pastures containing a fair proportion of the plant. There are no recorded mortalities in bovines, but this may be explained by the fact that bovines are rarely introduced on to country containing an abundance of the plant.

Feeding Experiments.

A quantity of Yellow Daisy for the purposes of carrying out feeding experiments was obtained from the Julia Creek district and was identified by the Government Botanist as *Wedelia asperrima*. The plant was full-grown and contained flowers and seed-heads, but only a small quantity of foliage. It was chaffed, and offered to sheep in the earlier feeding experiments, but was consistently refused by three different animals either when given alone or with mixtures with other foodstuffs. Force feeding was then carried out, using the chaffed upper portion of the plant containing seeds, leaves, and fine stems. One sheep died eighteen hours after receiving 3½ ounces of the plant, and a goat was found dead on the morning of the third day after receiving 4 ounces on the first day and 5 ounces on the second day. Three sheep also died in each case in less than twenty-four hours as a result of receiving extracts made by steeping from one-quarter to one-half pound of the chaffed plant in water for from twelve to twenty-four hours.

Symptoms.

The symptoms following forced feeding in all experimental animals were very acute, death taking place in the case of four sheep in less than twenty-four hours, and in from thirty-six to forty-eight hours in the case of the goat. This agrees with findings in the field where death frequently occurs within twenty-four hours of the animals being turned on to the plant. The period from the first sign of symptoms until death was also short and varied from four to not more than twelve hours. The first symptom detected was one of general malaise, the animal standing with drooped head and ears and making little or no attempt to move on being approached. This was followed by quivering and spasms of the muscles, giving the animal a stiff-legged appearance. Later the animal went down and exhibited marked muscular spasms as evidenced by uncontrolled leg movements and champing of the jaws. Respiratory distress was also noticed. About half-an-hour after going down death occurred. A quantity of blood-stained fluid issued from the nose a short time after death.

Postmortem Findings.

Postmortem examination revealed a severe inflammation of the abomasum or fourth stomach, and the first portion of the small intestine, but no other abnormalities were detected in the abdominal organs. A quantity of straw-coloured fluid containing jelly-like clots was present in the abdominal cavity. The amounts of fluid varied from a few ounces to half-a-pint in the different animals. A similar type of fluid was frequently found in the chest cavity.

Varying degrees of congestion of the lungs were present in the different animals. In some cases this feature was quite marked, whilst in others it was not so noticeable. In some of the animals the trachea

or windpipe contained a quantity of frothy or blood-stained fluid, and there was marked congestion of the lining membranes of this organ.

Discussion.

Symptoms and postmortem findings from mortalities in the field suspected as being due to *Wedelia asperrima* closely resemble those from feeding experiments, and as comparatively large amounts of the plant have been found in the rumen of dead sheep there is every indication that it has been responsible for these mortalities.

It is interesting to note that *Verbesina encelioides,* a plant closely related to *Wedelia asperrima,* was found to be toxic to sheep in New South Wales, and that the principal postmortem findings closely resembled those following death due to the ingestion of *Wedelia asperrima.*

Preventive Measures.

As the sickness following the ingestion of yellow daisy comes on very quickly, and as only a short time elapses between the onset of symptoms and death, little can be carried out in the way of treatment of affected animals. However, should an outbreak of poisoning due to this plant be encountered, all sheep that will travel should be moved to fresh pastures where the plant will not be available. Any sick animals should be moved to a shady paddock where they will be handy to water.

Special care should be taken with travelling sheep in districts where the plant may be encountered, and such sheep should not be allowed to feed over areas where the plant is growing. However, if this cannot be avoided the sheep should be allowed a good feed before they are taken on to the country, and they should be hurried over areas where the plant is abundant.

Rams which have been introduced from outside districts should be held in selected paddocks free of this plant as long as possible, or at least until they become accustomed to the new conditions.

AN IMPROVED WIRE GATE.

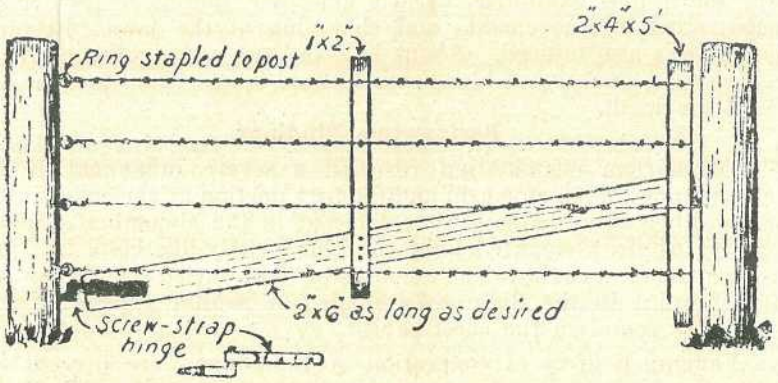


Plate 174.

An Improvement on the Ordinary "Concertina" Type of Wire Gate.

Fodder Conservation on Condamine Plains.

CONDAMINE Plains, the property of Mr. A. C. V. Bligh, form part of one of the oldest established holdings on the Darling Downs, with a history extending back to the earliest days of settlement in Queensland.

The plains are typical Darling Downs country—heavy, black soil land of extraordinary fertility. Up to about a quarter of a century ago, the Condamine country was used chiefly for wool and beef production. Since then an extensive acreage has been brought under the plough. Adjoining Condamine Plains are Melrose, Bostock's, and Kurrowah properties, all belonging to the Bligh family.

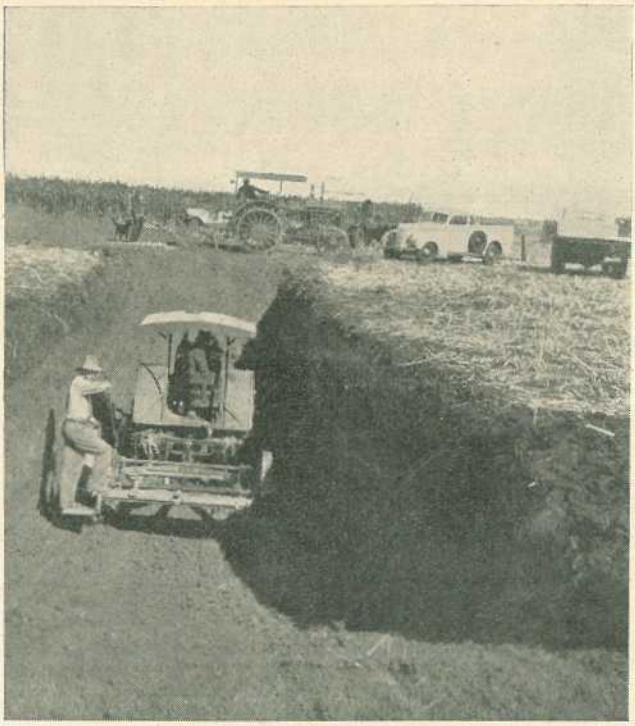


Plate 175.

Excavating a Trench Silo.—Several trenches like this—about 60 feet long, 12 feet wide, and 9 feet deep—were dug on Condamine Plains, each providing two days' work for four men with two tractors, a plough and a scoop, and with an estimated capacity of from 100 to 120 tons of sorghum.

Mr. Bligh has 3,300 acres under cultivation, mostly cropped for wheat. Sorghums, lucerne, rape, oats and introduced pasture plants also are grown on a comparatively large scale for fattening beef cattle and sheep, as well as for lamb raising.

Recently, as an addition to the regular cropping system, an extensive fodder production and conservation project was initiated. For conservation, several varieties of sorghum were selected as providing the most conveniently handled material. Altogether 370 acres were planted in one block, and 240 acres in another.

Plate 176.

A Crop of Sorghum on Condamine Plains.—Note height and density of growth.

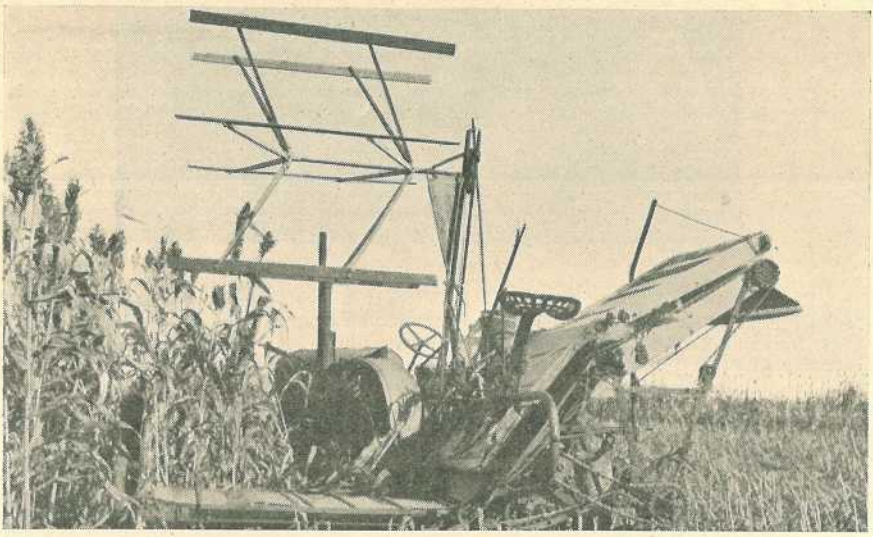


Plate 177.

The Reaping Machine.—Contrived from an ordinary reaper-binder, this outfit proved very effective in the field (see page 405).

The past season was an excellent one for the growing of sorghum, and some extraordinarily heavy crops were produced on Condamine Flats.

On the Darling Downs, grain sorghums are being substituted largely for maize, which in seasons of uncertain rainfall often fails as a grain crop, because of its moisture requirements at two critical stages of growth—tasselling and cobbing time. If soil moisture reserves are low, sufficient rain immediately before and after tasselling is of vital importance to the production of a satisfactory maize yield.

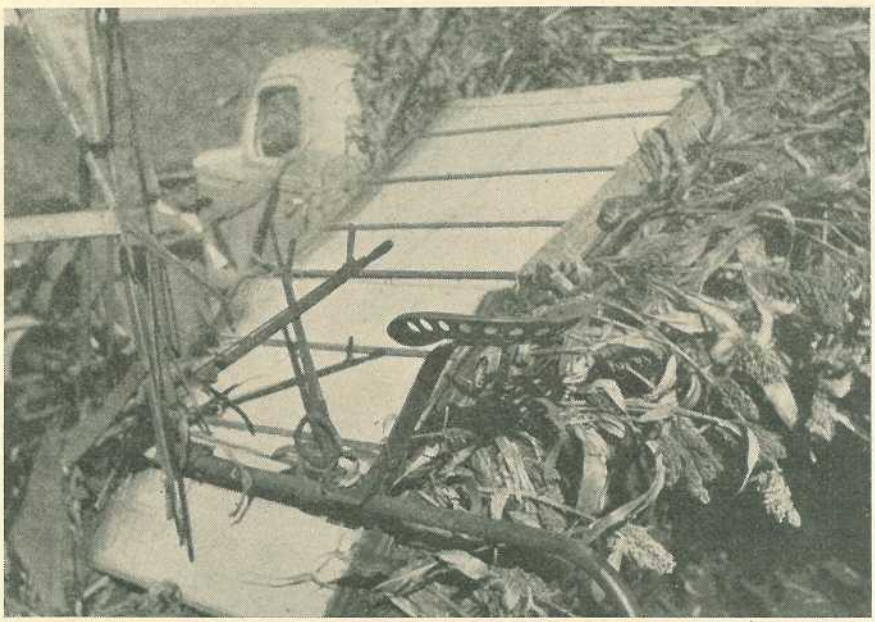


Plate 178.

A Close-up of the Extension Elevator on the Converted Reaper-Binder (see page 405).

The sorghums, on the other hand, are much hardier, and rain is not required so urgently at particular stages of crop development. Another point in their favour on the Downs where mint weed has become a pest, is their adaptability to sowing with a standard wheat drill, thereby checking or smothering all weed growth. Maize rows may be kept clean by cultivation, but the spaces between stalks become overgrown with mint weed, which absorbs considerable moisture to the detriment of the maize crop.

The feeding of sheep on sorghum also is adding to its popularity as a fodder crop, for the large quantity of feed it provides increases the carrying capacity of the grazed area. It is claimed for sorghum, too, that sheep do remarkably well on it.

For ensilage making, the sorghums are excellent; and, apart from their nutritive properties, they produce heavy tonnages to the acre.

The harvesting of sorghums for stacking, pitting, or trenching is becoming an established practice with stockowners on the Downs, and, in this respect, Mr. Bligh and other landholders have given a commendable lead.

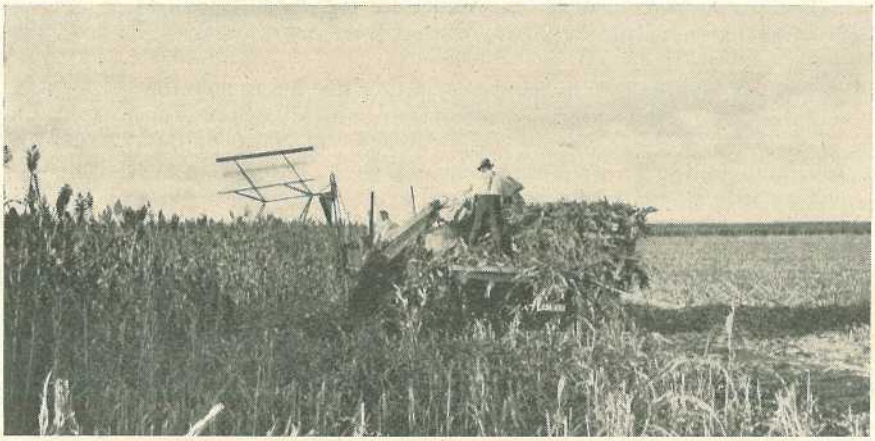


Plate 179.

The Reaper in Action.—Power for operating the converted reaper-binder is supplied by the tractor by an ingenious transmission device. The cut is delivered on to the lorry by an extended elevator. (See description on page 405.)

The reaper-binder was altered in an ingenious way for cutting, lifting, and delivering the fodder. The principal alterations were the removal of the knotter and its replacement with a pair of canvas rollers, and the raising of the reel to deal with a tall crop.

Plate 180.

A Closer View.—The lorry is attached to the reaper and the motive power is supplied entirely by the tractor.

The 10-20 tractor, with a power take-off to the reaper-binder, besides supplying the draught power, provides the energy for cutting the sorghum and lifting it on to the lorry alongside the machine, and on which a hurdle had been fitted on the off side. Across the lorry table top flexible wire ropes are laid to facilitate unloading the fodder into the trench.

To synchronise the cutting, elevating, and loading, the engine of the lorry is switched off as soon as it is drawn alongside the reaper-binder, and a towing chain passed from the scraper bar of the engine to a back shackle of the lorry spring.

As soon as one lorry is loaded, another takes its place; the first proceeds under its own power to the point of delivery at the trench side. By keeping this sequence, a load—about a ton in weight—is trenched every 15 minutes.

This year, sorghum on Condamine Plains made extraordinary growth. A stand of more than ten feet high was obtained; consequently, it became obvious that the crop would be very difficult to harvest if it were to be cut for ensilage, as the use of the ordinary binder was out of the question. The difficulty, however, was overcome ingeniously by Mr. J. Eggleston, who is in charge of the farm operations on Condamine Plains, and who contrived a machine, with an ordinary reaper-binder as the chief part, to harvest the crop cheaply and, except for the height of the cut, very efficiently.

Plate 181.

Delivering the Cut Sorghum at the Trench Side.—To pull the load into the pit, the cables laid across the floor of the lorry before the load is placed on it are passed over the top of it and attached to a tractor. (See Plate 182).

From the original reaper-binder, Mr. Eggleston removed the whole of the binding gear. Above the ordinary canvas elevator an extension elevator was placed, which works with a pair of ordinary binder canvases. The beater reel was heightened and the main frame extended, so that crop stalks as long as seven or eight feet could be harvested without difficulty. But even with this extension, it was found that a large proportion of the Condamine Plains crop was too high for the machine, so the cutting knife had to be lifted from the ground as far as practicable. The wheel drive of the original reaper-binder was removed. For operating the improved machine, power is supplied from a tractor by an ingenious transmission device. The tractor also pulls a lorry attached to and alongside the reaper, the pull being by a chain from the tractor scraper bar, through a D, to the offside back spring shackle. The lorry engine is de-clutched and the motive power supplied entirely by the tractor, so that the lorry must keep its position in line with the elevator on the reaper. One man steers the lorry from the side near the tractor to keep it running in its correct alignment. Another drives the tractor, and two other men remain on the lorry to receive and place the sorghum stalks delivered from the extension elevator. To the lorry top, or floor, a 2 ft. extension has been fitted on the side further from the reaper, and on this an inclined batten frame has been built.

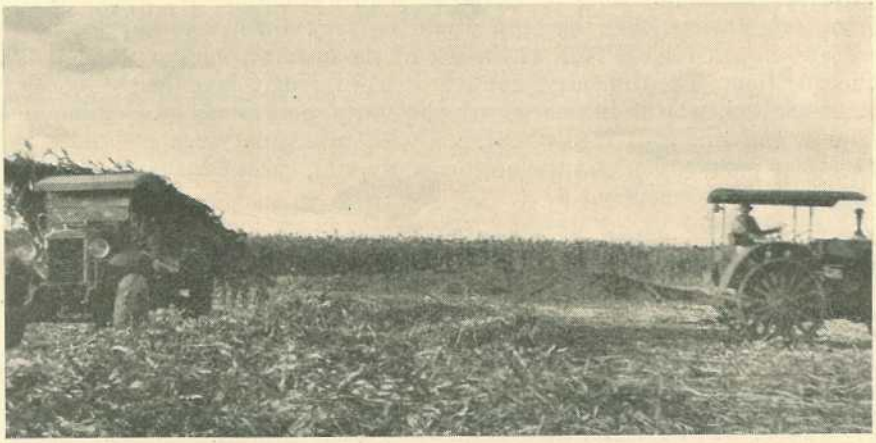


Plate 182.
TRACTOR READY TO PULL THE LOAD FROM THE LORRY.

By this contrivance, the lorry is loaded with a ton of sorghum in 15 minutes, and is then driven to the silage trench, its place being taken by a second lorry similarly equipped.

The trench silo is filled from both sides alternately. To off load, two light flexible steel cables are laid across the floor of the lorry before it is loaded. When the load is to be dumped into the pit, the cables are passed over the top of it across the trench and fastened to a tractor, which, with a movement of a few yards, pulls the whole load into the excavation. The cables are then disconnected and the lorry returns to the reaper for its next load. The operation is repeated with the second lorry, and thus the reaper keeps two going continuously. Odd stalks out of position are raked by the driver of the trench-side tractor, who has a

Plate 183.
DUMPING THE LOAD.

few minutes between loads to do this. As each layer of sorghum is laid the length of the trench the tractors are run over the sorghum to pack it down tightly.

The trenches—about 60 feet long, 12 feet wide, and 9 feet deep—were excavated in two days by four men with two tractors, a plough, and a scoop. One tractor was used for ploughing, and the other for pulling the scoop. The spoil was conveniently placed for use in forming a mound on top of the sorghum "filling" on completion of the job. It is estimated

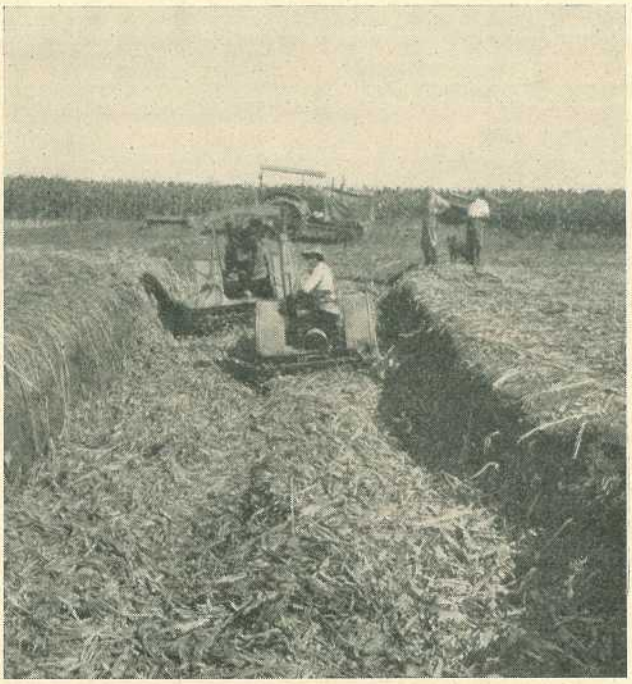


Plate 184.

A Partly-filled Trench.—The tractors traversing the trench to consolidate the dumped sorghum.

that each trench contains from 100 to 120 tons of ensilage. Scoops were used again to cover the filled trench with soil, the earth being hilled at each end of the trench and then pulled over its whole length with a small scraper scoop attached to a long cable from a tractor. When filled and covered, a mound 6 to 7 feet high was formed on top of the trench, covering rather more than its full length, but as both ensiling material and soil settled the height of the mound was considerably reduced.

The sorghum crop on Condamine Plains was planted late in January, and it was considered the best crop of its kind ever grown on the property. It averaged at least 20 tons to the acre—10,000 tons of excellent fodder from 500 acres. At maturity the crop was very sweet and juicy, with heavy seedheads well filled. It was impracticable to conserve more than a very small proportion of the crop as ensilage, and the great bulk of it is being used for feeding and fattening stock in the paddock.

Plate 185.
The Trench Nearly Filled.—The "packing" process continued.

Plate 186.
A Few More Loads to Top Off.

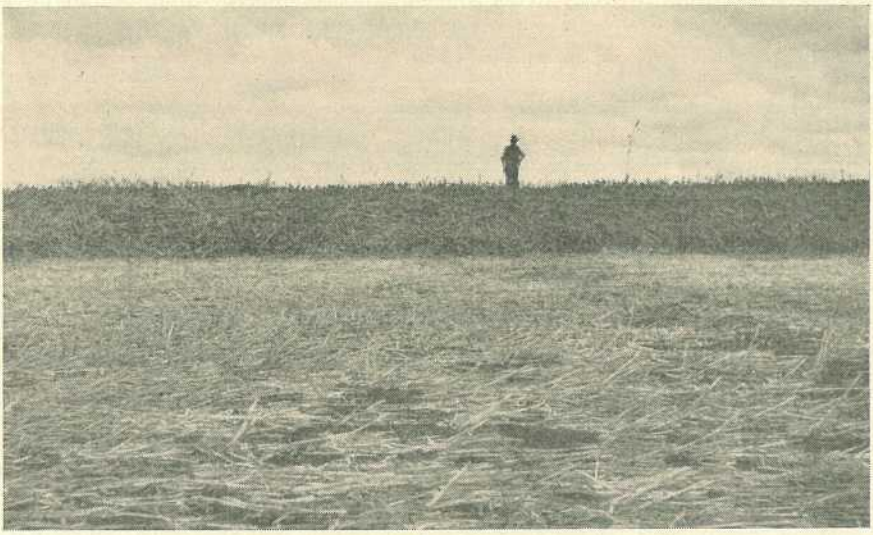


Plate 187.

The Job Finished.—After filling the trench, soil—spoil from the excavation—was scooped over the sorghum stalks to a considerable height, completely excluding air from the ensiled material. The man standing on the top of the bank is 6 feet tall. The mound of soil, high enough to allow for subsidence, is cambered and banked well beyond the edge of the excavation.

Plate 188.

A Mob of Forward Feeders on Condamine Plains.—These cattle were topped off on sorghum, other fodder crops, and improved pastures, and were sold on the property as fat stock, at a highly satisfactory price.

The harvesting plant employed, especially the ingenious reaper-binder adaptation, proved to be remarkably economical in its operation, as well as a great saver of time and labour. The actual cost of trenching the sorghum worked out at 4s. 8d. a ton.

Stock-fattening on the Darling Downs.

The fattening qualities of sorghums—saccaline, feterita, and wheatland milo—were demonstrated last year in the Pittsworth district. On 80 acres of crop, 1,100 sheep were grazed for five months, and they fattened during that period.

Southdown-merino crossbred lambs, sold in drafts five weeks and later after weaning, realised 24s. 6d. a head.

So far, two drafts of fat cattle which had been running on sorghum and green crops throughout the winter have been turned off Condamine Plains. The cattle, when turned on in May, were in poor condition. Despite an abnormally wet winter and the consequent deterioration of much of the sorghum, they topped up well and brought good prices—around £10 a head—when sold on the property. The sorghum was fed off by subdividing the paddocks with an electric fence, and afterwards the cattle were moved to a bigger area to graze on the broken-down sorghum crop, with access also to green feed. The 500 tons of trench silage made from the sorghum remains untouched.

It is considered that the system of cattle-fattening now practised on Condamine Plains has a definite future and its general adoption on a large scale is practicable, particularly at the present time of necessity for increasing beef production. The extension of cattle-fattening on the Darling Downs, however, will depend a good deal on the establishment of a store cattle market at some convenient centre, where fatteners in a small way could obtain stock in numbers in accordance with the carrying capacity of their holdings. Such a market would be of advantage to breeders as well, for they would be able to produce more stock for sale to graziers specialising as fatteners.

PRICE INSURANCE FOR FARM PRODUCTS.

Here is a new idea—or an old idea with a new application. In the course of the current campaign for placing agriculture in Britain on a firmer foundation, the British Government has decided to provide further assistance to the land industries by applying the principle of price insurance to sheep, barley, and oats.

The British Government's "new deal" is not intended to guarantee a profit to farmers; it is designed to insure farmers against what is termed "substantial loss," to improve and maintain the fertility of the soil, and to obtain an all-round improvement in the economic position of the industry. In defining the principle of price insurance, it was made clear that it is not a "guaranteed price," which would mean, obviously, that if a guaranteed price were granted, farmers would enjoy a degree of security which Parliament has not given to any branch of industry.

On the other hand, "price insurance" means that, at the worst, the prices a farmer would receive will not be allowed to fall so far as to involve him in a substantial loss on the working of his enterprise as a whole. Also, by it the fear that an unforseen drop in price of one commodity may eat up all the profits of the farm would be removed from the farmer's mind. Price insurance would enable him to look ahead and plan his production in such a way as to accord with the real needs of his land and maintain its fertility and productivity. That is the real insurance which agriculture needs, and it will be interesting to watch this new plan to see how it works out in actual practice in Great Britain.

Fruit Packing Instruction.

J. H. GREGORY, Instructor in Fruit Packing.

NUTRITIONAL knowledge emphasises the necessity of correct diet. The chief essentials for a correct diet are fruit and vegetables. To win popular favour, fruit should be presented for sale in the best of condition. Most fruits marketed in Australian cities have to be conveyed long distances. To avoid damage in transit, right packing methods have to be adopted by producers. To assist them in producing good packs, the Department of Agriculture gives free packing tuition to all growers who apply for it. In addition, the Department, in conjunction with the Department of Public Instruction, conducts classes for school children in most Queensland citrus-growing districts, in the South Coast banana-growing districts, the Stanthorpe deciduous fruit district, and the tomato-growing areas near Brisbane. Instruction in packing other fruits is given as required.

Lessons to children cover the theory and practice of marketing. Pupils 12 years and over receive instruction, which may be spread over two years. While not being experts at the end of their period of tuition, the children are able to master the principles underlying modern methods of packing, which may be afterwards applied with good effect in practice.

The first lesson of the series consists of an explanation of how and why it is necessary to pack fruit correctly. This is followed by visits to some nearby farm, where the children are shown how to pack consignments of fruit for market.

Many growers show a fine spirit of co-operation by providing fruit as well as facilities for the use of the classes. On some occasions, over 30 cases of fruit have been packed during a lesson, and in the ten years of continuance of these packing classes no complaint has been received as to the condition of the fruit on arrival at the market.

The real benefit of this tuition to the children can be consolidated by parents encouraging them to pack at home. At the same time, it is advisable that they should not be allowed to acquire speed in packing at the expense of efficiency. Experience in packing correctly at all times is the chief desideratum in home packing. By guiding the young people in this way at the beginning, doing the correct thing will become customary at all times.

The work of the fruit packing section of the Department covers a wide range. Investigation into storage and transit of all fruits, type of cases, efficiency of packing materials, design of case labels, and investigation into and advice on all marketing problems is obtainable free by growers on application to the Under Secretary, Department of Agriculture and Stock, William street, Brisbane.

The assistance given by the Department of Public Instruction, the Sub-Department of Forestry, school teachers, individual growers, and the Committee of Direction of Fruit Marketing in the work of improving the methods of marketing Queensland fruits is evidence of the truly co-operative spirit which animates all concerned in an excellent service to the fruit industry, and, therefore, to the State.

Plate 189.

Banana Packing Instruction, Tallebudgera State School.—Removing the "hands" from a bunch of bananas.

Plate 190.

"Dehanding" at the Ingleside State School.—Showing the correct angle to hold the dehanding knife to avoid damage to the bananas underneath.

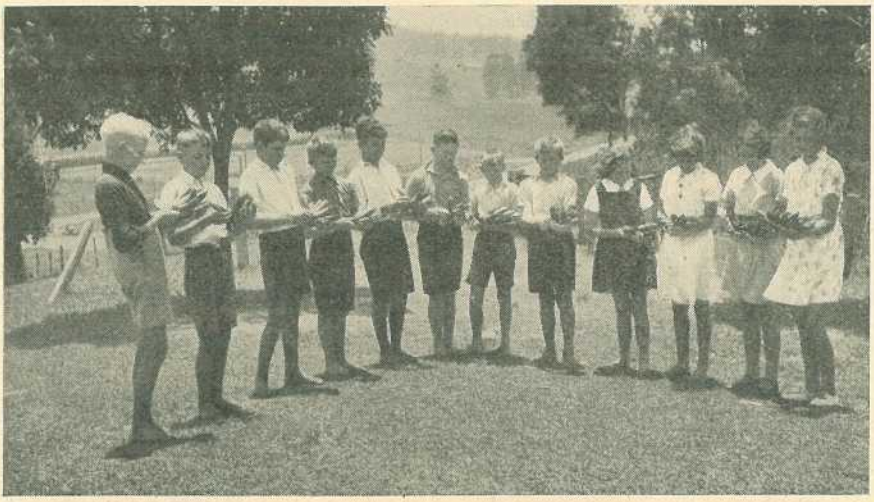


Plate 191.

Applying Principle in Practice.—The children at the Beeches State School practice removing correctly the "fingers" from the hand to avoid wrenching the shank and so causing black end.

Plate 192.

Packing the Fruit.—Note how the weight of the hand is supported on the forearm of the packer.

Plate 193.
AN INTERESTED CLASS AT UPPER CURRUMBIN.

Plate 194.
THE FINISHED CASE.—The work of the fruit packing class at the State School, Currumbin.

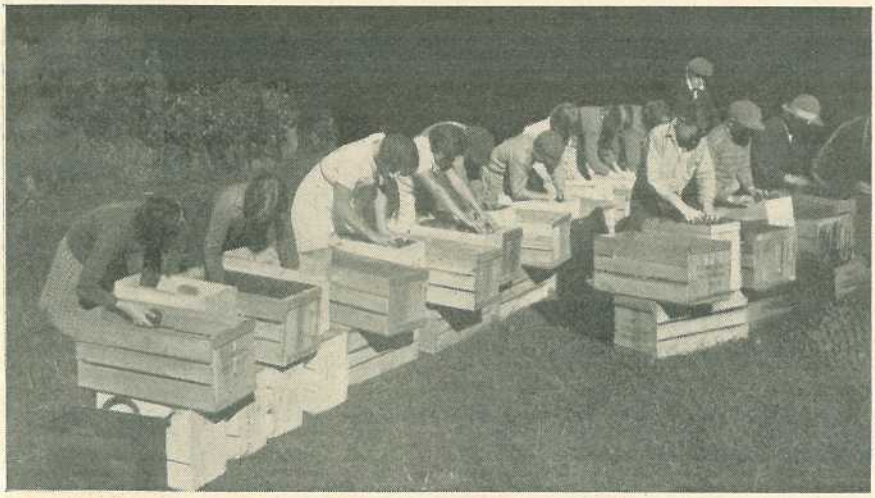
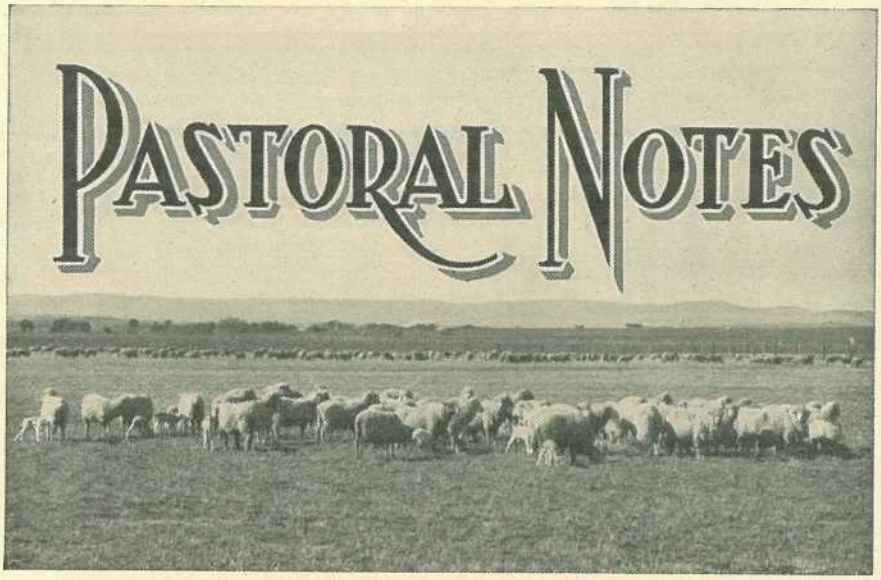


Plate 195.
Woombye Scholars Hard at Work.

Plate 196.
At the End of the Lesson.—The citrus fruit packing class at Montville State School.



The Effect of Seasonal Conditions on Sheep Parasites.

SEASONAL conditions must be taken into consideration when attempting to protect sheep against likely losses from blowfly strike.

If spring rains occur, resultant warm, moist conditions may be conducive to a big increase in flies. Fresh green vegetation, springing up after rain, is likely to cause scouring in flocks in localities in which those conditions prevail. Graziers who benefit by spring rains may, therefore, expect trouble amongst their sheep with wool sufficiently long and, probably, dirty.

To treat the odd sheep in a flock is only putting off the evil day, and much greater benefit will follow the effective treatment of the whole mob. Shearing is a great protection, but as this is only an annual job, the long interval between shearings must be considered. In places where dipping for lice and ticks is necessary, it has—if a good arsenical mixture is used—a most protective effect on the sheep, besides killing many of the flies. Dipping, from this point of view, is most satisfactory when the sheep are carrying at least six weeks' growth of wool. Crutching is a sanitary and useful method likely to give some protection against fly strike, but, as it does not kill the pest, the protection will be of short duration in a bad fly season.

Jetting with a regulation ·8 per cent. arsenical mixture will not only protect the sheep from maggots, but also will destroy large numbers of flies which suck the poisonous moisture from the wool. Because of the strength of the mixture, the wool surrounding the usual places of attack will carry arsenic in sufficient quantity for some weeks to kill any maggots which may be deposited after jetting. Jetting does not prevent

strike, but will destroy the maggots before they do harm to the sheep. The important point is for the flock owner, where early storms are experienced, to apply his favoured method of protection to all his sheep as soon as convenient.

The same seasonal conditions are also conducive to an increase in internal parasites. The worms which usually cause trouble in a flock become numerous while the sheep are still doing well on fresh green feed. Consequently, the risk of pasture contamination is serious. When the grass becomes dry and less nutritious as the season advances, the wormy sheep will suffer severely, while heavy lamb losses may be expected. Early drenching for the control of stomach worms will do much to protect the sheep. Where necessary, drenching should be continued at monthly intervals.

UNIFORMITY IN FAT LAMBS.

One of the greatest hampering factors in the fat-lamb raising industry is the lack of the right type of crossbred ewe. In fat-lamb raising in Queensland, a beginning has often to be made with the Merino ewe. The type chosen should be of the large-framed, strong-woolled kind. On ewes of this type, long-woolled rams—such as the Romney Marsh, Border Leicester, or Lincoln—should be used. The ewe progeny of this mating should be reserved as future breeders in the fat-lamb producing flock. To produce the most desirable lamb at an early age, the use of Southdown, Dorset Horn, or Shropshire rams on these crosses is advised.

Pure Corriedale ewes make excellent mothers for the early fat lamb.

Time is saved and impetus is given to the fat-lamb industry when farmers acquire ewe weaners of the right crosses. It is always a pity to see these potentially valuable breeders slaughtered.

SHEEP DIPPING.

The only known method to combat lice and ticks (ked) in sheep successfully is to dip. A preparation of proved efficiency should be used. If a powder dip is chosen, great care should be taken in the mixing. The powder in small proportions should be mixed with water and stirred until the consistency of an ordinary mustard mixture is attained. When the whole of the powder necessary to charge the bath is so mixed it may be added to the full quantity of water in the dip. This should be done overnight.

It is necessary to follow carefully the directions as to quantities given by the manufacturers. Sheep get most benefit from dipping when a month to six weeks off shears. Never dip sheep when they are hot or thirsty. For the job, avoid, if possible, extremes of heat and cold. Let the sheep drain thoroughly in the shade, if practicable. Treat the dipped sheep gently and avoid driving them for any considerable distance.

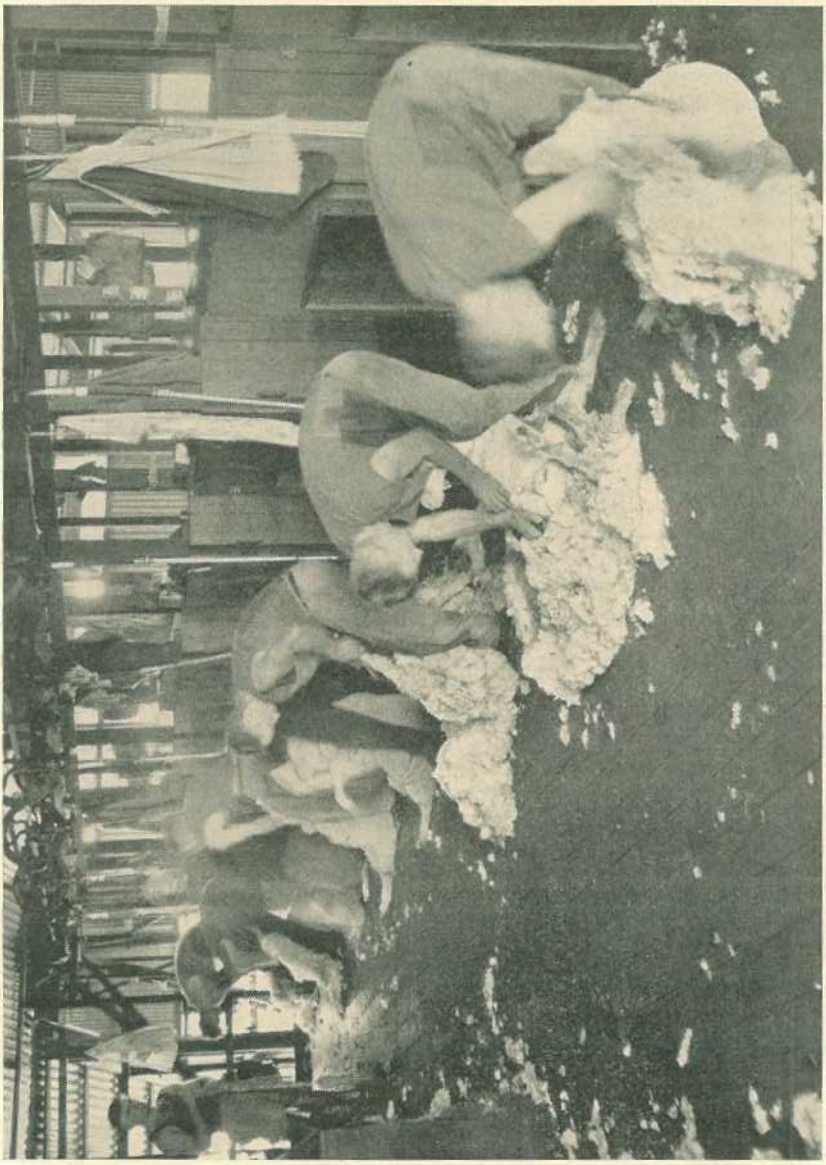


Plate 197.
ON THE SHEARING BOARD AT NORTHAMPTON DOWNS, CENTRAL QUEENSLAND.

WHEN BUYING FLOCK RAMS.

Even in these more or less enlightened days too many graziers still hold the opinion that practically any flock rams will do, so long as they are pure merino and cheap enough. No greater mistake could be made in the breeding of sheep. The ill-effects of such a policy are lasting.

In the selection of rams for a certain line of ewes, familiarity with the type and qualities of the latter are essential.

A grower without the necessary knowledge to successfully "nick" the sexes would be well advised to employ a man fully qualified for this important work.

Violent contrasts in the types of ewes and rams should be avoided. For instance, if a grazier has a medium flock of, say, 64's quality, and it is desired to strengthen the clip somewhat, it is not advisable to join the strongest of merino rams. This is an attempt to do in one year something which should take not less than four years. Breeding for an alteration of type should be gradual.

Rams selected for a certain line of ewes should be slightly stronger in fibre than the ewes with which they are to be joined, and, further, should be specially selected to rectify any pronounced fault in the ewe flock.

A guinea or two is neither here nor there in the acquisition of suitable flock rams.

MERINO TYPES TO SUIT COUNTRY AND CONDITIONS.

In merino sheep it is not always advisable, or even possible, to breed the type one would wish. To be successful, a farmer should realise that the type should be chosen to suit his country and local conditions. For instance, it should be obvious that the sheep carrying the clothing wools of Western Victoria would prove a failure in the western districts of Queensland.

In selecting a type, the first consideration should be constitution. In the West sheep frequently have comparatively long distances to go to water. A sheep then should be introduced that is fitted by nature to withstand this hardship. Judged from a financial point of view—and, after all, everything practical in the industry comes back to a matter of pounds, shillings, and pence—consideration should be given to the type of animal which gives the yield per head rather than price per lb.

Having evolved a type suitable to his particular conditions, it is important that the farmer should stick to the stud supplying the rams. It takes a man of experience in breeding to successfully maintain a flock while chopping and changing about from stud to stud.

Pay the price for the better-type rams and, if necessary, pay the right man to select them, having regard to the type of ewes with which they are to be mated.

Milk Fever and How to Treat It.

SINCE the discovery of udder inflation for the treatment of milk fever, this disease has had few worries for the dairy farmer, but it is considered that a few notes on it, describing the precautions to be observed in udder inflation, some of the undesirable consequences that may follow, and recent advances in treatment, may be useful.

Usually the condition has been present some time before treatment is applied, and the affected beast will be down and more or less unconscious.

The udder should be wiped clean with a clean damp rag, and then a clean towel should be placed under the udder to prevent contamination from the soil. The beast should then be propped up on its breast bone in as natural a position as possible, taking care that the hind legs are in a normal position and not causing undue pressure on the udder. In very advanced cases this may not always be possible, but it should be attempted.

Strip the udder of any milk present and then commence inflation with a teat syphon. Each quarter is inflated firmly and the teats are tied off at the bottom with clean tapes to prevent the escape of air. The udder should then be massaged gently to distribute the air throughout the organ. The tapes should be untied about half an hour after they were put on. If no improvement is noted after three hours, inflation should be repeated. The most undesirable after effect that may follow treatment by udder inflation is mammitis. To avoid this the following precautions should be observed:—

(1) The teat syphon used should be sterilized thoroughly before use by boiling.

(2) Take every precaution during inflation that the teat syphon does not come in contact with any contamination; should that happen, immerse the syphon in boiling water before continuing its use.

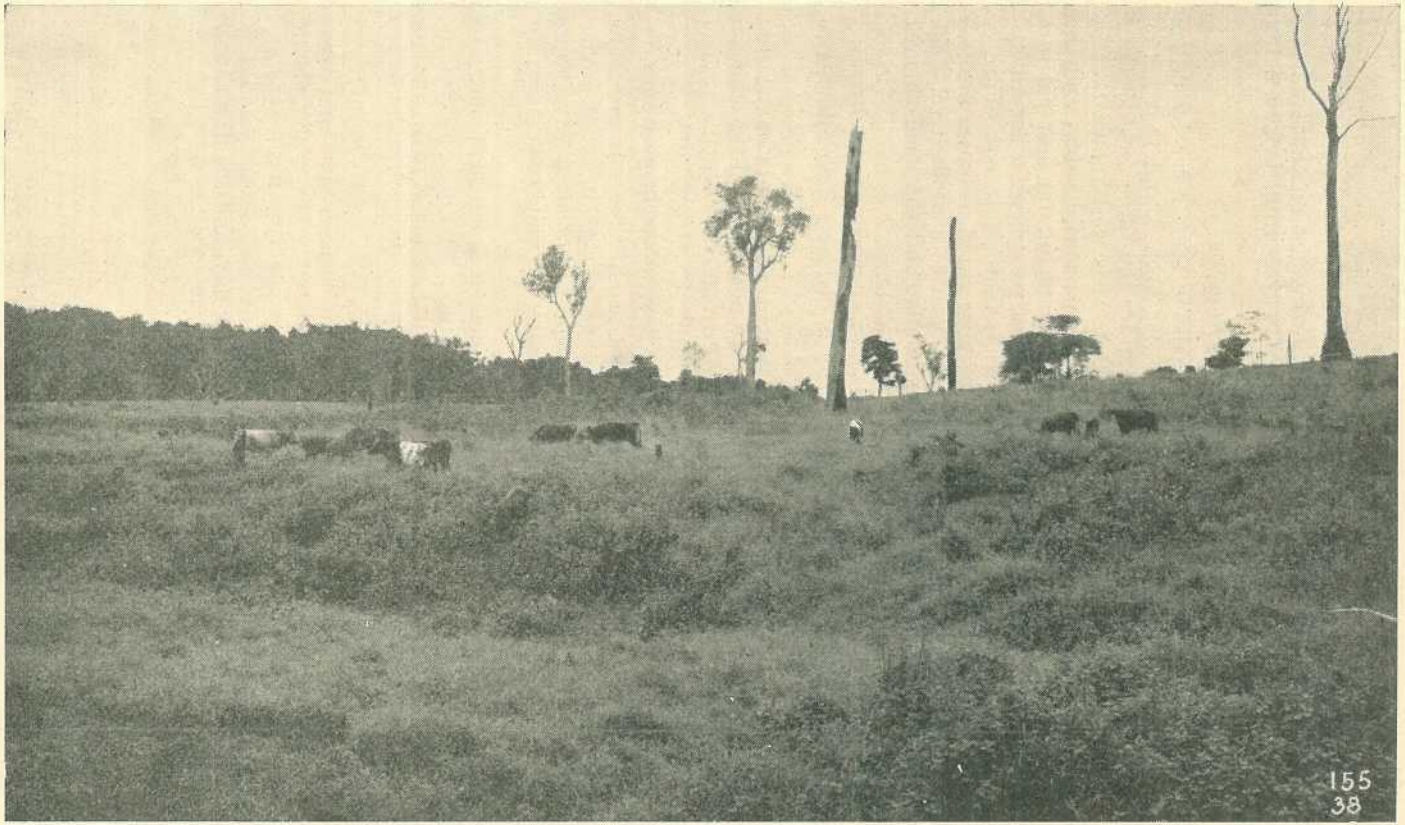


Plate 198.
FROM DENSE RAIN FOREST TO HOCK-DEEP PASTURES.—Newly developed dairy country in the Utchee Creek land settlement area, North Queensland.

These precautions are against the possibility of introducing any infection into the healthy udder.

(3) If a quarter of the udder of a cow being treated for milk fever is affected with mammitis, or has been so affected at any time, that quarter should be the last inflated; and, following use on that quarter, the teat syphon must be sterilized thoroughly by boiling before being used again.

The necessity for such a precaution is obvious.

Despite the fact that most cows treated for milk fever by udder inflation record an uneventful recovery, it has been found that better results are obtained by the subcutaneous (under the skin) injections of a substance known as calcium boro gluconate. It is well known that in milk fever the calcium content of the blood drops considerably, and the injection of calcium boro gluconate aims at restoring the lost calcium balance. In addition to being a more convenient treatment, other advantages it possesses over udder inflation are that there is no risk of introducing or spreading mammitis, recovery is more rapid, relapses are less likely to occur; and also the method may be used as a preventive. The drug is put up in convenient form commercially, and the local chemist will be able to advise where to get it.

The drug is usually issued in cartons containing 2½ oz., the contents are dissolved in 10 oz. of hot water recently boiled and then allowed to cool to body temperature before use.

The dose given is sufficient for one treatment, and should be injected under the skin at various parts of the body—do not inject all the solution in one place. The usual precautions are taken regarding sterilization of the syringe and needles and antiseptic precautions at injection.

It has been found that repetition of the dose is rarely necessary.

Some cows are known to be more subject to milk fever than others, and in such cases it has been found advisable to give an injection immediately after calving followed by a second injection about twenty hours later. For these injections, the dose should be half that used for curative treatment.

Whatever the method of treatment adopted, it is advisable to cover the animal with a rug and in no circumstances should the beast be drenched, as, because of the paralysis extending to the throat, the cow is unable to swallow, and any liquid forcibly given may enter the lungs and set up pneumonia, which almost invariably proves fatal.

When the treated cow gets to her feet, it is advisable that some definite form of after treatment should be adopted. The udder should not be touched for at least twelve hours after the cow has risen, and milking "dry" must be avoided. Small quantities of milk should be drawn off at frequent intervals on the following day, and the diet should be restricted.

BOBBY CALVES.

If a substantial and lasting success in the development of a trade in veal is to be achieved, the greatest care must be given to methods of feeding, and the condition in which calves are marketed. The trade has already increased the income of the dairy farmer; hitherto, it has been the practice on many farms of limited carrying capacity to kill all calves at birth.

Some farmers, unfortunately, have made a practice of sending calves to the meatworks as soon as they are born, and that accounts for the high percentage of condemnations, of which the principal cause is immaturity.

The milk of a newly-calved cow is fed to pigs and poultry, and, therefore, is not wasted, but it should be borne in mind that this milk would show a better return if fed to the new-born calf than if fed to pigs. The value of this milk is often not so much as a weight increaser as a preventer of weight loss. This is true of the larger breeds. With the smaller breeds its value is, of course, primarily for growth.

The law provides for a dressed weight of not less than 40 lb., and an age of not less than 14 days.

Condemned calves are a direct loss to the farmer, and they also involve the meatworks in loss on account of wasted effort and loss of time.

Mature veal is a wholesome food article, while immature veal, which has a laxative effect on the consumer, is not allowed on the market for consumption.

This loss, due to immature calves, can be avoided if the calf is fed for a few days on its mother's milk. The calf should weigh 80 lb. or more before being sent to the meatworks. This live weight will give a dressed carcase of approximately 40 lb.

SOME CAUSES OF DIMINISHED DAIRY PROFITS.

It is a mistake to think that higher prices offer the only solution of the dairy farmer's problems. Increased and cheaper production per acre also is of importance. Better methods of management, and the cutting out of all waste can do much to make dairying profitable. Sick and low-producing cows are among the biggest charges in the profit and loss account of every dairy farm.

It is very important, too, to guard against disease infection—especially mammitis and other disorders that spread rapidly through a herd.

By isolation and careful management, it is possible to keep dairy stock diseases down to a minimum. A close study of feeding methods will help to keep a herd healthy and in good condition, and thus render the animals less liable to contract infectious or other diseases.

The unprofitable cow is one of the dairy farmer's worst handicaps, economically speaking. Frequently she is a cow that pleases the eye, yet deludes her owner into the belief that she is filling the bucket with the rest of the team. Each herd collectively must show profitable returns to the owner, otherwise he soon may be asking his bank for an overdraft. How many farmers can show that they are getting a profit from each cow in the herd?

It costs no more to own, feed, or milk, profitable cows, so it is obviously unwise to persevere with unprofitable ones. The adoption of herd recording, therefore, needs no argument to commend it.

A registered pure-bred bull of known production record is a decided advantage, and farmers who will persist with a bull of unknown quality are certainly risking heavy loss.

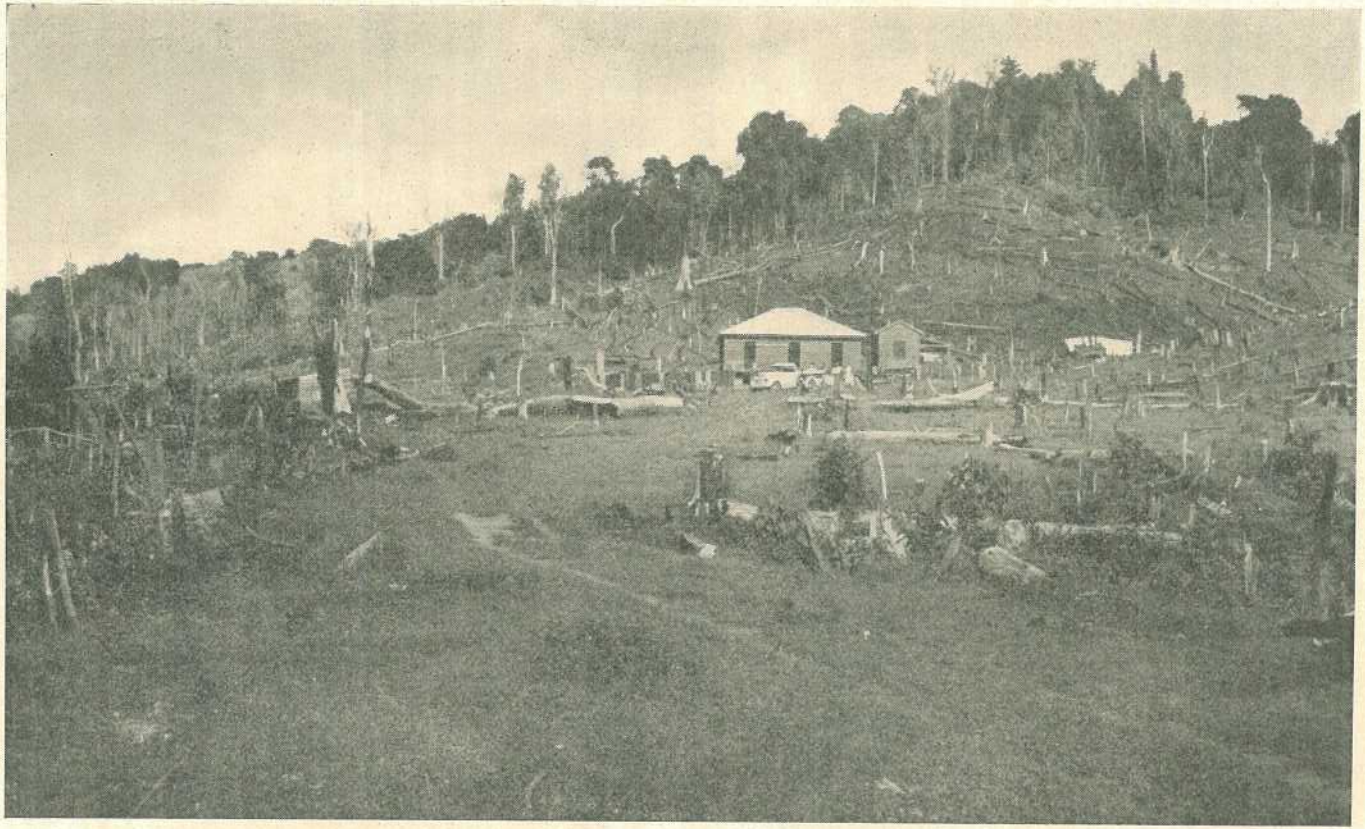


Plate 199.
A NEW BANANA PLANTATION ON THE SOUTH COAST.

Food for Bacon Pigs.

THE Department of Agriculture and Stock offers the following advice to farmers, especially in districts south of Rockhampton.

Soft, Oily Pork.—Although several foods may be the cause of this soft condition, all the evidence points to the fact that the chief cause of the trouble is the feeding of peanuts or meal manufactured from peanuts to pigs which are being finished or topped up for the market. Maize and other grain foods are relatively scarce and high priced, and as peanuts produce particularly fast growth in pigs, farmers are naturally tempted to use them or the meal in place of grain. The position could be relieved if pig raisers would concentrate their peanut feeding on the breeding stock and young store pigs, which will make very good use of surplus peanuts, and then other foods available could be kept for the pigs from the store stage until they reach bacon weights. Separated milk, root crops, pumpkins, lucerne (either as green fodder, hay, or chaff), and small quantities of pollard, meat meal, and pasture can be used to make up good rations in the absence of maize.

Yellowish-coloured Pork.—It is known that the probable cause of this condition is an excess of carotin, a colouring matter in plant life, and which is present especially during the early life of the plant and at the stage when (as in the case of pumpkins) the crop is fully ripe or over-ripe. The feeding of an excess of green wheat, oats, or barley, in the absence of, or short supply of, milk may also be responsible; so also may the continuous use of grass or of lucerne as the principal food.

Low-conditioned Pigs.—Lack of condition is, of course, invariably due to lack of sufficient nutritious food. When pigs are in such a condition they become more liable to infestation by internal and external parasites, which irritate the animal and cause much restlessness, especially at night.

It is better to keep fewer animals and to feed them properly than to attempt the keeping of more than the number for which food is available. It is better, too, to market the pigs when light and prime than to carry them on to heavier weights with loss of condition. Where milk is in short supply, meat meal may be used as a substitute. In all cases, the pigs should have clean drinking water and mineral material like charcoal.

Bruised and Damaged Pigs.—Where pigs are weakened as a result of lack of condition and where they are soft in texture—the result of improper food—they bruise much more readily, and tend to be more discontented. The only way to avoid bruising is to have the animals in the primest condition (not over-fat) and to treat them kindly and not force or beat them when loading or unloading. Avoid kicking them or forcing them through narrow gateways or over rough stony yards.

Over-fat Pigs.—Despite high-priced foods, there is still a proportion of over-fat and very heavy weight stock coming forward. Pigs should not be fed too heavily on grain, but should be kept growing and given abundant exercise in grassy pastures. It is a mistake to keep pigs penned up continuously in small sties and bare yards. The use of flesh-forming foods like milk, meat meal, lucerne, greenstuffs, &c., and mineral matters will tend to overcome any tendency to over-fatness.

SIZE OF BREEDING SOWS.

Size is an important feature in breeding pigs, yet some breeders do not give it sufficient consideration.

One of the chief objectives in pig raising is to get pigs to marketable weights in the shortest possible time. To obtain the desired rapid development and still have a finished pig with a light covering of fat, it is necessary to breed from pigs which are big within their class. That is to say, pork type breeding stock—such as Middle Whites—should be big animals of their category if their progeny are to grow quickly to porker weights. Bacon type breeding stock—such as Large Whites—also should be big of their type if their progeny are to develop similarly to baconer weights. The extreme bacon type of breeding stock could, of course, be used to produce fast growing porkers, but such porkers, under normal feeding conditions, would not be sufficiently mature to give good carcases at porker weights. Breeding pigs should be big within their type.

Size is inherited in pigs as it is in horses, and trying to grow a small type pig into an extreme bacon type is like trying to make a pony into a draught horse.

Observations lead to the belief that size within a breed is frequently lost through mating stock before they are sufficiently grown.

A large breeding sow, provided she is not too fat and clumsy, is more likely to produce a litter of large pigs and to be able to suckle them better than a smaller sow, under similar conditions.

Records of a large number of breeding sows show that sows which are mated when between nine and twelve months old are more productive throughout their breeding career than sows mated earlied or later.

Under Queensland conditions, it is common to see sows mated at five to six months old when they are barely bacon weight, but this practice does not give the sows a chance to develop and become productive mothers.

The best recommendation is to mate sows when they are about nine months old, or when they have reached a live weight of approximately 250 lb. In cases where sows are mated when very young, either by accident or design, they might be given a chance to develop by withholding them from service for some weeks after their first litter has been weaned.

THE PIG MAY RIVAL THE COW AS A MONEY MAKER.

Pig raising is an occupation with no appreciable peak load of work to clash with other jobs in dairy farming, and the by-products—skim milk, buttermilk, or whey—are converted readily into cheap and appetising pork.

On practically every dairy farm in Queensland, pigs have been and always will be a valuable side-line. Too often, however, the pig has been regarded as merely necessary to consume milk or whey which would otherwise be wasted.

Pigs, properly housed and fed, may even rival the cows themselves as money makers.

The open-air or pasturage system, under which pigs are allowed to graze at will in a good, well-grassed paddock, enables the dairy farmer to get the full benefit of his by-products. Where crops and pasturages are available, the young pigs can be reared chiefly on those feeds—the skim milk being reserved largely for the older pigs being topped off in the sty. The young pigs will, of course, go through the topping-off process in their turn.

Cheap and effective shelter can be provided in the pig paddocks. A small shelter can be quickly knocked together by any handy man. It should be strong and easily movable (on skids for preference); and, of course, should be rain, wind, and draught proof.

THE KEEPING OF BREEDING RECORDS.

On every farm where the farmer breeds his own pigs some form of breeding record should be kept, for a record of the productivity of each sow, as well as a herd average, will contain information of much value to the observant breeder. Such records are not difficult to set out, and but a few minutes would be required each week to keep the book up to date. Therefore, a very small expenditure of time and money will ensure a supply of information which may be the means of adding materially to the income from the piggery.

A simple record may be prepared in the following way:—Take an ordinary exercise book or card, and across the top of two facing pages, or the card, rule two lines, between which the breed, name, and date of birth of the sow may be written. Then rule vertical lines to the bottom,

and in the spaces between these lines there should be written such information as date of service, date of farrowing, number born, number weaned, pigs sold or killed for meat, gross returns, and remarks. In the remarks column, a note should be made of any pigs born dead, the causes of losses up to weaning, and deaths after weaning, as well as remarks concerning the type and growth rate of the litter.

When a complete breeding record is kept for each sow on the farm, the owner can, by studying the individual records, note the sows which have had small litters, or have not reared litters well, and so on. Therefore, if a sow's performance is not good, she should be replaced. By doing this, the average for the herd is raised, to the ultimate benefit of the owner.

Another use for records is to compare the results obtained from different foods. By feeding different rations to groups of pigs, and keeping a record of the amount of food eaten and the weight increases made on different rations, the farmer can determine for himself the foods which will give the greatest gain in weight for the least cost or labour.

The useful information to be gained from breeding records does more than merely compensate for the brief time and light expense involved.

MANGE IN PIGS.

Caused by a minute, worm-like mite which lives in the hair follicles and sweat glands of the skin, the condition described as demodectic mange in pigs is one which the pig raiser ought to know all about, because its presence sometimes results in the degrading of carcases, especially of those submitted for export.

The mites are microscopic in size, measuring only one-hundredth of an inch in length.

The lesions of demodectic mange first appear, as a rule, on the snout, eyelids, elbows, and knees. In the initial stages, the areas attacked have a reddened, scurfy appearance with numerous small, hard nodules scattered over them. These become infected with bacteria and begin to ooze pus and serum. The disease gradually spreads over the throat, breast, abdomen, and elsewhere where the skin is soft and thin.

In its early stages, demodectic mange may be checked by frequent applications of crude oil. The disease, however, is very difficult to cope with, and once it appears it is best to get rid of infected animals and to isolate all other animals which have been in contact with them for at least a fortnight. In addition, the sties should be cleaned out thoroughly with boiling water and soda, and then disinfected.

CHANGES OF ADDRESS.

Subscribers are asked to kindly notify changes of address to this Department without delay.

Control of Seedling Pests of Cotton.

PLANTING is a critical period for the cotton-grower, as failure to obtain a reasonable stand at the right time may greatly prejudice the success of the crop. For a number of reasons, planting should take place as soon as temperature and moisture conditions permit. This is particularly desirable in order to avoid severe insect damage, both in the early and subsequent stages of the growth of the crop. The Central district of Queensland, wherein the bulk of the cotton-growing industry is situated, is very prone to hot, dry spells and severe corn-ear worm attacks from mid-January to April. Planting should therefore be completed, if possible, between late September and the end of October, in order that the plants may be well advanced when this period of likely adverse conditions commences. If suitable planting rains do not fall in September and October, the land should be kept in such a condition that full advantage can be taken of any rains which may be received. It is seldom that a satisfactory crop is obtained from plantings made after mid-November, except under especially favourable conditions.

The main pests associated with the early stages of the crop include false wireworms, cutworms, thrips, aphids, jassids, grasshoppers, flea beetles, and corn-ear worms.

In control, two factors are of importance, namely weed growth and the location of the block of cotton. All the pests just mentioned breed up on weeds many of which shoot up with the late winter and spring rains. It is, therefore, essential to maintain clean fields and headlands for at least a month before planting. Sandy soils, if not treated in this way, are very liabe to heavy cut-worm attacks on the seeding cotton. Ploughing, harrowing, and planting should not be carried out in one operation, especially if the land is carrying a growth of weeds. There are years when such a procedure may be quite successful, but on the general run of seasons it does not pay. Weed patches are frequently centres of cutworm infestation, and when they are ploughed under many

of the larvae live until the cotton seedlings are large enough to be attacked. With regard to the location of the cotton fields, it is advisable to plant cotton as far away as possible from weedy fields or crops such as maize, lucerne, and tomatoes. Weeds breed many pests, and the crops indicated often carry heavy populations of corn-ear worm, and lucerne occasionally has, in addition, larvae of the cotton web spinner. If for any reason, such as the drying out of the host plants or disturbance by parasites or any mechanical means, the pest larvae migrate, the nearby cotton may suffer an extensive loss of stand before the pests are checked, unless, of course, the farmer is fully aware of the possibilities of such a position.

Land which has been cropped with cotton for many years should not be abandoned to weed growth, for it is not a costly procedure to effectively grass these areas, and thus remove a potentially dangerous pest-breeding source.

It is recommended that heavier seedling than is necessary to produce a normal stand of cotton should be practised, for it is far better to thin out excess plants than to replant depleted stands. Wireworms are seldom responsible for the loss of a reasonable stand if the heavy planting method is followed.

Where it is necessary to apply chemical control measures against invading swarms of caterpillars. both baiting with the usual cutworm mixture and swabbing the rows of cotton with a molasses-arsenic solution are productive of satisfactory results.

In the swabbing method a solution of the following formula is used:—Lead arsenate, ½ lb.; molasses, 1 gallon; water, 6 gallons. The lead arsenate and molasses are mixed separately in water, then one added to the other, and the whole made up to six gallons and thoroughly stirred.

The fluid so prepared is flipped on to the attacked plants and five or six rows in front of the infested area wiht a whitewash brush or a bundle of straw. One gallon of this mixture will do approximately 300 yards of a cotton row.

Freshly-cut weed hosts, such as the pigweeds and hogweed, dipped in the swabbing solution and spread as a barrier in front of the invading larval swarm make an efficient and cheap bait.

Where the plants are very small, the use of baits is preferable, as in the swabbing method the plants are often badly injured before the larvae are able to obtain a lethal dose of the poison. However, once the plants are infested, swabbing with the sweetened poisoned solution is the most effective way of ridding the plant of the pests.

The cutworm bran bait scattered under and around the plants is a very successful method for combating cutworms and grasshoppers when they become established in the field.

It is strongly recommended that every cotton-grower should have 4 gallons of molasses and 2 lb. each of lead arsenate and Paris green on hand, so as to combat an insect attack as soon as it is noticed. The time required to obtain the materials for baits or swabbing is frequently so long that the damage is done before the insecticides arrive. Hence a supply on hand is a good form of crop insurance. Both the lead arsenate and Paris green are highly poisonous, and must accordingly be used with discretion.

CUTWORMS IN SEEDLING COTTON.

During the spring and early summer months one of the most serious pests of seedling cotton with which the farmer has to contend is the common cutworm.

In years of cutworm outbreaks the loss of stand may necessitate replanting. Replanting is successful only when the soil contains adequate soil moisture, and some time may elapse between a cutworm outbreak and the resowing. Late replant crops are rarely so successful as those sown early, and for that reason precautions should be taken against cutworms to ensure a commercial stand of cotton with the first seeding.

Cutworms have been very destructive to autumn sown crops, such as lucerne, in some districts, and good spring rains may favour widespread moth emergence shortly before cotton crops are planted. Farmers, therefore, should be familiar with the pest and ready to deal with it if necessary.

The cutworm—the larva of a dark-brown moth—is a stout, soft-bodied greyish-brown to greyish-green caterpillar growing up to 1½ inches in length, which feeds principally on low-growing weeds. When these food suppiles are disturbed in any way, the caterpillars may migrate to nearby cotton fields or, if already in the paddock, they may damage the germinated cotton. The pest feeds at night and normally attacks the stem just above the ground level.

Cutworm losses in cotton may be considerably reduced by a good cultural system. Thorough ploughing, in which weeds are destroyed completely, is necessary. Patches of weeds missed during ploughing are frequently the centre from which extensive cutworm damage may radiate. Ploughed land should be kept free of weeds for at least a month before the planting, which, if the rains are suitable, will be carried out between mid-September and mid-October. Early ploughing is, therefore, required. After planting, weeds should be kept in check.

If weeds are ploughed under immediately prior to planting, the risk of cutworm injury is increased greatly, for many of the eggs and larvae on the weeds will survive and attack the cotton seedlings.

Virgin land. or Rhodes grass paddocks which are being prepared for cotton, usually contain little weed growth, and this, to a great extent, minimises the risk of cutworm injury. Under these conditions, a later planting may be made without incurring severe seedling losses. Even in these cases, however, early ploughing is preferable, in order to ensure the preparation of a good seed-bed, and to allow adequate time for the organic matter to break down.

Where direct control of the cutworms is required, insecticides must be used. The poisoned bran bait method has been tested thoroughly, and is recommended as a reliable control measure.

To prevent the entry of invading swarms, the use of one or more baited furrows is necessary. When the pest is within the field, the bait may be broadcast or applied in lines along the rows of cotton seedlings. If broadcast, about 50 lb. dry weight of bran will be required per acre; if distributed along the rows, 25-30 lb. dry weight of bran per acre should be sufficient for baiting purposes. The formula of the poison bran bait is as follows:—25 lb. bran, 1 lb. Paris green, 2 quarts of molasses, and enough water (2-2½ gallons) to make a friable crumbly mash which can be broadcast without difficulty. The bran and Paris

green are first mixed dry; the molasses is dissolved in the water, and after being mixed the whole is well stirred up to make the mash as required. As the cutworms are night feeders, the bait should be applied in the later afternoon and evening.

HOW TO LIFT OLD FENCE POSTS.

Removing is sometimes a difficult job, and usually means some hard work with a crowbar. A device like the one shown will enable a horse to get an almost vertical

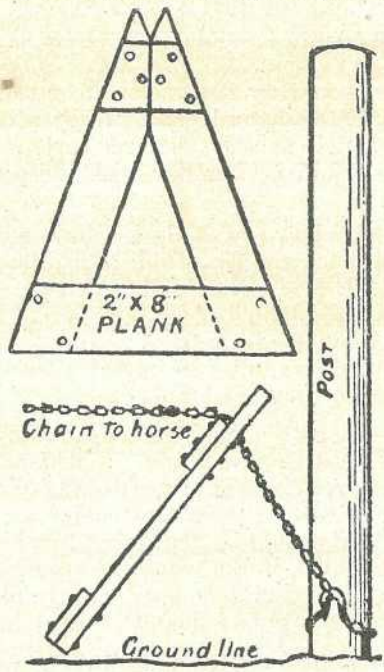


Plate 200.

pull, and in soft ground the posts can be pulled out with very little effort. A bush method of making use of the idea is to obtain a forked branch cut as shown in the sketch.

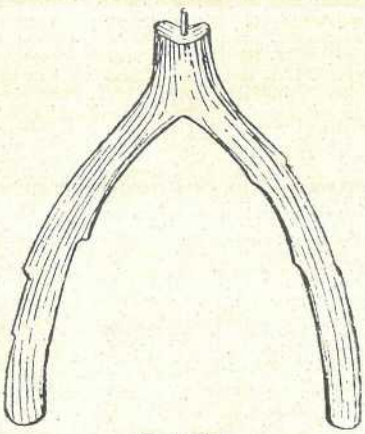


Plate 201.

A notch is cut in the single end, and a piece of round iron, such as a bolt with the head cut off, is placed in the centre of the notch. A link of the chain can be pulled over this to prevent it from slipping when the pull comes on it.

Name and Address.	Name of Hatchery.	Breeds Kept.
G. Adler, Tinana	Nevertire ..	White Leghorns, Australorps, Rhode Island Reds, and Langshans
F. J. Akers, Eight Mile Plains	Elmsdale ..	White Leghorns and Australorps
E. J. Blake, Rosewood ..	Sunnyville ..	White Leghorns, Australorps, White Wyandottes and Rhode Island Reds
R. H. & W. J. Bowles, North Rockhampton	Glenmore Poultry Farm and Hatchery	White Leghorns and Australorps
J. Cameron, Oxley Central ..	Cameron's ..	Australorps and White Leghorns
M. H. Campbell, Albany Creek, Aspley	Mahaca Poultry Farm and Hatchery	White Leghorns and Australorps
J. L. Carrick & Son, Manly road, Tingalpa	Craigard ..	White Leghorns
N. Cooper, Zillmere road, Zillmere	Graceville ..	White Leghorns
R. B. Corbett, Woombye ..	Labrena ..	White Leghorns and Australorps
T. G. Crawford, Stratford ..	Rho-Isled ..	Rhode Island Reds
Dr. W. Crosse, Musgrave road, Sunnybank	Brundholme ..	White Leghorns, Australorps, and Rhode Island Reds
Dixon Bros., Wondecla	Dixon Bros. ..	White Leghorns
Rev. E. Eckert, Head street, Laidley	Laidley ..	Australorps, White Leghorns, and Langshans
Elks & Sudlow, Beerwah ..	Woodlands ..	Australorps and White Leghorns
W. H. Gibson, Manly road, Tingalpa	Gibson's .	White Leghorns and Australorps
Gisler Bros., Wynnum	Gisler Bros. ..	White Leghorns
G. Grice, Loch Lomond ..	Kiama	White Leghorns
J. W. Grice, Loch Lomond ..	Quarrington ..	White Leghorns
Mrs. M. Grillmeier, Mount View, Milman	Mountain View	Australorps, Minorcas, and Rhode Island Reds
C. & C. E. Gustafson, Tannymorel	Bellevue ..	Australorps, White Leghorns, and Rhode Island Reds
P. Haseman, Stanley terrace, Taringa	Black and White	Australorps and White Leghorns
C. Hodges, Kuraby	Kuraby ..	Anconas and White Leghorns
J McCulloch, Whites road, Manly	Hindes Stud Poultry Farm	White Leghorns, Australorps, and Brown Leghorns

Name and Address.	Name of Hatchery.	Breeds Kept.
A. Malvine, junr., The Gap, Ashgrove	Alva ..	White Leghorns and Australorps
H. L. Marshall, Kenmore ..	Stonehenge ..	White Leghorns and Australorps
W. J. Martin, Pullenvale ..	Pennington ..	Australorps, White Leghorns, and Langshans
J. A. Miller, Racecourse road, Charters Towers	Hillview ..	White Leghorns
F. S. Morrison, Kenmore ..	Dunglass ..	Australorps, Brown Leghorns, and White Leghorns
Mrs. H. I. Mottram, Ibis avenue, Deagon	Kenwood Electric Hatcheries	White Leghorns
J. W. Moule, Kureen	Kureen ..	White Leghorns and Australorps
D. J. Murphy, Marmor ..	Ferndale ..	White Leghorns, Brown Leghorns, Australorps, Silver Campines, and Light Sussex
S. V. Norup, Beaudesert Road, Cooper's Plains	Norup's ..	White Leghorns and Australorps
H. W. & C. E. E. Olsen, Marmor	Squaredeal Poultry Farm	White Leghorns, Australorps, Black Leghorns, Brown Leghorns, and Anconas
A. C. Pearce, Marlborough ..	Marlborough Stud Poultry Farm	Australorps, Rhode Island Reds, Light Sussex, White Wyandottes, Langshans, Khaki Campbell and Indian Runner Ducks, and Bronze Turkeys
E. K. Pennefather, Oxley Central	..	Australorps and White Leghorns
G. Pitt, Box 132, Bundaberg ..	Pitt's Poultry Breeding Farm	White Leghorns, Australorps, Langshans, Rhode Island Reds, and Brown Leghorns
G. R. Rawson, Mains Road, Sunnybank	Rawson's ..	Australorps
J. Richards, Atherton	Mount View Poultry Farm	White Leghorns and Australorps
H. K. Roach, Wyandra	Lum Burra ..	White Leghorns and Australorps
C. L. Schlencker, Handford road, Zillmere	Windyridge ..	White Leghorns
A. Smith, Beerwah	Endcliffe ..	White Leghorns and Australorps
A. T. Smith, The Gap, Ashgrove	Smith's ..	White Leghorns and Australorps
T. Smith, Isis Junction	Fairview ..	White Leghorns and Langshans
H. A. Springall, Progress street, Tingalpa	Springfield ..	White Leghorns
A. J. Teitzel, West street, Aitkenville, Townsville	Teitzel's ..	White Leghorns
W. J. B. Tonkin, Parkhurst, North Rockhampton	Tonkin's Poultry Farm	White Leghorns and Australorps
W. A. Watson, Box 365, P.O., Cairns	Hillview ..	White Leghorns
G. A. C. Weaver, Herberton road, Atherton	Weaver's Stud Poultry Farm	Wyandottes, Indian Game, Barred Rocks, Australorps, White Leghorns, Anconas, Rhode Island Reds, Buff Orpingtons, Black Orpingtons, and Buff Leghorns.
T. Westerman, Handford road, Zillmere	Zillmere ..	Australorps and White Leghorns
H. M. Witty, Kuraby	..	White Leghorns and Australorps
P. A. Wright, Laidley ..	Chillowdeane ..	Brown Leghorns, White Leghorns and Australorps
R. H. Young, Box 18, P.O., Babinda	Reg. Young's ..	White Leghorns, Brown Leghorns and Australorps

MARKETING TABLE POULTRY.

To obtain the highest returns, it is necessary to market table poultry in the best possible condition. The term condition covers the state of the feather, flesh, and age of the bird. If culling of the layers is given the attention that it should, little can be done to improve the returns from culled hens.

Experiments have indicated that the flesh carried by a well-fed hen that has finished egg production cannot be increased economically by extra feeding, because the hen that has lost weight through regular laying takes too long to respond. The best practice, therefore, is to market culled hens before they become a mass of pin feathers. This condition applies particularly about this time of the year.

The right marketing of cockerels is of particular importance. This class of fowl sells reasonably well at any stage of development, if it is sold before it reaches what is known as the "staggy" stage. This term is applied to birds commencing to show spur development. To obtain the maximum value for cockerels for table purposes, they should be sold while the spur is still in the bud stage. Many breeders keep cockerels until this stage has passed, and, consequently, do not get top prices.

In the marketing of cockerels, it is well to examine the feather growth; cockerels with a lot of pin feathers do not dress attractively. This applies particularly to birds such as the Australorp, because of the colour of the plumage. Pin feathers on white feathered birds are not so noticeable.

Again, certain breeds are not well-fleshed at all times. This applies generally to the bigger birds—such as the Light Sussex and the Rhode Island Red.

To summarise—poultry raisers with cockerels to market should, firstly, bear in mind the fact that birds with indications of spur development do not realise the maximum value; secondly, that the rate of development of cockerels from twenty to twenty-four weeks of age is not as great as that which takes place earlier, consequently any increase in body weight is at a greater cost; and, thirdly, that it is undesirable to market cockerels carrying a lot of pin feathers, and those that are scraggy and not well fleshed.

CARE OF GROWING PULLETS.

Any special attention or care given to pullets during their growing stage will be well repaid by greater production when they come into profit.

The main points in management which ensure profitable pullets are:—Perching early, separation of sexes, small units, feeding, and sanitation. Pullets should be taught to perch as soon as possible after they have been removed from the brooder. The earlier they become accustomed to perching, the more they spread at night. This prevents crowding and ensures a good air supply for all.

The separation of sexes as soon as the males can be distinguished, gives them a much better chance of making good development. Small units also assist in their development and decreases the percentage of stunted pullets, which is the usual result when large numbers are housed

together. It is advisable not to house more than 100 pullets in any one unit.

Feeding also is important. The ration should be correctly balanced and the birds given as much food as they will eat. The birds should be given as much mash as they will consume in about 20 minutes; if they require more, it should be supplied. It is advisable to give two meals of wet mash, one early in the morning and the other at midday.

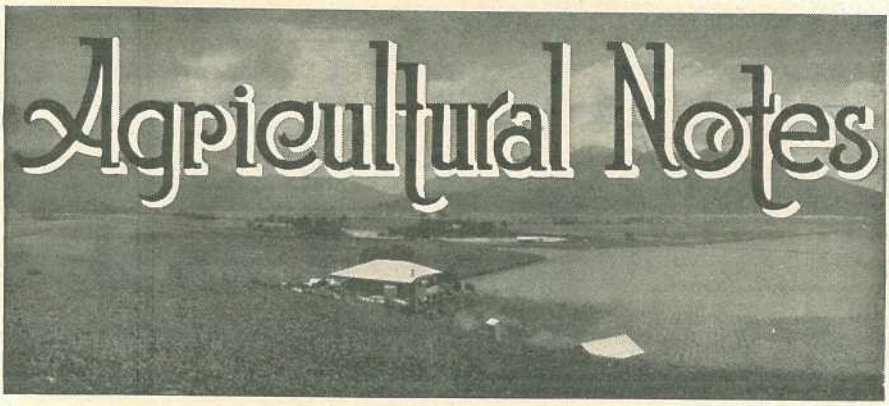
In no circumstances, should wet mash be left lying about, as it sours rapidly and puts the birds off their food. Dry mash hoppers should be kept well filled and always open. The feeding troughs of both systems should be long enough to provide ample feeding space. Lack of sufficient feeding space is a very common error in dry mash feeding. At least one foot of space should be allowed for each ten birds.

Green feed may be supplied with the midday meal, unless the birds have access to a well-grassed run. Wet mash should form the bulk of the midday meal, unless the dry mash method is used. In dry mash feeding, a small quantity of mash mixed with the greens will tend to increase the consumption of greenstuff As an evening meal, the pullets should be given as much grain as they will consume.

Clean, cool, fresh water should always be supplied daily, and the drinking vessels should be kept in a shaded position.

Coarse sand, shell grit, and charcoal should always be available and kept in suitable containers. Each of these materials has an important influence as an aid to digestion and assimilation of food, and is, therefore, invaluable in maintaining health in the flock.

Sanitation also is important and covers the regular cleaning of pullet pens. Wet patches should not be allowed to surround the drinking vessels, and the treatment of perches with creosote to prevent an invasion of blood-sucking parasites should not be overlooked.



Effect of War on Fertilizer Supplies.

THE Director of the Bureau of Sugar Experiment Stations (Dr. H. W. Kerr) advises that, with the entry of Britain and Australia into the European War, there exists a grave danger that adequate supplies of necessary fertilizers may not be available to farmers in Australia: this is, of course, a matter which vitally concerns the Queensland cane grower.

Immediate action was taken to determine the present position in this State, and a conference of representatives of the fertilizer companies and the Government was held to discuss the outlook. It would appear that there is little to fear in respect of superphosphate supplies, while the availability of sulphate of ammonia should meet normal requirements. But the amounts of potash now in stock or on the high seas gives us reason to believe that action should be taken to utilise what is available to the best advantage.

The matter has still to receive the final consideration of the Government, but as a voluntary effort to safeguard the future, the fertilizer distributing companies have agreed upon a plan whereby the sales of potash will be carefully scrutinised during the ensuing months.

The details of this plan will be made available to those concerned in due course: but we take this early opportunity of informing cane growers of the reason why their orders for consignments of potash or mixtures rich in potash may not be filled. The desirability of utilising mixed fertilizers of suitable composition has always been stressed by the Bureau; but in times of emergency—and the present is such an occasion—it may be necessary to restrict these mixtures in a manner which will ensure that limited plant food stocks will be employed for the greatest good of the greatest number.

For instance, all the experiments of the Bureau, to date, have shown no beneficial effects on cane yield from the use of potash in the Burdekin district. Virtually all gains from fertilizers in these parts can be ascribed to the nitrogen of the mixtures. Therefore, we feel confident that the Burdekin farmers can safely restrict fertilizer purchases, for a year or two at least, to meatworks manure and sulphate of ammonia,

together with superphosphate if desired. This will liberate a quantity of potash for growers on soils deficient in this plant food.

Similarly, farmers cultivating the alluvials of North Queensland could confine their purchases to similar materials for a year or two, without impairing crop yields at all. These soils are generally rich in potash, notably where complete fertilizers have been used consistently.

It is for the red volcanic soils of the State generally, and the schist soils of North Queensland, that potash is most necessary. But farmers should not be stampeded into thinking that unless they make heavy applications this year, they may be in trouble a year hence. On the contrary, the fertilizer companies are acting in the best interests of all, and we are all agreed that light annual applications of this plantfood will confer greater benefits than the immediate consumption of all available stocks, with the risk of nothing for next year.

To sum up, we would advise:—(1) Farmers who are cultivating soils for which Sugar Bureau No. 1 Mixtures are advised might well confine their purchases to mixtures containing *no potash* for the present; (2) where Sugar Bureau No. 2 Mixtures have been recommended, employ a mixture with a moderate amount of potash; and (3) where Sugar Bureau No. 3 Mixtures are advised, purchase the fertilizer of this type containing the highest percentage of potash available.

It would not be out of place, at this time, to point out, also, that cane growers could help themselves in respect of sulphate of ammonia purchases for 1940 (should there occur any shortage), by placing as much as possible of their fallow land for 1940 planting under a leguminous green manure crop this spring. Such a policy would ensure a minimum of nitrogen requirements for cane planted next year.

In conclusion, it is sincerely hoped that, as the position is clarified, it may be possible to announce that ample supplies of potash are coming forward from overseas. If such should be the case, the present rationing plan can be suspended. But it must be remembered that this country suffered an acute shortage of potash in the years 1914-18, when fertilizer requirements were nothing like what they are to-day, and it is always better to play safely than to gamble on an obscure future.

POINTS FOR NORTH QUEENSLAND POTATO GROWERS.

Potato planting in North Queensland rarely commences before April, and usually continues until well into May. Because of this, harvesting commences long enough after winter to allow the potato moth to become very active. To prevent damage from this source, great care is required. Effective hilling should be practised during the growth of the crop, and immediately before it is lifted the whole field should be very carefully hilled to prevent infestation of the remaining crop after harvesting has commenced. No way of lifting is completely efficient, as some potatoes will remain partly exposed in the field and thus become a possible source of infestation as harvesting proceeds. Continued efforts to restrict the moth's field of activity is, therefore, necessary and the following additional precautions are recommended:—

1. Do not plant moth-infested seed unless it has been fumigated for the destruction of moths, larvae and eggs.

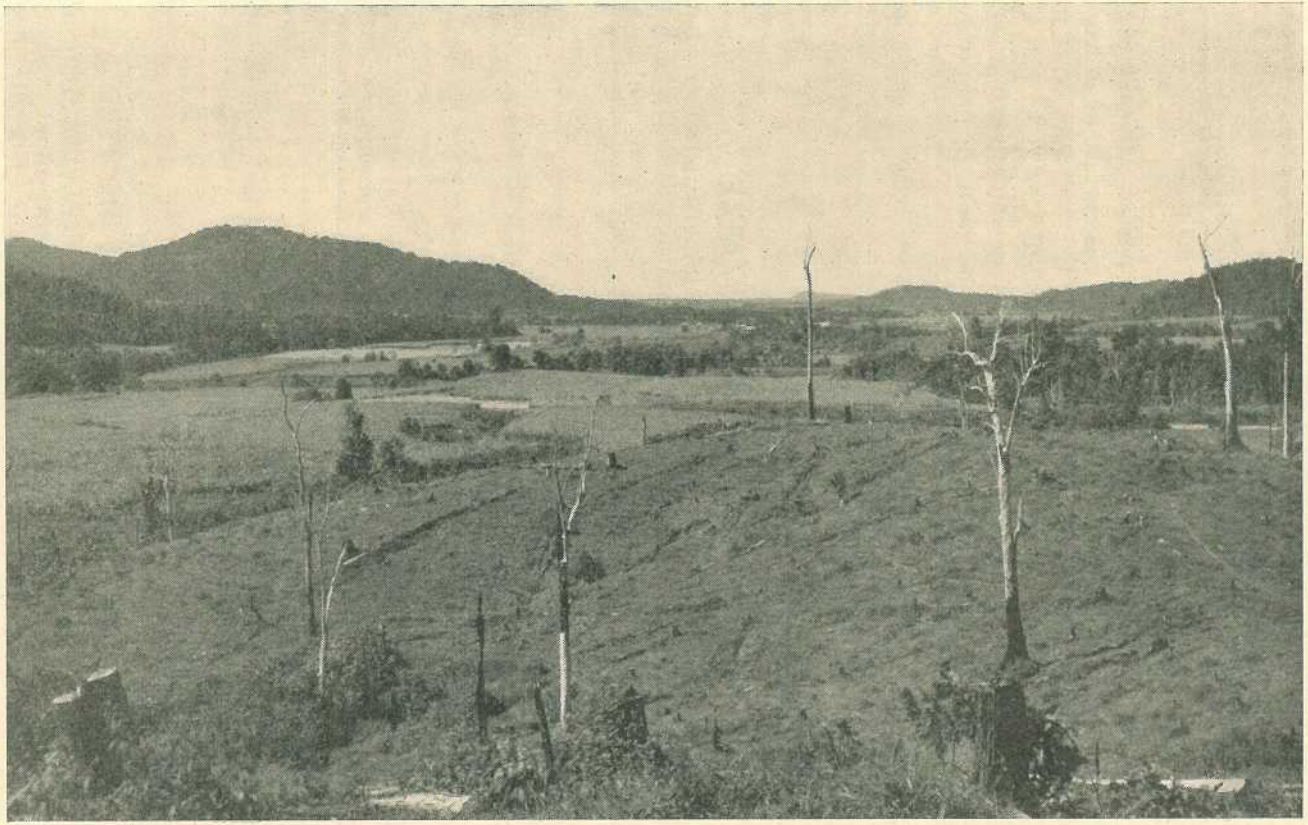


Plate 202.
IN THE RICHLY FERTILE JAPOON VALLEY, NORTH QUEENSLAND.

2. Prepare ground thoroughly before planting so that effective cultivations and hilling can be given.

3. Cultivate and hill after every irrigation, as soon as this work can be done satisfactorily.

4. Plant deeply, not less than 4 inches from the surface.

5. Bag potatoes immediately after digging, sew the tops and invert the bags, thereby making a seal against the moth.

6. Remove the crop from the field as soon as possible after digging.

7. On no account leave potatoes exposed to the surface or in bags in the field overnight.

8. Rake and burn all potato tops after each day's harvest.

9. Sheds in which potatoes are hardened-off should be moth proof.

10. Market the potatoes as soon as possible, and only dig quantities that can be sold without delay.

11. Keep all weeds in check, particularly those likely to serve as host plants for the potato moth.

12. Practise crop rotation.

TREATMENT OF SEED MAIZE.

The difficulty often experienced in obtaining satisfactory crop stands—more particularly in the early sowings of maize because of crows and currawongs developing an appetite for germinating grain and seedling plants—can be largely overcome by adopting the undermentioned pre-seeding coal tar method of seed treatment.

The procedure is as follows:—

Warm a small quantity of coal tar slowly until it tests to a string-like horse hair consistency.

Place the seed maize in a large shallow vessel and wet it with warm water for a few minutes and then drain.

Spread over the warm moistened grain 1½ to 2 tablespoonfuls of prepared tar per bushel and stir immediately and continuously until each kernel comes in contact with the tar and assumes a sooty appearance.

Spread the grain out and expose it to dry.

The addition of a handful of sulphur to each bushel of grain will assist in a smooth run through the planter.

RED STRIPE (TOP ROT) DISEASE IN 1939.

Reports received during the current season indicate that death of cane due to top rot has been rather more prevalent than usual. Such a situation was expected to eventuate, following the generally dry conditions of last spring. Top rot is largely a seasonal disease, and is closely related to the vigour of the crop. During a dry spring and early summer the crops generally are severely checked in growth, and this condition renders them particularly susceptible to top rot with the onset of the rainy season and the commencement of rapid growth.

Generally speaking, the older and more advanced the crop the more resistant it is to top rot, and for that reason autumn-planted cane is much less liable to the disease than spring-planted cane. That is not to say that autumn-planted cane will always escape the disease; if the spring is very dry, or if the moisture-holding capacity of the soil is low, or if the cane is overcrowded, then considerable death may occur in autumn-planted cane. In general, however, the autumn-planted crops escape without very much damage.

There is, of course, a great difference in the resistance of different varieties, and S.J. 4, Badila, and P.O.J. 2878, for example, are much more susceptible than Q. 2, Q. 10, Clark's Seedling, and P.O.J. 2725. Q. 2 is, in fact, highly resistant, and damage in that variety would be rare; odd stalks will be killed, but dead stalks would be numerous only if the variety were grown alongside a badly-diseased field of a susceptible variety.

Overcrowding of stalks also increases susceptibility to top rot, and consequently it is desirable to avoid over-heavy fertilization, particularly late in the season.

Top rot is a very striking disease, and always appears to be causing more damage than is actually the case. The reason for this is that there is always a compensating increased growth of the remaining stalks; in fact, if the death takes place early, say, in January, there is really very little loss, while if death takes place as late as the end of March there is somewhere about 50 per cent. compensation.

—A.F.B., in "The Cane Growers' Quarterly Bulletin."

CANE VARIETY Q. 20 IN THE MACKAY AREA.

At the present time a new variety which was produced at the Mackay Station is undergoing yield trials on several farms in the Mackay area. It is a seedling of Badila. We are now in possession of a considerable amount of information concerning the cane, which is given the serial number Q. 20; the main features are:—

1. Moderately good yields in comparison with the standard canes of the area: appears to be superior in ratoon yield.
2. Good ratooning cane, at least when cut at favourable times.
3. Arrows rarely, and then only late and sparsely.
4. Resistant to downy mildew disease—a very important point.
5. Somewhat inclined to trash binding, but does not become badly trash bound.
6. Rather sparse foliage, calling for close planting to give better coverage.
7. Gives extraordinarily sweet and pure juices during mid-season.

The lastnamed characteristic is particularly interesting. In several juice tests it has shown purities of 95, and it is usually about 2 units better than the standard of comparison in this regard. Mill tests of 18 C.C.S. and better have been recorded.

It is not suggested that this is a cane of outstanding merit, but if observations on the existing trial plots continue to confirm present opinions, the variety will be released for general distribution in the coming spring.

—H.W.K., in "The Cane Growers' Quarterly Bulletin."

Diseases in Tomato Seed-beds.

THE following diseases may occur in tomato seed-beds in Queensland:—Irish blight, target spot, Septoria leaf spot, bacterial wilt, Fusarium wilt, bacterial canker, damping off, and possibly the virus troubles. Growers planting seed-beds at the present time, e.g., those in the Stanthorpe area, are not likely to be troubled with Irish blight, but target spot and collar rot (both of which are caused by the same fungus) may be serious.

The utmost care in managing seed-beds is always justified, for here the whole crop is concentrated into one single patch. As a result of this proximity of the plants to each other the spread of a disease is often very rapid and the effect disastrous, resulting in the loss of several weeks in planting up and the failure to catch the advantages of an early market.

There are three points during the production of tomato seedlings at which some control of diseases may be exercised:

(i.) Before planting seed, by—
  (*a*) Sterilizing the seed-bed;
  (*b*) Disinfecting the seed;
(ii.) At the time of planting, by arranging the seed in rows instead of broadcasting it;
(iii.) After emergence of the seedlings, by dusting and spraying with a fungicide.

Seed-bed.—The placing of a seed-bed on virgin soil is usually sufficient protection against soil-borne troubles other than nematodes, but if there is any doubt about this point, then sterilization should be practised. The two most suitable methods are by fire and by formalin.

Firing.—Brushwood and branches should be laid evenly over the bed and the surrounding margin. The quantity of wood required can

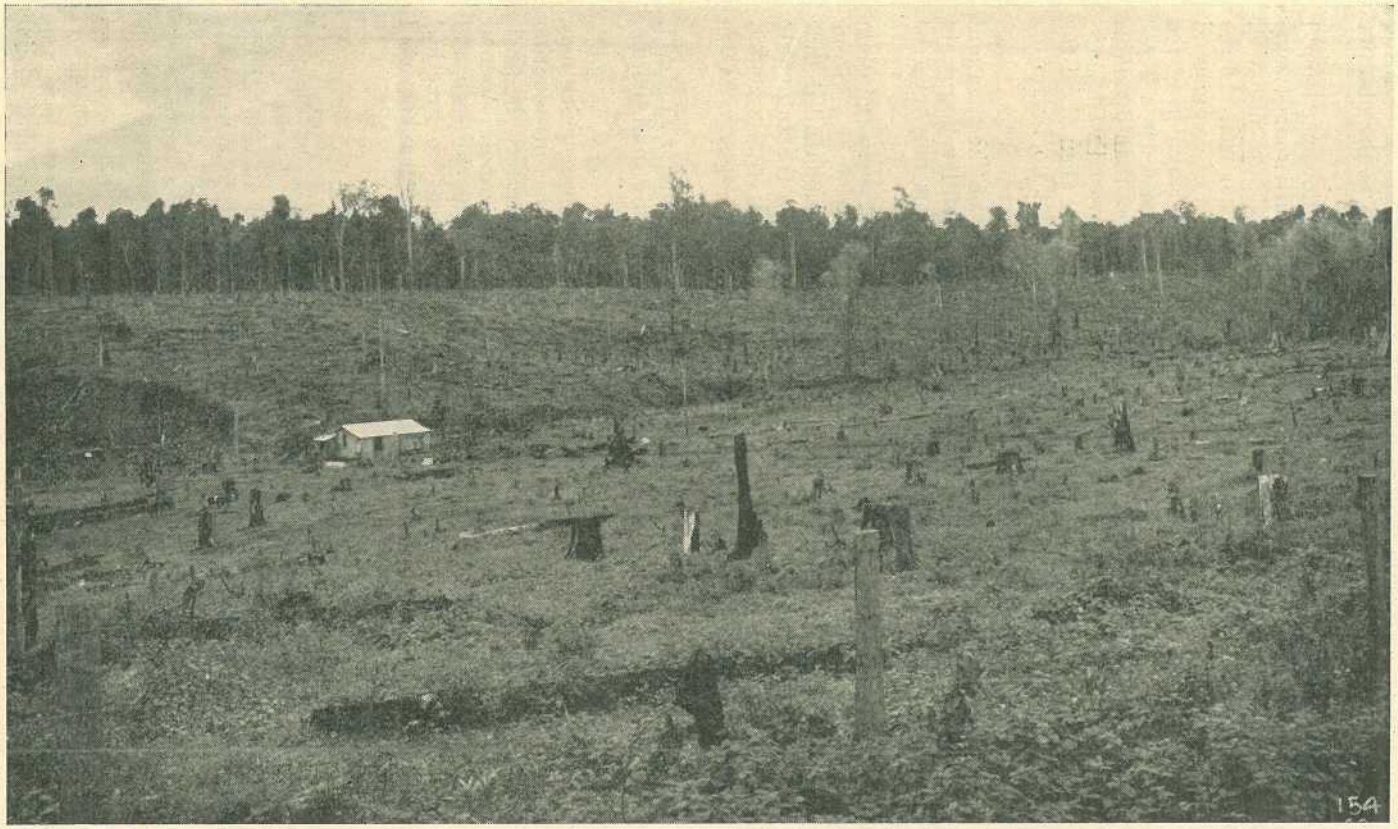


Plate 203.
A Fine Dairy Farm in the Making.—Rich pastures walled in by virgin rain forest, Utchee Creek land settlement area, North Queensland.

be reckoned as the equivalent of a solid layer of about 3 inches thick. The soil should be moist and neither dry nor excessively wet when firing takes place. Where wood is readily available, the fire is the cheaper method.

Formalin.—When using formalin in the seed-bed, allowance should be made for the fact that the seed cannot be planted until some twelve to fourteen days after application of the liquid. The beds are prepared ready for planting, and preferably should be moist but not wet. If the soil is dry use a 1 per cent. solution of formalin (1 gallon of commercial formalin in 100 gallons of water) and apply with a watering can at the rate of 10 gallons to the square yard. If the soil is moist, use a 2 per cent. solution of formalin watered on at the rate of not less than 5 gallons to the square yard. The beds, as soon as treated, are covered with sacking for two or three days to keep in the fumes. They are then aired for a further ten days or until the odour of formalin can no longer be detected, after which they are ready for use.

The target spot organism, which causes a black spot on the stem and may result in the seedlings suffering a collar rot just at soil level, appears to carry over in the soil. Other damping off organisms may also be present.

Seed.—Seed treatment has always been a general recommendation, though only a few growers have made a routine practice of it. In the light of recent observations, however, it is strongly recommended that all growers should treat their tomato seed with a corrosive sublimate before planting. If it is known that the seed has come from a sound, healthy crop, then treatment is not necessary. In most cases, however, the seed source is not known.

Tomato diseases shown to be carried by the seed include Irish blight, target spot, Fusarium wilt, bacterial wilt, bacterial canker, and mosaic.

It must be understood clearly that the action of this corrosive sublimate treatment is to destroy any disease producing organism which may be adhering to the outside of the seed, and so prevent the introduction of a disease into the seed-bed. It does not in any way protect the seedling against a disease which may attack it after it has emerged. A small percentage of the disease organism may be present inside the seed and so be unaffected by the treatment, but this is usually of no practical importance. In the case of bacterial wilt and bacterial canker, seed treatment is the most important method of control.

The seed treatment is summarised as follows:—

The tomato seed is placed in a piece of mosquito netting and suspended in a solution of corrosive sublimate (mercuric chloride), one part to 3,000 parts of water, for five minutes. The seed mass is stirred occasionally with a wooden stick during this period to remove air bubbles. After that it is thoroughly washed in four or five changes of water and dried. It is recommended that the seed be sown immediately after treatment. Corrosive sublimate tablets, with directions for the preparation of the solution, should be obtainable at any chemist.

Planting.—Growing conditions include many factors, of which the more obvious—such as soil tilth and sufficiency of plant foods—are well known to growers. The point for consideration here is whether the seed should be broadcast or planted in rows. In order to control disease better, the latter method is preferable. Distances of about 6 inches

between rows allow easy penetration of the dust or spray to the stems and also prevent the formation of a still, humid atmosphere beneath the leaf canopy, as is found when plants are broadcast.

Spraying.—Regular spraying or dusting with a copper compound is necessary. If using a wet spray, Bordeaux mixture of 2-3-40 strength is recommended. Care should be taken not to spray the seedlings too heavily, as an accumulation of spray liquid in the centre of the plants may result in a burning of the young foliage. In the case of dusts, any of the proprietary copper dusts may be used. Heavy applications of these dusts should not be made on seedlings if much free moisture is present on the young plants, especially if warm weather is likely to follow. Under such conditions, burning may result with either copper carbonate or copper sulphate dusts.

At various times, the grower will have to include in his spray of dust, arsenate of lead and nicotine or nicotine sulphate for insects such as caterpillars and aphids. For tomato mites, a separate dusting with sulphur is the most suitable. Dust mixtures are available which contain the various insecticides in addition to copper compounds.

TABLE BEETS.

The beet will grow well in most soils, but, like other root crops, it does best in a light loamy soil. The soils should be prepared thoroughly and enriched with liberal dressings of well-rotted stable manure or vegetable matter.

Commercial fertilizers may be used, and the Agricultural Chemist advises the following mixture:—

Sulphate of ammonia	1½ to 2 cwt.
Superphosphate	2 to 3 cwt.
Muriate of potash	¾ to 1 cwt.

A complete fertilizer, 2-12-6, also, may be used at the rate of from 4 to 6 cwt. to the acre.

The fertilizer should be applied at the time of thinning if the seed has been sown where the plants are to remain; or otherwise at the time of transplanting. A top-dressing about a month later with sulphate of ammonia at the rate of 1 to 2 cwt. to the acre would be beneficial.

As the seed is usually sown in the field, it is necessary to have the soil in a fine state of tilth prior to planting. The seed is customarily planted in rows about 2 feet 6 inches apart for horse cultivation, or 1 foot 6 inches apart for hand. Six to 8 lb. of seed is usually sufficient to plant an acre, or 1 oz. to every 150 feet. It should be sown to a depth of from ½ inch in heavy ground to 1 inch in light soil. The seed is usually slow in germinating. The distance between plants may vary from 3 to 4 inches, according to variety sown. Thorough cultivation is necessary after planting out, and until the plants are a fair size care must be taken not to injure them with the implements or heavy clods of earth.

Beets should be harvested when of suitable size for market. They are usually washed and tied in bundles of about six. Varieties recommended are—Nonpareil, which has a long oval shape; and Crimson Globe—a turnip-rooted, early beet, suitable for hot districts.

SELECTION OF BANANA SUCKERS.

In planting a new area of bananas it is advisable to make a good selection of suckers. In every banana plantation there are stools which are above the average, and it is from these that growers should select material for future plantings. Some stools are outstanding in growth and quality production. For example, they may have remained free, or nearly so, from borer attack, or they may have benefited from better soil, greater amount of moisture and other conditions in their immediate vicinity.

It is advisable for growers to mark these outstanding stools for use at planting time, noting the quality of the fruit which has been recently cut from them or which they are still bearing. This can be done by placing a stake against the selected stools or some other suitable means of easy identification at the time when planting material is required.

If by selection it is possible to produce a more open bunch of the Cavendish variety, it will be of benefit in so far that the harbourage for skin blemishing insects is lessened, that the bracts are permitted to fall more freely from the bunch, and that individual fingers fruits are more exposed to sunlight—thus ensuring uniform development of the bunch.

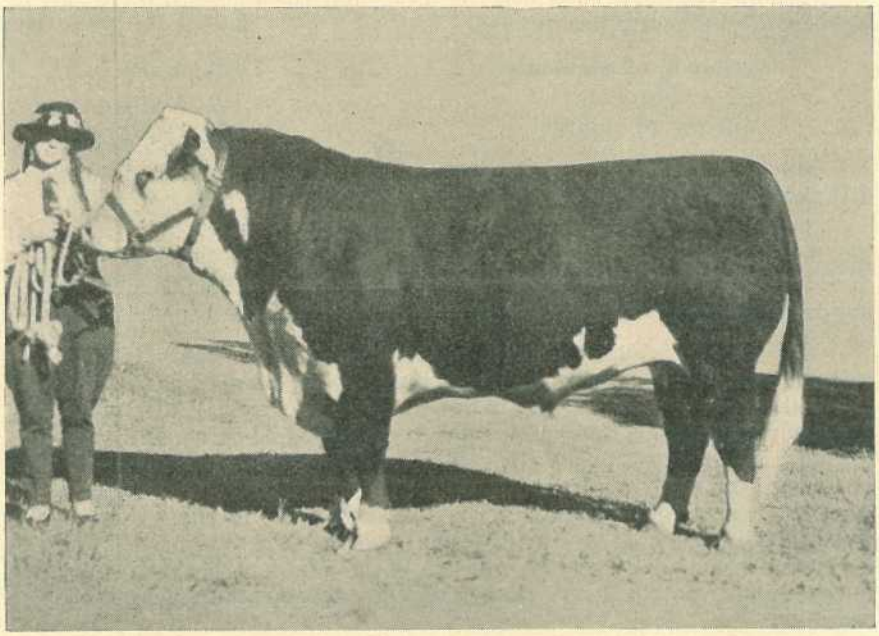


Plate 204.

PARK PRINCE ANXIETY IV.—Champion Hereford bull at the 1939 Brisbane Show, the property of Mr. J. Sparkes.

The Fruit Market.

J. H. GREGORY, Instructor in Fruit Packing.

DURING the last two years seasonal conditions in Queensland have alternated between prolonged dry periods and wet periods. Under these conditions, the maintainance of continuous supplies of quality fruit has been difficult.

A prolonged dry period has followed an unusually wet cold winter. With many fruits now blossoming, it is hard to accurately forecast the prospects for the coming season's crop.

Pineapple growers are still sending fruit too green.

Citrus fruits have been excellent in quality on the Brisbane market, and satisfactory price levels are being maintained.

Custard apples are in short supply and high values are being realised for good fruit.

The continuous dry weather has affected the quality of strawberry supplies.

New season mangoes and cherries will soon be coming on to the market. Mango growers are advised not to send green fruit to market as it soon depresses price levels. For the same reason, fruit which has been bruised should not be sent, also for the same reason.

The following were the ruling market prices during the last week of the month of September, 1939:—

TROPICAL FRUITS.

Bananas.

Brisbane.—Cavendish: Small, 5s. 6d. to 8s. 6d.; sixes, 8s. to 10s. 6d.; sevens, 9s. to 10s. 6d.; eights and nines, 9s. to 14s. 6d.; inferior grades lower.

Sydney.—Cavendish: Sixes, 8s. to 12s.; sevens, 12s. to 15s.; eights and nines, 15s. to 18s.

Melbourne.—Cavendish: Sixes, 9s. to 11s.; sevens, 11s. to 13s.; eights and nines, 12s. to 16s.

Adelaide.—Cavendish: Sevens and eights, 20s. to 22s.

Southern markets report squirter and blackend causing losses and price reductions.

Lady's Finger, 1¾d. to 9d. per dozen.

Pineapples.

Brisbane.—Smoothleaf, 4s. to 7s. 6d. per case; loose, 1s. 6d. to 6s. per dozen; Ripley, 4s. to 7s. per case; loose, 9d. to 4s. 6d. per dozen.

Sydney.—Smoothleaf, 7s. to 10s. per tropical case.

Melbourne.—Smoothleaf, 9s. to 12s. per tropical case.

Adelaide.—Smoothleaf, 10s. to 14s. per tropical case.

Green pineapples are being sent to southern markets to the detriment of returns to growers. This practice is foolish, as it spoils the marketing of a commodity in which Queensland has a monopoly.

Papaws.

Brisbane.—Yarwun, 5s. to 8s. tropical case; Gunalda, 5s. to 6s. bushel case; locals, 3s. to 4s. 6d. bushel case.

Sydney.—4s. to 10s. tropical case.

Melbourne.—8s. to 12s. tropical case.

Custard Apples.

Brisbane.—3s. to 6s. half-bushel.

Monstera Deliciosa.

Brisbane.—6s. per dozen.

Avocados.

Brisbane.—9s. to 11s. half-bushel.

Passion Fruit.

Brisbane.—First grade, 12s. to 16s.; second, 9s. to 11s.

Sydney.—6s. to 14s.

CITRUS FRUITS.

Oranges.

Brisbane.—Small, 5s. to 8s.; choice, 9s. to 11s.

Grapefruit.

Brisbane.—6s. to 9s. bushel case.

Lemons.

Brisbane.—Locals, 7s. to 11s.; Gayndah, 10s. to 14s.

DECIDUOUS FRUITS.

Apples.

Brisbane.—Jonathan, 8s. to 14s.; Granny Smith, 8s. to 14s.; Cleopatra, 8s. to 10s.; Sturmer, 5s. to 10s.; Yates, 10s. to 14s.; Democrat, 7s. to 10s.

Pears.

Brisbane.—Winter Nelis, 9s. to 15s.; Winter Cole, 9s. to 16s.; Packham's Triumph, 9s. to 14s.; Josephine, 8s. to 15s.

OTHER FRUITS.

Tomatoes.

Brisbane.—Ripe, 4s. to 10s.; coloured, 5s. to 8s.; choice coloured, 8s. to 12s.; green, 5s. to 7s.

Sydney.—Cleveland, 8s. to 15s.

Cape Gooseberries.

Bowen, 3s. 6d. to 10s.; Yarwun, 5s. to 12s.

MISCELLANEOUS, VEGETABLES, &c.

Cucumbers.—8s. to 15s. bushel case.

Pumpkins.—4s. to 5s. bag.

Marrows.—2s. to 6s. dozen.

Lettuce.—6d. to 1s. 6d. dozen.

Cabbages.—2s. to 5s. dozen.

Cauliflowers.—6s. to 14s. dozen.

Beans.—5s. to 10s. sugar bag.

Peas.—4s. to 9s. sugar bag.

Beetroot.—3d. to 9d. bundle.

Chokos.—6d. to 9d. dozen.

Celery.—Local, 6d. to 1s. 6d. bundle. South Australian, 15s. to 17s. crate.

Rhubarb.—9d. to 1s. 3d. bundle.

CUTTING TALL-GROWING BANANAS.

The cutting of bunches of tall-growing varieties of bananas frequently presents a difficulty to growers who have not had previous experience in growing these varieties, such as Mons Marie and Lady's Finger.

The following very simple method, and one which can be worked successfully by one man is recommended:—

On the same side of the stem as that on which the bunch is hanging make two cuts with a cane knife, about 5 to 6 feet from the ground. The cuts are made one downwards and one upwards, and should meet, making an angle of about 60 degrees, approximately two-thirds of the distance through the stem, or deep enough to sever the bunch stalk in the centre of the stem. Immediately this is done, the upper portion of the stem with the bunch will not fall suddenly to the ground, but will slowly bear over, and as it gradually comes within reach the bunch is grasped and cut.

The principle of this method is that the soft fibrous tissue of the unsevered portion of the stem does not break suddenly, but because of its flexibility allows the bunch to heel over gradually. The V-shaped wedge also assists in this way: it cushions the lower and upper portions of the plant, and only gives way steadily and partly crushes under the increasing strain as the bunch nears the ground.

When cutting the stem, care should be taken to sever the bunch stalk. The tissue of this stalk is very brittle, and will snap readily. If this stalk is only partly cut, the weight of the bunch pulling the plant over will cause the unsevered portion to snap, and this sudden snapping will invariably result in the remainder of the stem also breaking and the bunch falling heavily to the ground to the detriment of the fruit.

Brisbane Show (1939) Champions.

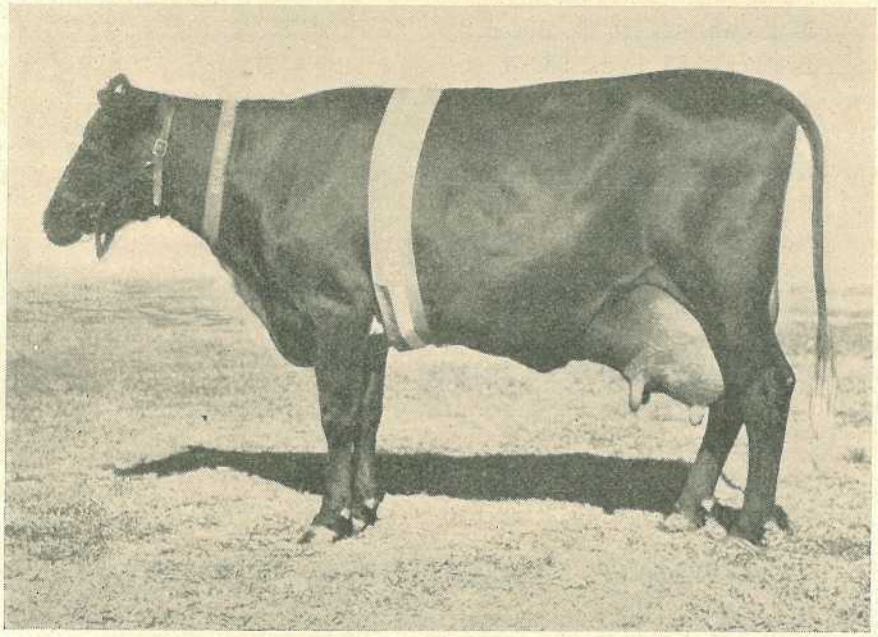


Plate 205.

ALFA VALE NELLIE IV.—Champion butterfat cow, the property of Mr. W. H. Thompson.

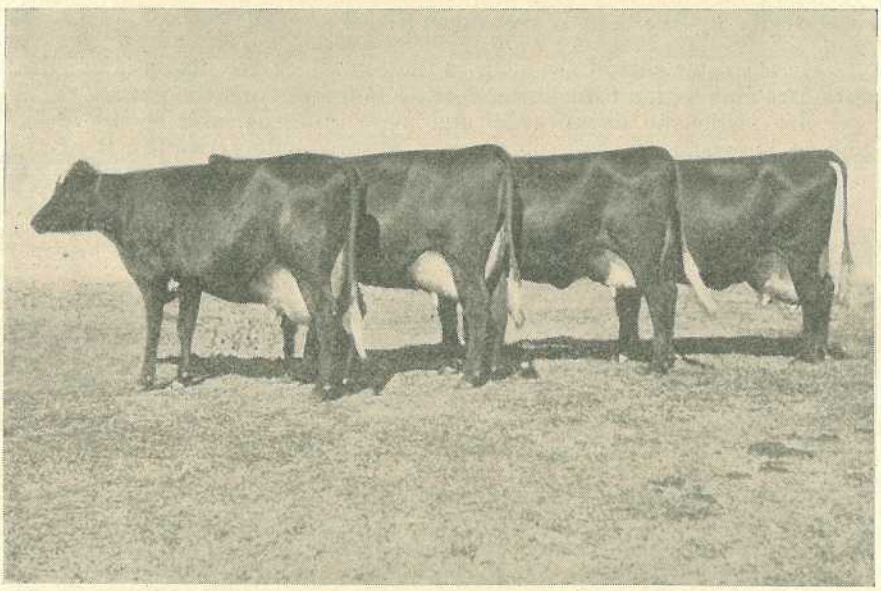


Plate 206.

THE WINNING TEAM IN THE MILKING TESTS.—Left to right: Alfa Vale Nellie IV., Alfa Vale Gentle II., Alfa Vale Laura II., and Alfa Vale Model II. This group, owned by Mr. W. H. Thompson, was awarded first, second, third, and fourth places in the milking competition for aged cows.

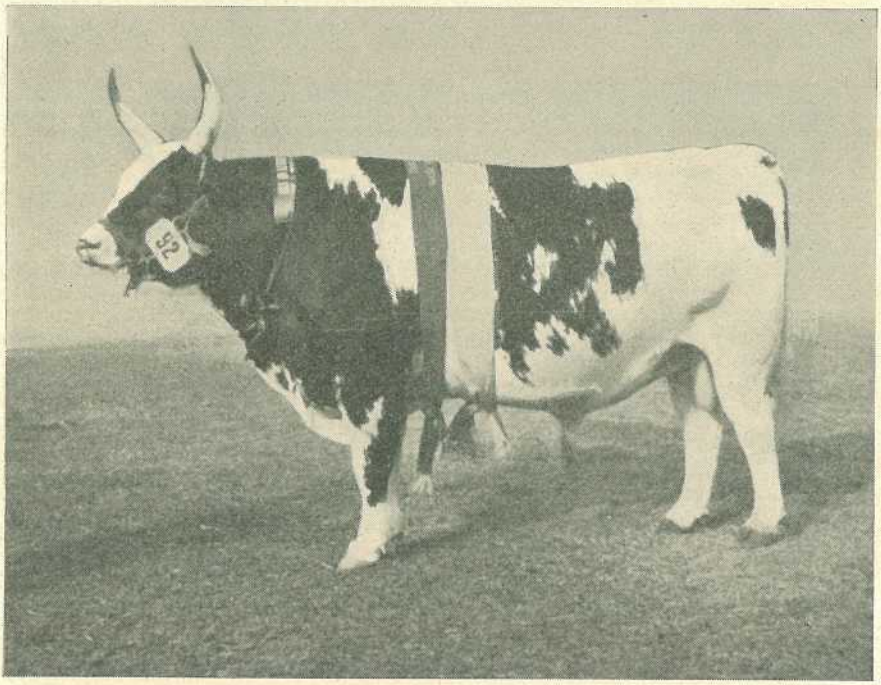


Plate 207.
Myola Bosca.—Champion Ayrshire bull, the property of Mr. R. M. Anderson.

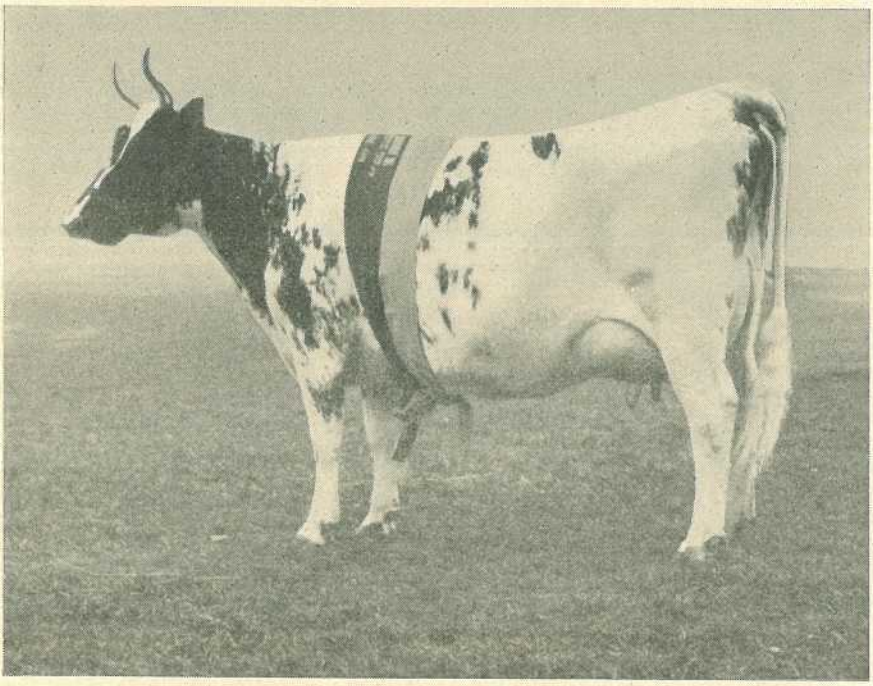


Plate 208.
Myola Joy Enid.—Champion Ayrshire cow, the property of Mr. R. M. Anderson.

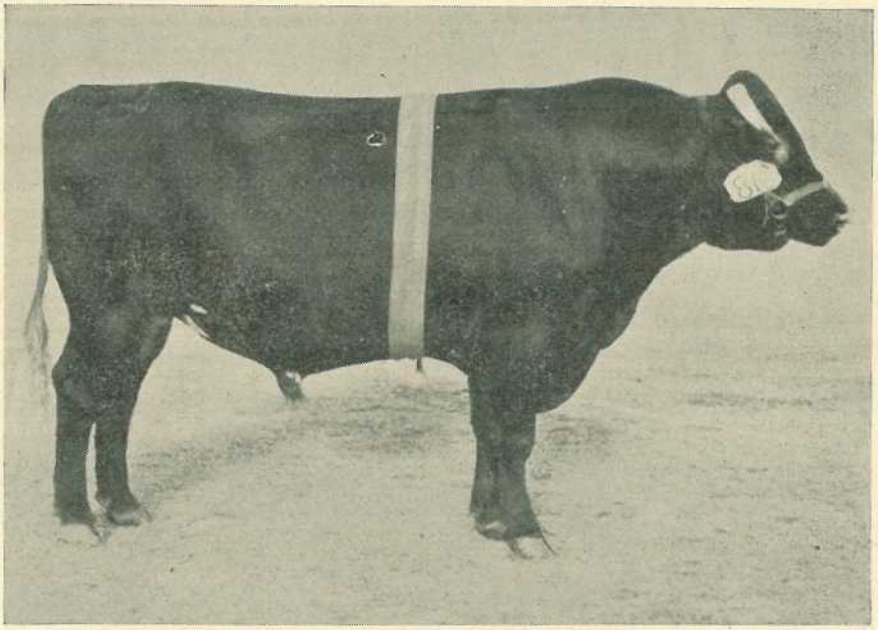


Plate 209.
Blacklands Czar.—Champion Australian Illawarra Shorthorn bull, the property of Mr. E. D. Lawley.

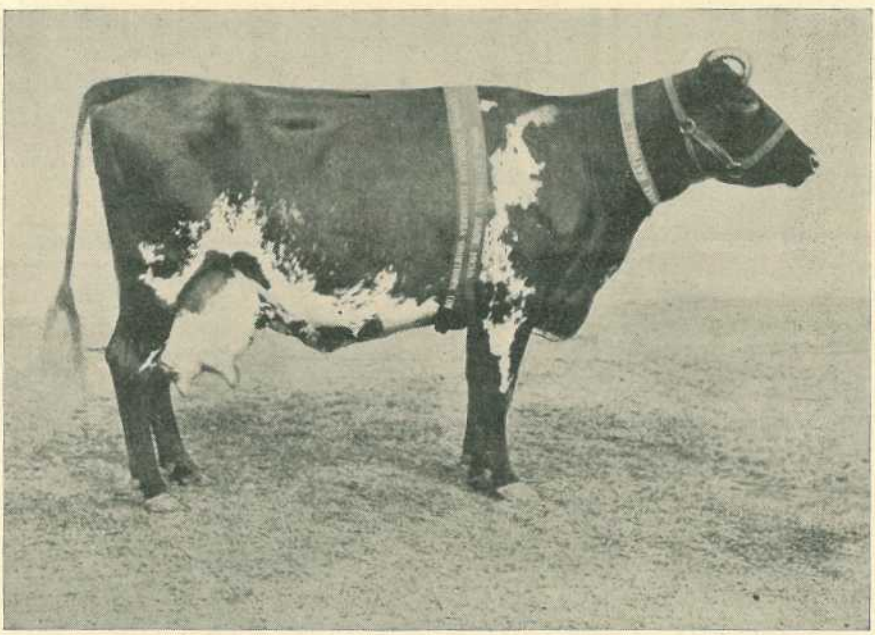


Plate 210.
Springdale Nancy XIV.—Champion Australian Illawarra Shorthorn cow, the property of Messrs. J. Phillips and Son.

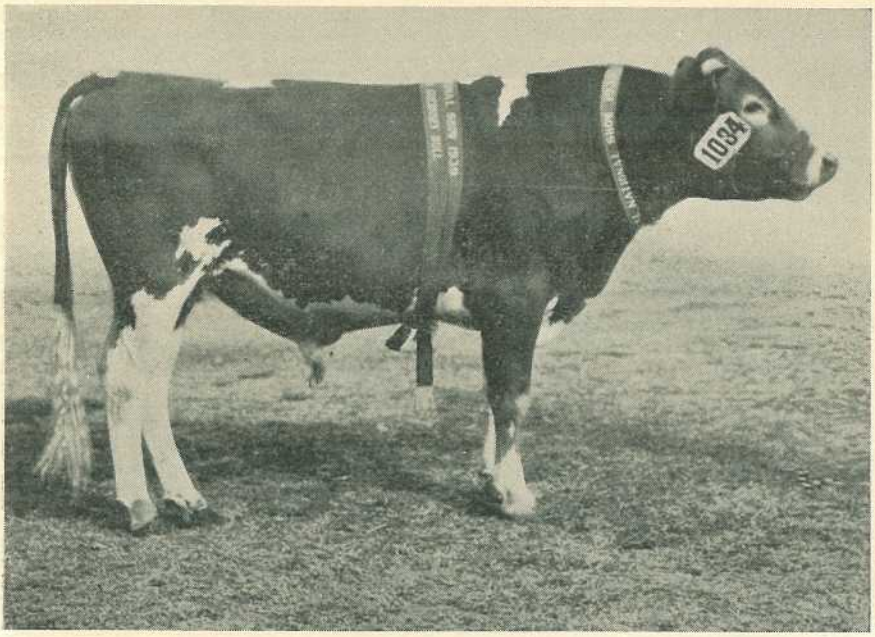


Plate 211.
Fairfield Martin.—Champion Guernsey bull, the property of Stimpsons Ltd.

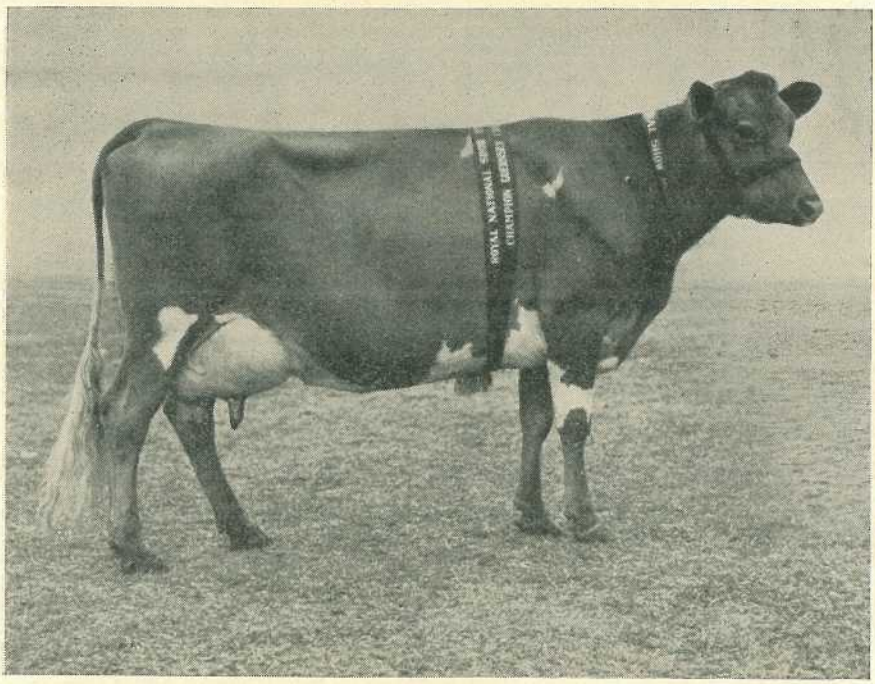


Plate 212.
Laureldale Rosette.—Champion Guernsey cow, the property of Mr. W. A. Cooke.

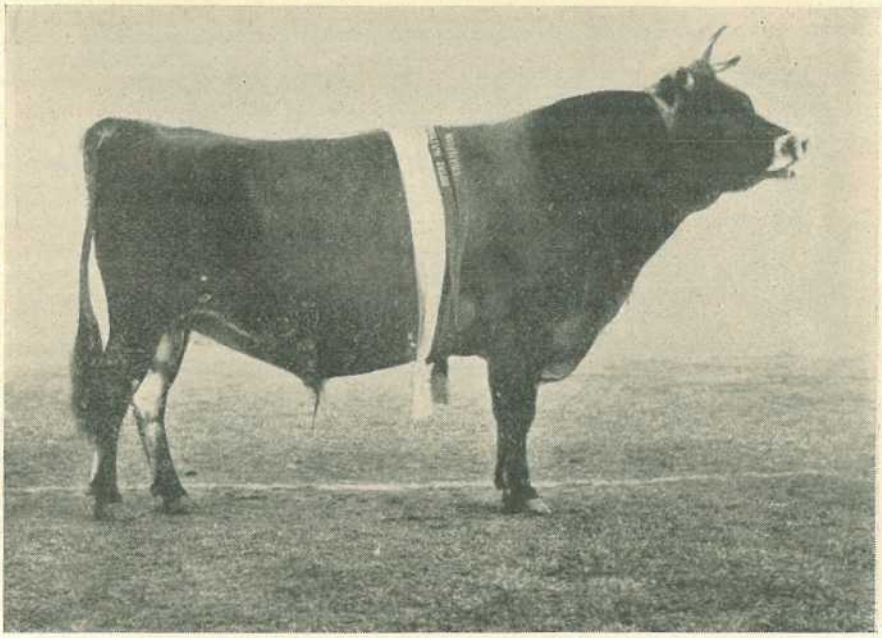


Plate 213.
Oxford Brown Victory.—Champion Jersey bull, the property of Mrs. M. E. Stanton.

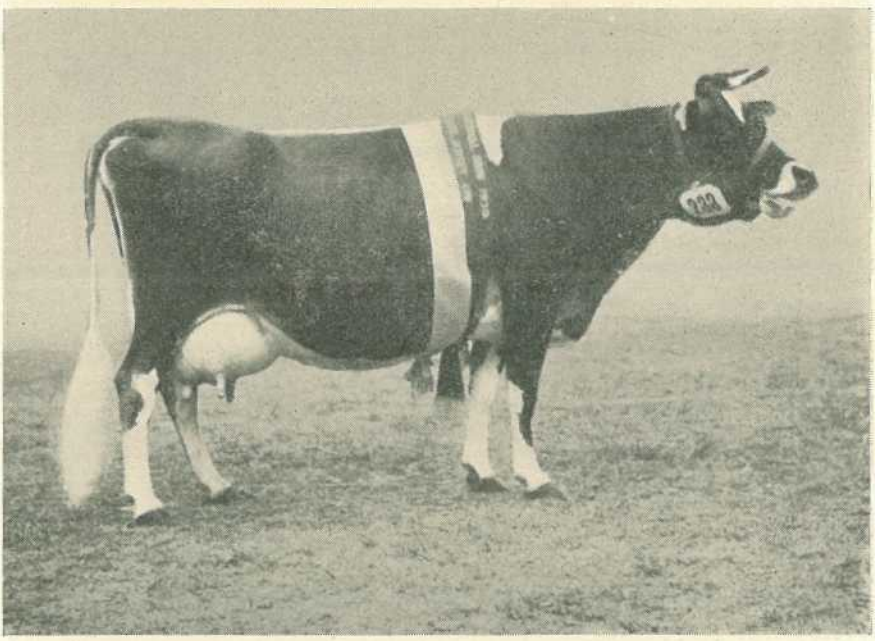


Plate 214.
Glenview Starlight.—Champion Jersey cow, the property of Messrs. F. P. Fowler and Son.

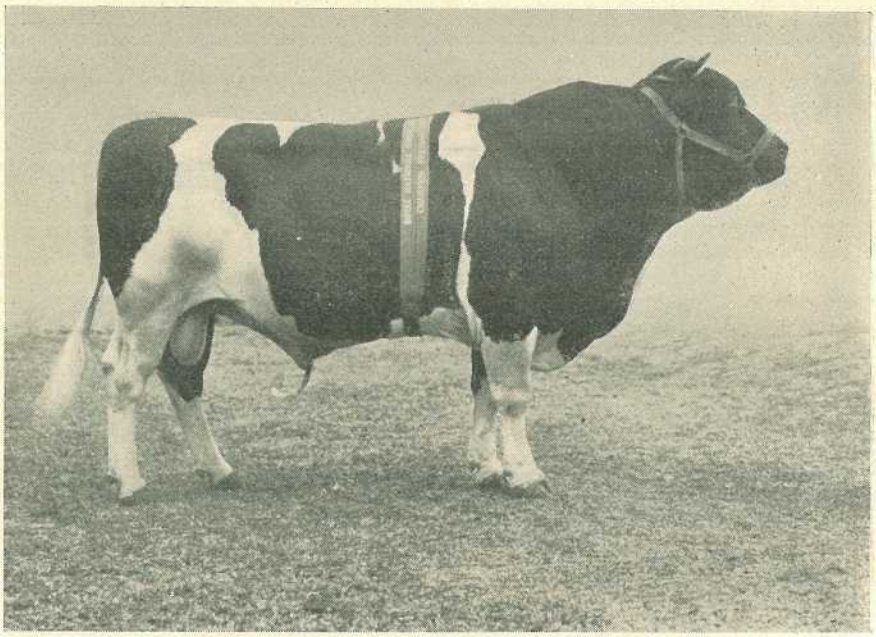


Plate 215.
Burnbrae Joechal Dekol.—Champion Friesian bull, the property of Mr. M. C. Pearce.

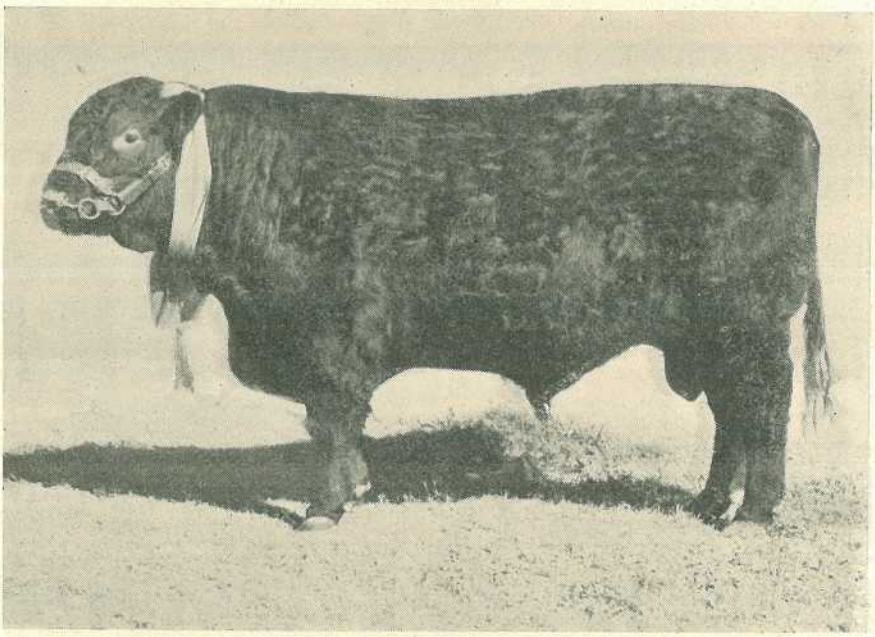


Plate 216.
Woomargama Commander.—Champion Shorthorn bull, the property of Messrs. C. P. Fairbairn and Co.

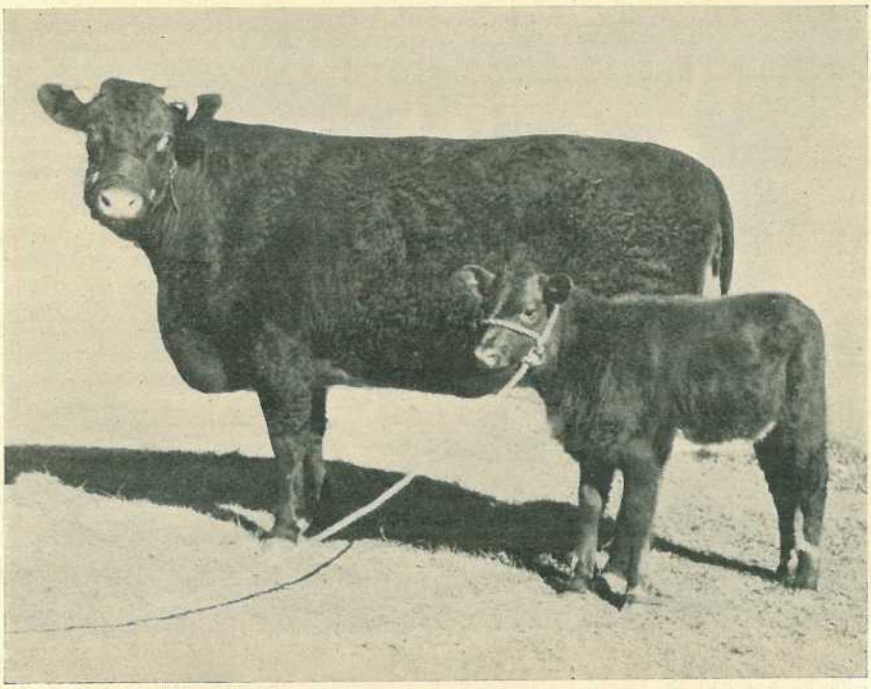


Plate 217.
Netherby Meadow Sweet.—Champion Shorthorn cow, the property of Mr. J. T. Scrymgeour.

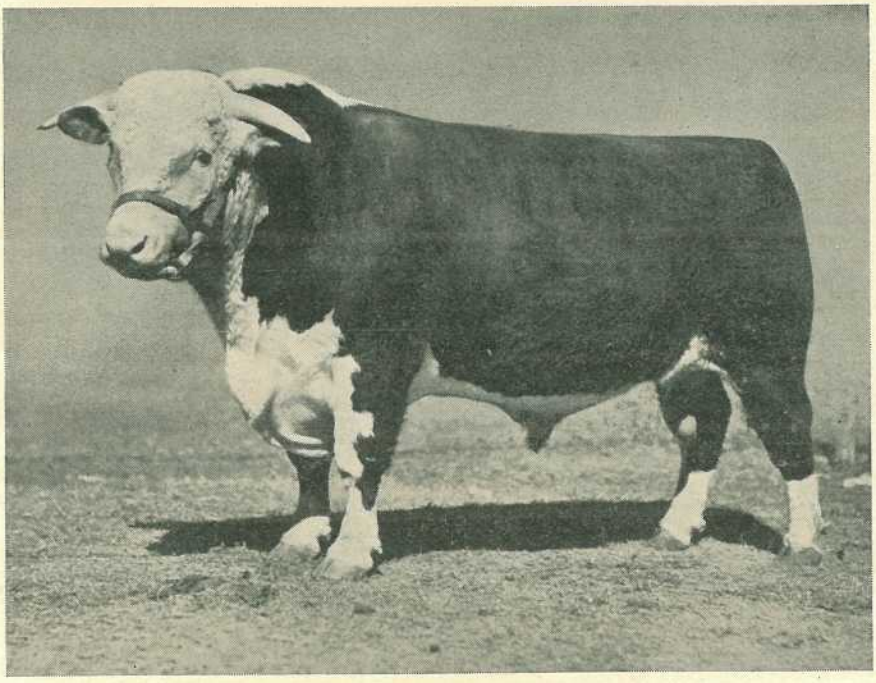


Plate 218.
Ennisview Oscar.—Hereford bull, the property of Mr. E. R. Reynolds.

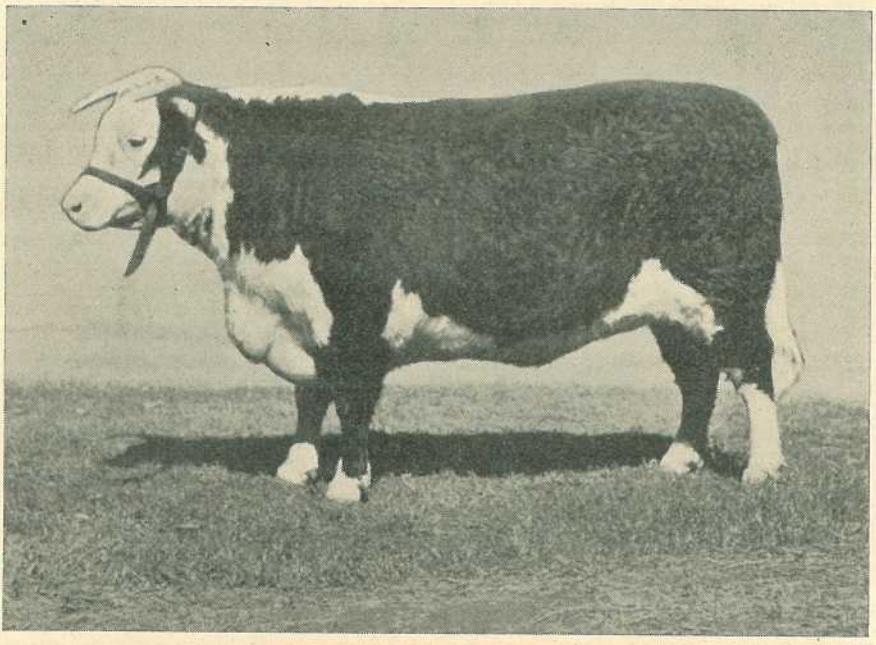


Plate 219.
Myall Sunbeam II.—Champion Hereford cow, the property of Messrs. Fenwick Bros.

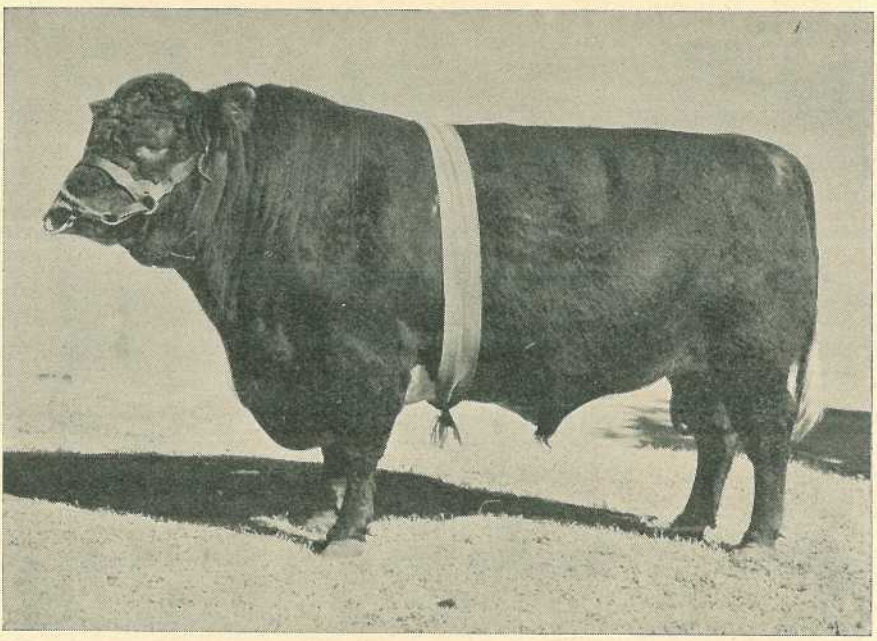


Plate 220.
Red Victor.—Champion Polled Shorthorn bull, the property of Mr. J. T. Scrymgeour.

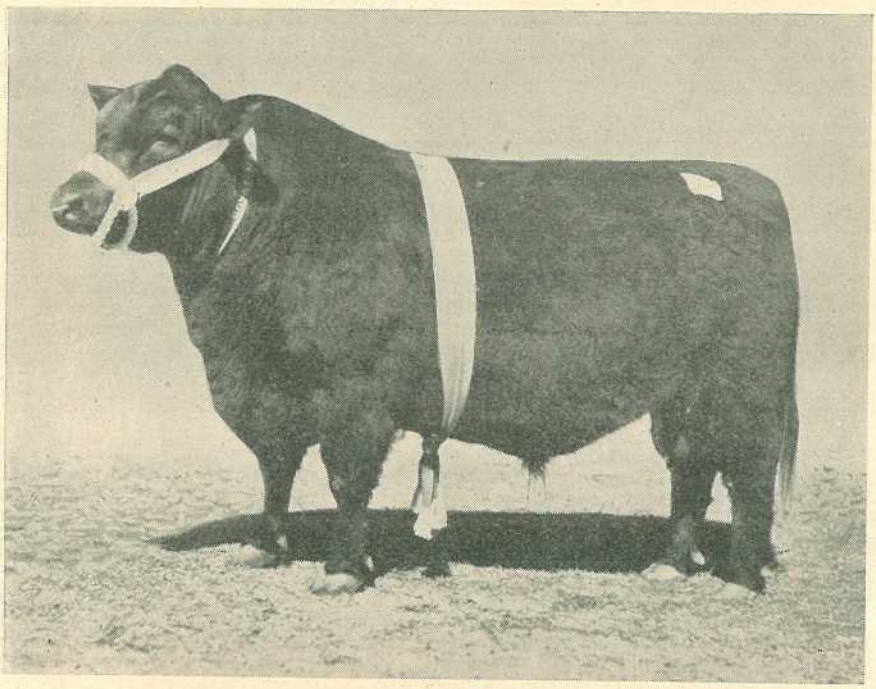


Plate 221.
Devoncourt Snug 1661st.—Champion Devon bull, the property of Mr. R. A. Howell.

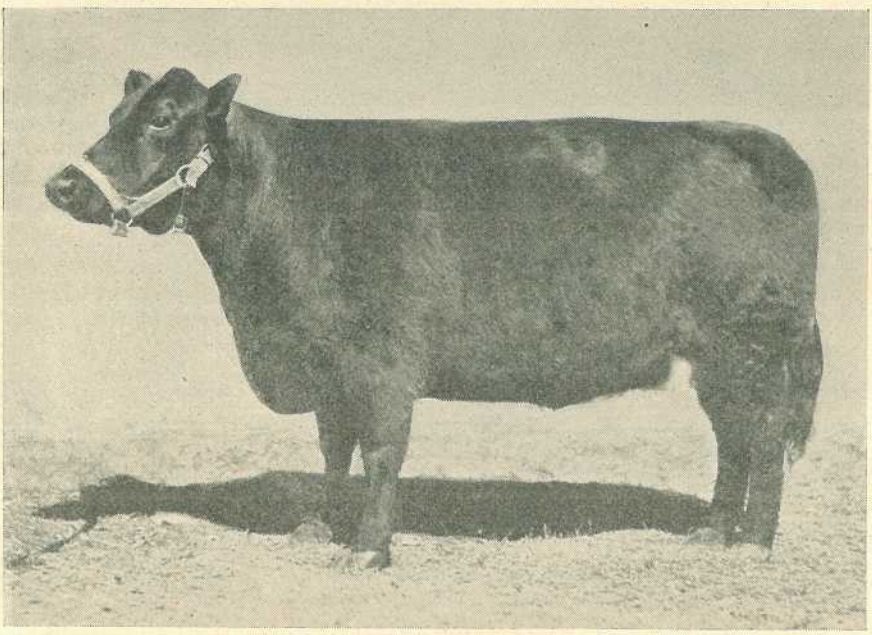


Plate 222.
Devoncourt Lusty 110V.—Champion Devon cow, the property of Mr. R. A. Howell.

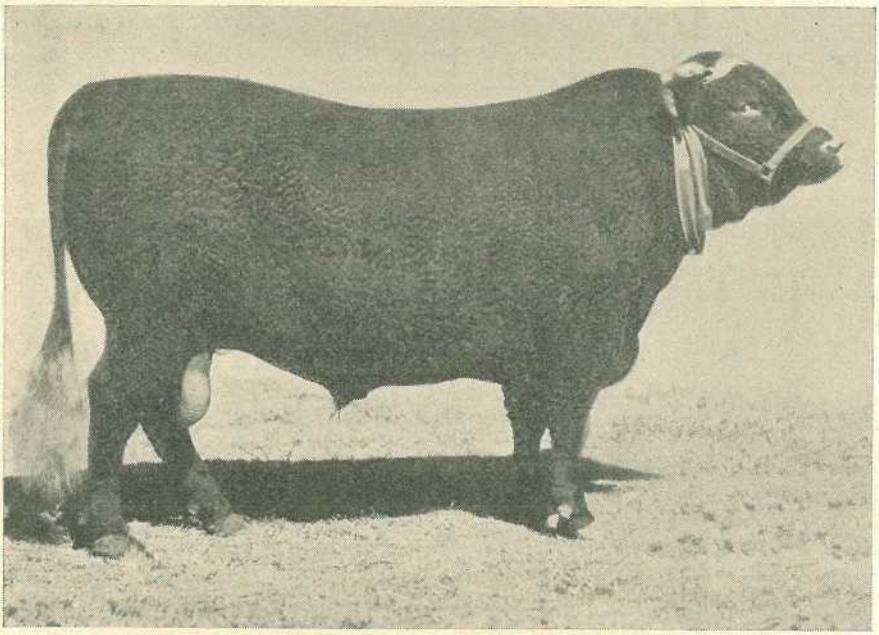


Plate 223.
Abington Max II.—Champion Aberdeen Angus bull, the property of Mr. N. L. Forster.

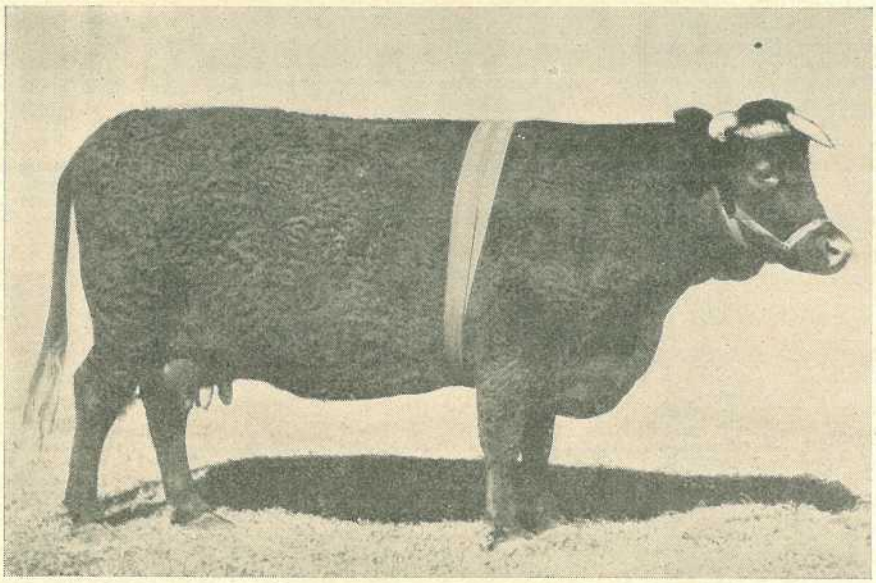


Plate 224.
Elegosa of Ballindaloch.—Champion Aberdeen Angus cow, the property of Mr. J. M. Newman.

PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock which have qualified for entry into the Advanced Register of the Herd Books of the Australian Illawarra Shorthorn Society and the Jersey Cattle Society, production charts for which were compiled during the month of August, 1939 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
MATURE COW (STANDARD 350 LB.).				
Glengarry Doris	G. Waugh, Glengarry, Peeramon	11,140·35	478·593	Sailor of Thurles
Sunnyside Empress 27th (350 days)	P. Moore, Wooroolin	12,192·6	461·874	Emblem of Sunnyside
Brunda Hilda 4th	Mrs. K. Henry, " Tara," Watts Siding	8,740·5	353·991	Karrawarra Enchanter
Navillus Nancy	E. W. Jackson, " Ennismore," Nobby	8,721·61	353·678	Midget Shiek of Westbrook
SENIOR, 4 YEARS (STANDARD 330 LB.)				
Navillus Model 5th	C. O'Sullivan, " Navillus," Ascot	9,317·4	378·397	Alfa Vale Re Nell
JUNIOR, 4 YEARS (STANDARD 310 LB.)				
Rosenthal Handsome 21st	Sullivan Bros., Pittsworth	9,784·54	346·846	Rosenthal Carbine
Pilton View Ruby	P. D. Fiechtner, " Pilton View," Greenmount	7,804·3	335·864	Navillus Venie's Sheik
SENIOR, 3 YEARS (STANDARD 290 LB.)				
Menidale Thistle	H. D. Giles, Menidale, Biggenden	9,022·4	325·833	Menidale's Gentles Reflection
JUNIOR, 3 YEARS (STANDARD 270 LB.)				
Cedar Grove Ivy 21st	C. O'Sullivan, Navillus, East Greenmount	7,922·48	325·966	Cedar Grove Umpire
Pilton View Lady Alice	P. D. Fiechtner, Junr., Pilton View, *via* Greenmount	7,668·00	294·992	Navillus Venie's Sheik
Sunnyside Ruby 24th	P. Moore, Wooroolin	6,537·2	277·829	Sunnyside Wongas Final

JUNIOR, 2 YEARS (STANDARD 230 LB.)				
Glenroy Damsel	W. F. Kajewski, Glenroy, Glencoe	8,578·9	362·253	Blue Boy of Glenthorn
Glenroy Rosetta 3rd	W. F. Kajewski, Glenroy, Glencoe	8,091·2	329·782	Parkview Glider
Navillus Princess 4th	C. O'Sullivan, "Navillus," East Greenmount	8,147·68	319·606	Park View Mars
Navillus Voco	C. O' ullivan, "Narvillus," East Greenmount	7,452·46	285·807	Park View Mars
Cedar Grove Sadie	P. D. Fiechtner, Pilton View, *via* Greenmount	7,654·00	285·168	Cedargrove Umpire
Rosenthal Pendant 14th	Sullivan Bros., Pittsworth	7,858·11	282·819	Peggs Admiration
Ehlma Park May	N. Bidstrup, Warra	6,567·39	276·671	Alfa Vale Peter
Calrossie Beryl (256 days)	D. L. Lithgow, Longlands	6,556·44	247·895	Sunnyside Major
Pilton View Bonnie	P. D. Fiechtner, Pilton View, Greenmount	6,532·25	240·407	Navillus Venie's Sheik
JERSEY.				
MATURE COW (STANDARD 350 LB.)				
Brooklands Royal Roseleaf	W. S. Conochie, Sherwood	8,004·85	365·92	Retford Earl Victor
SENIOR, 4 YEARS (STANDARD 330 LB.)				
Trinity Marshalls Coronada	C. W. Barlow, Spring Creek, Toowoomba	8,485·24	419·287	Trinity Field Marshall
JUNIOR, 4 YEARS (STANDARD 310 LB.)				
Cabulcha Musty Twilight (255 days)	J. M. Newman, Caboolture	6,485·6	326·888	Pymble Twilights Paragon
SENIOR, 3 YEARS (STANDARD 290 LB.)				
Windy Way Duchess	Wakefield Bros., Upper Barron, Atherton	6,223·00	346·542	Royal Emblem 2nd of Rosedale
JUNIOR, 3 YEARS (STANDARD 270 LB.)				
Tecoma Dove	W. Semgreen, Tecoma, Coolabunia	6,470·7	350·111	Bruce of Inverlaw (Twin)
Trinity Bright Girl	G. A. Champney, Wooroolin	7,876·25	438·694	Trinity Noble Born
SENIOR, 2 YEARS (STANDARD 250 LB.)				
Westbrook Safety 16th (258 days)	Farm Home for Boys, Westbrook	5,539·75	317·569	Oxford Golden Dreamer
Windy Way Melba	Wakefield Bros., Upper Barron, Atherton	4,343·85	282·99	Royal Emblem 2nd of Rosedale
JUNIOR, 2 YEARS (STANDARD 230 LB.)				
Bellgarth Countess	D. R. Hutton, Bellgarth, Cunningham	5,784·21	324·52	Trecarne Renown II.
Inverlaw Mable	R. J. Crawford, Inverlaw, Kingaroy	6,491·49	320·877	Oxford Royal Lad
Bellgarth Charm	D. R. Hutton, Bellgarth, Cunningham	6,223·31	316·009	Bellgarth Thornhope
Oxford Betty VI.	E. Burton and Sons, Wanora	4,942·25	260·513	Oxford Peer
Oxford Sylvie 3rd	E. Burton and Sons, Wanora	4,918·05	248·921	Oxford Peer

General Notes

Staff Changes and Appointments.

Mr. D. O. Atherton, B.Sc., M.Sc.Agric., Assistant Research Officer, has been appointed research officer, Entomological Section, Division of Plant Industry (Research), Department of Agriculture and Stock. Mr. Atherton is stationed at Toowoomba.

Messrs. R. D. R. Rex and C. M. Martin, assistant cane testers, have been transferred from Bingera Mill to Marian Mill, and from Marian Mill to Bingera Mill, respectively.

Mr. E. H. Baker, clerk of petty sessions, Childers, has been appointed chairman of the Isis Local Sugar Cane Prices Board, and an agent of the Central Sugar Cane Prices Board for the purposes of Section 5 (2A) of the Regulation of Sugar Cane Prices Acts, in place of Mr. V. J. Anderson, who has relinquished the position of acting clerk of petty sessions at Childers.

Mr. A. J. Cork, "Bellaringa," via Jackson, has been appointed an honorary protector of fauna and an honorary ranger for native plants.

Mr. A. C. A. Rayner (Union street, Maryborough) has been appointed an honorary protector under "*The Fauna Protection Act of* 1937."

Messrs. C. Brown (of the Enoggera Golf Club) and D. J. Wilson (West End) have been appointed honorary protectors under the Fauna Protection Act and honorary rangers under the Native Plants Protection Act.

Mr. C. J. F. Swinburne, instructor in sheep and wool, Department of Agriculture and Stock, has been transferred from Brisbane to Blackall.

Mr. A. P. Hansen (Seaforth, Kuttabul) and Mr. G. H. Miers (Springcliffe, Kuttabul) have been appointed honorary protectors under "*The Fauna Protection Act of* 1937."

Mr. A. C. Ward (Gloucester street, South Brisbane) has been appointed an honorary protector under the Fauna Protection Act and an honorary ranger under the Native Plants Protection Act.

Mr. W. A. G. Haylett, inspector of stock, slaughter-houses, and dairies, has been transferred from Brisbane to Toowoomba.

Banana Industry Protection Board.

A Regulation has been issued under the Banana Industry Protection Acts providing that for the period until 30th September, 1940, the two growers' representatives on the Banana Industry Protection Board, in lieu of election, shall be nominated by the Committee of Direction of Fruit Marketing from the Banana Sectional Group Committee.

Messrs. W. J. Branch (Russell Island) and A. W. Chapman (Eumundi) have been appointed growers' representatives on the Banana Industry Protection Board until 30th September, 1940.

Millaquin Mill Levy.

Regulations have been issued under "*The Primary Producers' Organisation and Marketing Acts,* 1926 *to* 1938," empowering the Millaquin mill suppliers' committee to make a levy at the rate of one half-penny per ton on all sugar-cane loaded at the Yandaran railway siding, the proceeds from such levy to be used for administrative purposes by the Yandaran canegrowers' branch of the Millaquin mill suppliers' committee.

Wild Life Preservation.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937" declaring "Bellaringa" (the property of Mr. A. J. Cork, via Jackson), to be a sanctuary under such Act.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937" declaring portion of North Toolburra, near Warwick, the property of Messrs. R. E. and S. Rankin, to be a sanctuary under the Act.

Central Sugar Cane Prices Board.

The Regulations under the Regulation of Sugar Cane Prices Acts have been amended to provide for preferential voting in connection with the election of the canegrowers' representative on the Central Sugar Cane Prices Board.

Sugar Experiment Stations.

Executive approval has been given to the issue of an Order in Council under "*The Sugar Experiment Stations Acts,* 1900 *to* 1938," providing that notification of the appearance of disease shall apply only in respect of the areas to which it is from time to time made applicable by proclamation.

A number of proclamations have also been approved under such Acts, covering—

The declaration of diseases and insects;

The removal of sugar-cane;

The removal, planting, or transplanting of sugar-cane plants in the parishes of Sophia, Grafton, and Trinity, Mulgrave Mill area;

The introduction of sugar-cane into the Isis Mill area;

The Bundaberg-Childers district quarantine area;

The removal of cane plants from the parishes of Maryborough, Tinana, Bidwell, Wallieburn, and Young; and

The notification of Fiji disease and downy mildew in the Bundaberg-Childers District Quarantine Area.

The issue of the abovementioned Order in Council and proclamations is consequential on the passing of "*The Sugar Experiment Stations Acts Amendment Act of* 1938," and, further, all previous regulations in force under the Acts have been rescinded, and new regulations to give effect to the requirements of the amended Acts have been approved to-day.

These, amongst other things, provide for the appointment of inspectors under the Acts who may seize and detain any sugar-cane suspected to be diseased which is being introduced into Queensland or removed from one part of the State to another, and may also inspect any land or premises where sugar-cane is grown or kept. The officers of the Bureau of Sugar Experiment Stations have been appointed inspectors under the Acts.

Trans-Border Stock Crossings at Killarney.

Because of the reinfestation by ticks of the Woodenbong area of New South Wales, it has been found necessary to issue an Order in Council under the Diseases in Stock Acts prohibiting the introduction into Queensland of any cattle or horses from New South Wales through the crossing place at Killarney, unless such cattle or horses are provided with a certificate of health and freedom from ticks, and unless they are found to be clean on inspection at the crossing place and are dipped or hand-dressed at Killarney.

Answers to Correspondents

BOTANY.

Replies selected from the outgoing mail of Mr. W. D. Francis, Botanist.

Red Natal Grass.

P.R. (Pittsworth)—

The specimen is Red Natal grass, *Rhynchelytrum repens*. It was introduced into Australia many years ago as a fodder grass, and has since become widely spread in coastal and subcoastal Queensland. The grass did not sustain its reputation as a fodder, cattle showing little taste for it. It usually occurs as a weed of fallow land, along roadsides, cultivation headlands, railway cuttings, and anywhere the ground has been disturbed. It has the further disadvantage of being shallow-rooting. So far as we know, there has been no grazing experience with the grass on the Downs. One method which has been used on a small scale to utilise the grass as a fodder was to mow it, and stack it, and then mix it with more palatable cultivated fodders and make it into a chop-chop, which horses are reputed to be fond of.

Groundsel.

J.H.A. (Miva)—

The specimen is groundsel bush (*Baccharis halimofolia*), a native of South America. This plant has become a great pest, especially in parts near the coast along salt-water and brackish creeks. It has spread over a very large area of the coastal country. It is of very little feed value for stock, but is not known to be poisonous. As it is such a pest, it is advisable to eradicate it before it gains a hold.

Ball Nut.

Inquirer (Brisbane)—

The nut is an immature specimen of the ball nut (*Macadamia praealta*). It is a native product of the rain forests of Eastern Australia from the Clarence River in New South Wales to as far north as Gympie in Queensland. According to Rumsey, a nurseryman in New South Wales, this nut is worth growing for its edible properties. However, we have not known it to be eaten. As its botanical name implies, it is related to the Queensland nut (*Macadamia ternifolia*). It is a tree attaining a height of about 60 feet, and a stem diameter of about 1 foot.

A Tick Trefoil.

J.D.O'B. (El Arish, North Queensland)—

The specimen is, as you suspect, a tick trefoil, and is known botanically as *Desmodium triflorum*. It is common in the pastures from the border of New South Wales right up to Cairns. It is considered to be a good fodder, and has the advantage of being a leguminous plant. However, it is so short and grows so closely to the ground, that it does not provide much head as fodder for dairy stock.

Sensitive Plant.

K.E.A. (Kwato, Samarai, Papua)—

Your specimen is the sensitive plant (*Mimosa pudica*). This species is not a bad pest in Queensland. Where hoeing is impracticable, noxious weeds here are sprayed with arsenical sprays, or preparations such as Weedex.

Blue Pincushion, Spur Velleia, Cape Weed.

H.W.B. (Eulo)—

1. Blue pincushion, *Brunonia australis.*
2. Spur velleia, *Valleia paradoxa.*
3. Cape weed, *Cryptostemma calendulacea.*

Nos. 1 and 2 are native plants. They are not known to be harmful to stock.

No. 3 is a native of South Africa. It is a common weed in New South Wales and southern parts of Queensland. This plant is not known to possess any poisonous properties. In New South Wales and Victoria, it is sometimes reputed to be a fairly good fodder, but the plants mostly observed in this State do not appear to be eaten by stock to any great extent. Although this plant has been present in Queensland for many years, it has not become a very serious pest. One objection to it, however, is that it covers the country to the exclusion of grasses and other herbage, and leaves large areas devoid of feed when it dies down in the summer months.

A Reputedly Poisonous Weed.

M.K. (Brisbane)—

The specimens represent *Solanum Seaforthianum,* a native of tropical America. At different times we have received reports that children have become violently ill after eating the berries. The berries also have been, at times, stated to be poisonous to poultry. Otherwise, we have no definite evidence of their poisonous properties. This plant is now very common as a weed in some of the drier rain forests of the coast.

White Horehound.

J.R. (Laidley)—

The weed specimen looks like the common white horehound (*Marrubium vulgare*). This is a native of Europe, and it a common weed on the Darling Downs. This plant is used in medicine and in the preparation of beverages. Extracts made from it have tonic and stimulating properties. The best method of eradication is by hoeing, or ploughing in before the plant seeds.

A Milk-tainting Plant.

M.D.O'D. (Lowood)—

The specimen is from *Rivina lævis,* a weak undershrub and a native of South America. As you remark, it causes a bad taint in milk and cream. We have not heard a distinctive local name applied to it.

Plants from Lockyer District Named.

T.L.M. (Laidley)—

1. *Nicandra physalodes,* Apple of Peru. Garden plant grown for its flowers and peculiar fruit; rarely touched by stock; not known to be poisonous. It is closely allied to the Cape gooseberry.
2. Your "plant with the little stars which form the seed" is *Acanthospermum hispidum,* Star burr. It is a native of Brazil. This burr is spreading in Southern Queensland. It is not known to be poisonous.
3. The two pods belong to *Cajanus indicus,* Pigeon Pea, a native of India. The young pods may be used as a vegetable in the same way as French beans.

Carpet grass or mat grass is a menace to good pastures, although it may be valuable on second-class country. It is not known to cause any flavour in cream, but in good pastures, such as paspalum pastures in the more fertile coastal regions, the cream supply is greatly reduced when mat grass replaces paspalum.

A Common Tropical Plant.

S.E.S. (Cairns)—

The specimen is *Pterocaulon glandulosum*, for which we have not heard a common name. It is a common plant in the tropics of Australia, and is not known to be poisonous to stock. It is used by aborigines to apply to spear wounds as a healing agent.

Shrubs Suitable for the Fassifern District.

P.B.N. (Harrisville)—

Suitable shrubs are: *Ligustrum ovalifolium*, *Ligustrum chinense*, the Oleander (*Nerium Oleander*), *Tecoma stans*, and the various kinds of *Legerstroemia* which are referred to as "Pride of India."

The two species of *Ligustrum* form very dense, shapely shrubs with small white flowers. The other shrubs in the list are conspicuous for their bright flowers. Most nurserymen stock them.

Emu Grass. Darnel.

W.B. (Warra)—

The plant with the small, finger-like leaves is a native legume, sometimes called Emu grass. It is known botanically as *Psoralea tenax*, and is a good fodder plant.

The grass specimen is commonly known as darnel or drake. Its botanical name is *Lolium temulentum*. It is a native of Europe and Asia. It is an annual, and is relished by stock. The seed, however, contains a narcotic poison, and because of this it should not be encouraged to grow abundantly.

Wild Tobacco.

H.F.M. (Dayboro)—

The plant is the wild tobacco, *Solanum auriculatum*, a native of tropical America. It is a common pest of coastal scrub lands. It is very difficult to eradicate by brushing, as it shoots repeatedly, but after a period of years it usually dies out soon after it attains full development, when it has become a tall shrub or small tree.

Tape Vine.

A.J.F. (Upper Nerang)—

The specimen is the tape vine, *Stephania hernandiæfolia*. This plant has been reported as poisonous, but in feeding tests at Yeerongpilly by the Poison Plants Committee of the Department of Agriculture and Stock negative results were obtained in all cases. The committee now considers that the plant may be regarded as non-poisonous.

The tape vine belongs to a family of which some members are very poisonous. Notable among plants of this family are some species which provide the most active ingredients for the arrow poisons or curare of certain Indian tribes of South America. In these cases, however, the toxic principle is effective when it comes in contact with wounds.

Some Trees of Inland Regions.

W. (Toowoomba)—

The emu apple is common along the western line as far as Roma. We have seen good specimens of the tree in the Tara and Chinchilla districts. As it is a very well-known tree, some of the farmers of those districts would be in the best position to obtain seeds for you.

The wilga also is a very common species from Dalby, around Tara, and westwards to Charleville. The myall is common in districts from Dalby to Roma. The belah is one of the commonest trees in the Tara district.

It is suggested that seeds of these trees may be obtainable from residents of the districts mentioned.

Rural Topics

Beekeeping and Defence.

Beekeepers may have to play an important part in the defence of Australia, it was stated at a conference of beefarmers in Sydney recently.

It was said that "without sufficient bees to properly pollinate plants, agricultural and horticultural interests in Australia would be greatly handicapped.

"If Queensland got into difficulties and we were cut off from our sugar-producing areas, other States would have to depend on honey production for sweetening for many purposes."

During the Great War, it was said that a "Digger" was offered fifteen shillings for a 2-lb. tin of honey sent to him in a parcel from Australia, so keen was the demand for it.

The Danish Farmer's Example.

This is what a farmer, who knows Denmark and the Danes well, said recently:—

> "The explanation why Danish farmers are the most prosperous in the world is simply this:—They produce, manufacture, finance, and market their own products. They produce directly, but they finance, manufacture, and market by proxy through their own co-operative organisations; and there is no other way out for the farmer in any land or country."

Milk and Beauty.

In Hollywood, that fabulous beauty centre, milk is now regarded as an indispensable aid to health. Famous "film stars" drink it in their dressing rooms, studio restaurants use thousands of quarts every day, and a milk truck goes along "on location." Efficient distribution of safe, dependable milk is accepted as a vital daily factor wherever beauty and health are watchwords.

Beware of the Quiet Bull.

It is a common news item that tells of somebody being badly hurt by a vicious bull. Usually the bull was not considered vicious—it was trusted, hence the trouble. No one ever hears of a vicious bull hurting anybody, for the simple reason that as he is known to be vicious he is not trusted. So therefore it is wise to beware of the quiet bull, especially the Jersey.

Our Greatest Farm Workers.

The enormous amount of work a dairy cow is called on to do makes their care and attention the important problem that it is. Cows do more work, everything considered, than any of the other farm animals, for in addition to the production of large quantities of milk they must also reproduce their kind every year. This may be one of the reasons why the cow is provided with the capacity for the consumption of such large quantities of feed. Good feeding, adequate shelter, constant attention to their health, wellbeing, and comfort are all necessary if the best results are to be obtained from the cow.

Milk in Industry.

Here are some remarkable figures from a report of the National Milk Publicity Council in England. During one month workers in factories, mines, workshops, and offices consumed 708,273 gallons of milk. The figures are nearly double those of twelve months earlier. At the present rate of consumption the milk scheme in England is increasing liquid milk sales by nearly 8,500,000 gallons a year.

A Real Live Scare Crow.

A Texas farmer claims that he has successfully kept his crops free from crows by catching one alive, and then letting it go with a small bell attached to its neck. The belled bird, in trying to rejoin its flock, scares all the other crows away, but remains in the vicinity itself.

"Blood Lines" in Dairy Cattle.

This year an important work is being undertaken by the Council for Scientific and Industrial Research, and that is the investigation of "blood lines" in dairy cattle in order to discover the effect on production levels by the introduction of new blood. A start has been made with a study of the Jersey breed in Australia.

Every breed of animal has within it many blood lines, some of which have been intensified more than others. Production levels vary, sometimes as the result of better feeding, and sometimes as the result of new blood. Before these trends can be attributed to particular blood lines, however, it is necessary first to analyse the pedigrees, not only of individuals but of the breed as a whole, and to find out all about the influences of in-breeding and everything else associated with these trends.

Mastitis Control.

Queensland dairy farmers will be interested in the trying out of a German method for the treatment of mastitis at the Glenfield Stock Experiment Station in New South Wales. The method attacks the disease direct, and results so far have been very successful. After treatment, it was noticed that the milk of affected animals returns to normal. The treatment, of course, cannot yet be recommended for general use, but it looks as though the method may eventually prove of great value to the dairy industry.

Grand Opera in the Milking Shed.

Here is something more about the effect of music on cows at milking time. A well-known operatic singer has accepted an invitation to go to the Walker-Gordon Farms, New Jersey, to enable a study to be made by noted psychologists of the effect of her singing voice on the milk production of the 2,000 cows of the institution. A number of other celebrities will assist in the experiment to determine just what kind of music the cows like best.

There is a suggestion in that for our own budding Melbas and Carusos to soothe their favourite cows with song. "It's Better to Fill the Bucket than Kick the Bucket" might well be the first number of a cow yard concert. And think of the economic possibilities of reviving the old farm home ballad—"The Cows are in the Corn," in the dewdamp fragrant morn! This year's phenomenal cream cheque for Queensland may reach ten million pounds (£10,000,000) in hard, cold cash. Think of the prospect of doubling that sum with softly warbled lyrics or recorded musical gems.

No doubt, the result of that operatic experiment will be awaited with widespread interest.

Overspeeding in Shearing.

Ways and means of bringing about better shearing are being discussed in southern pastoral districts. An authority in the wool industry says that "the chief enemy of shearing sheep properly is speed. The shearers can shear the sheep well, but they cannot shear well if they go too fast." This authority points out that each shearer has his top point, beyond which his work becomes faulty. His opinion is that the man who can shear 100 sheep a day well may shear 120 a day badly, and the man who can shear 140 a day well will shear 160 a day badly.

Grass as a Lightning Conductor.

Without grass all animal life would speedily go into a decline. We, ourselves, would soon find the earth uninhabitable if no grass grew.

Carpets of grass keep the earth warm in winter. In summer, grass tempers the heat, absorbing into its blades so much of the sun's power as to make the atmosphere tolerable to us, and at the same time its dense mass of roots keeps the earth beneath from becoming overheated.

Nightly respiration of grass gives back a vast amount of vapour into the air to help to counteract the drying effect of the previous day's sun, while all day long grass is absorbing poisonous carbonic acid gas and discharging the oxygen we breathe. Every upstanding blade of grass is a lightning conductor, and whenever there is a thunderstorm much of the lightning is attracted to the growing grass and conveyed harmlessly to mother earth.

Oranges on the Ice.

A process for the chilling of navel orange slices which retains the flavour, colour, and firmness of the orange indefinitely under refrigeration has been patented and is now being successfully developed in California. The fruit is peeled, sliced, and placed in glass jars of varying capacities. The jars are then filled with the required amount of honey and lemon syrup, prepared according to formula, and placed in freezing rooms until moved to market.

Storing Maize on Its Feet.

A new way of storing maize for stock food has been brought under notice. The idea was evolved by a farmer at Kurrajong, in New South Wales. After filling four pit silos with chaffed maize, he had 30 or 40 tons over. This surplus he cut green, the grain being in the milky stage, carted it in without losing any time and without drying, and stood it on its feet in a shed. To keep the stalks upright, and to allow for a current of air to pass through the stack, poles were placed every 2 feet as the shed was being filled. Consequently, there was no heating, and there was a complete absence of mould—the maize simply curing like hay, retaining all the leaf and much of its succulence.

About three months after it was stored it was chaffed with some sorghum, and a little bran and pollard was added to the ration. When fed to the dairy herd, results turned out remarkably well and the cows maintained their milk production better than they had done with any other sort of feed the farmer had tried.

On these results, this method of storing green maize is regarded as much better than trying to make hay with it by drying it in the field, or attempting to make stack ensilage with it, as, when treated in either way, considerable waste occurs, and the quality of the material is definitely inferior than when it is stored "standing on its feet" in the shed.

The success of this method depends entirely on placing the stalks upright and providing plenty of space for air movement, so that no heating or mould will occur. As it requires only a simple roof overhead, it is a cheap way of storing green maize in the stalk, especially as its feeding value, when so treated, is maintained.

What a Good Editor Ought to be.

A good editor is one who has never made a mistake; who has never offended anyone; who is always right; who can ride two horses at the same time he is straddling a fence with both ears to the ground; who always says the right thing at the right time; who always picks the right horse to win; who never has to apologise; who has no enemies, and who has worlds of prestige with all classes, creeds, and races. There never has been a good editor.—*Minnesota Press (U.S.A.)*.

Pure Wool Wanted.

Dr. Clunies Ross, the Australian representative on the International Wool Secretariat, who was recently in the United States, says that he found there a growing resistance to the use of wool substitutes. The American people still associate quality with wool and are becoming increasingly conscious of the need for asking for, and insisting on getting, wool when it is for wool they are paying.

Australia's Wettest and Driest Regions.

The wettest known part of Australia is on the north-east coast of Queensland, between Port Douglas and Cardwell, where three stations situated on or adjacent to the Johnstone and Russell Rivers have an average annual rainfall of between 142 and 165 inches. The maximum and minimum falls there are: Goondi, 241.53 inches in 1894 and 67.88 inches in 1915, or a range of 173.65 inches; Innisfail, 211.24 inches in 1894 and 69.87 inches in 1902, or a range of 141.37 inches; Harvey Creek, 254.77 inches in 1921 and 80.47 inches in 1902, or a range of 174.30 inches. The driest known part of the continent is in the Lake Eyre district in South Australia (the only part of the continent below sea level), where the average rainfall is only 5 inches, and where the fall rarely exceeds 10 inches for the twelve months.

A New Product of Lactic Acid.

The United States Bureau of Dairy Industry has perfected a process for making a transparent rubber-like substance from lactic acid of whey, which has many promising uses in various industrial operations. Fabrics, paper, and other fibrous materials may be coated with this substance to make them more or less waterproof, as well as resistant to oil and grease.

Dairy Keeping with a Tin Opener.

We've all heard of the untrained housewife who keeps the dinner table going with a tin opener as the most used kitchen implement. And now we learn that canned grass, for winter eating, is the newest addition to the American cow's bill of fare. The "cans" are 8 feet in diameter and 25 feet high, and are made of boiler iron. Freshly-mown grass is pushed through a silage-cutter, and dry ice is mixed with it as it goes into the cans. The ice cools the grass, changes to gas, drives out the air, and stops fermentation. Sliding, rubber-edged tops settle down with the grass and allow the air to escape around their edges, but prevent entrance of outside air. The 65 lb. of dry ice required for each ton of grass costs about 6d. 6d. in our money.

How to Bluff that Crowing Rooster.

If crowing troubles anyone's sleep, there is a way of silencing him permanently without using an axe. In London, the British Noise Abatement League recently turned its attention to muffling the thousands of noisy roosters in the city suburbs. Someone thought of stretching a heavy cloth canopy low over their roosts. Now, whenever the birds stretch their necks to crow, they hit their heads against the cloth and pipe down.

Hay for the Calf.

Plenty of good hay is the secret of successful calf-rearing, according to a well-known New Zealand dairy farmer, and he condemns the use of inferior fodder. Too often, he said, young stock are left to fend for themselves on roughage with an irregular ration of bad hay. That is an unprofitable practice, for the reason that the treatment given to heifers, especially heifers in calf, and the value of their winter feed contributes to a great extent towards developing good dairy qualities in the animals. Properly fed heifers usually develop into very profitable dairy cows.

A Silo Built of Straw.

What is believed to be the first straw silo in Australia has been built on a grazing property just below the border.

Straw silos have been in use in the United States for some time, and, with the present revival of interest in silage-making in Queensland, there is some talk of the idea catching on well here.

The way it is built is simple. Bales of straw are used. Each ring of straw bales—it is circular in construction—has a No. 8 wire strained round it to keep it in place. The round straw wall may be built as high as 25 feet. The straw silo on the property mentioned is being filled with lucerne, which is allowed to cure for five or six days before being placed within the straw walls of the silo. As each tier of straw is placed in position, the silo is filled to the top; and so on, until both the silo and filling are completed. The elevator used is home-made, and costs about £25 for material.

A neighbouring grazier, impressed with the cheapness and effectiveness of a straw silo, plans to build one also, but he proposes to make the walls of banana-shaped bales, bound with wire and piled 20 feet high. The silo will be filled with chopped greenstuff delivered by a blower, adding molasses at the rate of 4 lb. a cwt.

Better Butter.

Every dairy farmer is directly interested in the discussions at the recent butter factory managers' conference in Brisbane. Maintenance of the good name of the Australian dairy industry, and, incidentally, the obtaining of a better price for our exported butter, depends, in the first instance, on the proper handling of cream. Cream which can rightly be graded as choicest is the first thing in the production of butter which now rivals the world's best. Correct grading and skilful manufacturing are also of greatest importance. Packing, finish, and general appearance are also very important factors in butter-marketing. "Nothing but the best" is the slogan which, if what it implies is applied, will mean not only maintenance of Australia's reputation abroad, but better business and bigger returns for our butter exports.

According to Sir Geoffrey Whiskard, British High Commissioner in Australia, "the time is past when Australia can find an ample market for everything and anything she produces; markets are now restricted, and primary producers must concentrate more and more on quality in the face of strong competition."

Limewash which Lasts.

Common limewash, made by slaking freshly burnt lime and diluting it with water, is often found to be friable when dry, and rubs or flakes off rather easily. Effort has, therefore, long been directed to the discovery of a method of preparation which will make the coating more resistant to rubbing, less liable to flake off, and having some waterproofing qualities.

At the start, it should be said that a good deal of the flaking which occurs is due to new coats being put over previous applications which are practically already detached from their base, and merely require the slight "pull" caused by a succeeding coat to cause them to break. There is no known way of overcoming this condition other than removal by washing or scraping of the defective coating.

Ordinary limewash is made by slaking about 10 lb. of quicklime with 2 gallons of water. As an ordinary fixative, alum, 1 oz. to the gallon, will stop whitewash from rubbing off easily.

Flour Paste.

Alternatively, the addition of flour paste, which, however, needs the further addition of zinc sulphate as a preservative to prevent mildew, may be tried.

A reliable recipe for interior use (walls, ceilings, &c.) is:—

(*a*) 62 lb. (1 bushel) quicklime, slake with 15 gallons of water, and cover with sacking till steam ceases to rise. Stir occasionally to prevent scorching.

(*b*) 2½ lb. flour, beat up in ½ gallon cold water, then add 2 gallons boiling water.

(*c*) 2½ lb. common rock salt dissolved in 2½ gallons hot water.

Mix (*b*) and (*c*), then pour into (*a*) and stir until well mixed. This produces a mixture of good brushing consistency, and is used in factories, being recommended to prevent easy ignition.

Where a weatherproof coating for use out-of-doors is required, the following is a recipe which should prove satisfactory:—

Place 1 bushel of good fresh quicklime in a barrel with 20 lb. of beef tallow, slake with hot water (about 15 gallons added gradually so as not to "drown" the lime) and cover with sacking to keep in steam. When the lime has slaked the tallow will have disappeared, having formed a chemical compound with the lime. Dry earth colours (ochre, sienna, &c.) may be added before slaking if a cream or buff tint is desired. The mixture should be stirred occasionally, and thinned to easy-flowing consistency with clear water when cold.

"Lighthouse" whitewash, again suitable for exterior purposes and used for coastguard buildings, is made in the following way:—

(*a*) 62 lb. (1 bushel) quicklime, slake with 12 gallons hot water;

(*b*) 12 lb. rock salt, dissolve in 6 gallons boiling water;

(*c*) 6 lb. Portland cement.

Pour (*b*) into (*a*) and then stir in (*c*) and use at once.

Skimmed milk used in place of diluting water is sometimes advocated to increase the tenacity of the wash, and an old recipe for external colouring of farm buildings is:—Lime ½ bushel slaked with 1 gallon of milk and remainder of water; 1 lb. salt, ½ lb. zinc sulphate to withstand weather.

It has been found that an old cobwebby roof not easily accessible to brushing can be effectively cleaned by machine-spraying with common limewash (well strained) which will bring the dust and cobwebs down, so that a second application produces a reasonably clean, white finish.

—*Edwin Gunn in "The Farmer and Stockbreeder" (England).*

Oranges as Cow Feed!

Oranges can be fed to cows, not only as an occasional "shout," but as a staple diet. This claim is made by science workers at the Jewish Agricultural Experiment Station in Palestine. The object of the experiments is not only to improve the dietary of milking cows, but also to make use of surplus oranges which cannot be exported.

The investigators do not mention, however, whether the cows produce milk with an orange flavour. If they do, they'll soon win wide popularity as mobile milk bars! The possibility of other fruit flavours in the morning milk are infinite.

Farm Notes

NOVEMBER.

Wheat-harvesting will become general in November, and now is the time to see that all field equipment—header-harvesters, tractors and other machinery—is in thorough working order. All working parts should be oiled and examined and necessary readjustments made in order to avoid the risk of stoppages in busy times.

Rust is not the menace that it used to be, now that more or less rust-resistant varieties are in general cultivation. Three Seas and Seafoam wheats are moderately resistant, while other varieties—such as Flora and Florence—usually ripen early enough to escape rust.

November is regarded as the best time for the establishment of the main maize crop, because the tasselling period coincides usually with normal summer rains. Too much attention cannot be given to the preparation of land for maize, which should now be well advanced, for no amount of inter-row cultivation will overcome the retarding influence of faulty initial preparation. Inter-row cultivation should become progressively shallower as growth proceeds, and may be discontinued at the cobbing stage.

Increased attention is being given to the growing of grain sorghums, chiefly in districts where the rainfall is insufficient to assure profitable yields from maize. Instances are known of yields up to 12 bags to the acre being obtained under conditions which were fatal to maize, while the capacity of header-harvesters to deal with the new dwarf-growing varieties is a big factor in economical production.

For intermediate crops, the rapidly maturing millets, Japanese millet and white panicum, can be recommended for present sowing, being suitable for grazing, silage, or hay. If seed production is desired, preference should be given to the variety known as Giant Panicum or Giant Setaria, and to the French millet.

Local potatoes and onions will now be arriving on the market, and, in order to obtain the best possible returns, attention should be given to grading, and to marketing produce in good, clean bags.

To retard infestation by the potato tuber moth, the potatoes should be bagged and removed from the field without delay, as, if exposed overnight, some infestation may occur during storage.

The planting of peanuts will be continued in the main South Burnett districts, where Virginia Bunch and Red Spanish are the principal varieties grown. Growers are reminded of the better germination obtained where seed is treated with a fungicide before sowing.

In addition to the crops mentioned, seasonal sowings of Sudan grass, broom millet, buckwheat, pumpkins, and melons can be made, and cow cane and sweet potatoes planted out.

Where broom millet is grown as a side-line, it is sometimes preferable to make small successive sowings in order to spread the harvesting over a longer period.

Orchard Notes

THE COASTAL DISTRICTS.

Citrus Fruits.

In the citrus orchard increasing temperature and the possibility of a dry period call for the utmost attention to soil conditions, particularly aeration and moisture conservation. At the slightest sign of distress because of lack of moisture, trees should be irrigated thoroughly whenever water is available. At the same time attention should be given to cultivation, particularly on hillside orchards. In the coastal districts the possibility of the approach of storms will prompt growers to consider the completion of each cultivation by forming shallow drains for running off excess water and preventing soil losses.

The incidence of mites, which are the direct cause of the darkening of the skin of the fruit, a condition known as "Maori disease," is another matter for observation. Usually the first indication of the trouble is when, with the sun shining on it, the fruit has the appearance of being covered with a grey dust. If examined with a good lens, the skin will be seen to be covered with numerous yellow slug-like insects which are living on the skin.

Under certain weather conditions scale movement may be expected.

Detailed information regarding insect control may be obtained from departmental publications on the subject.

Pineapples.

Continue planting pineapples as discussed in these notes last month, always remembering that the modern practice is smaller areas, close planting with more pineapples to the acre, quicker, better and healthier growth, and finally better fruit by liberal fertilizing through the leaf bases with 10-6-10. Collectively, these practices tend towards the elimination of wilt.

Bananas.

New Plantings.—November and December are very suitable planting months in most districts. Just as modern methods have brought about great improvements in pineapple culture, so they might be applied in principle to banana-growing. Smaller areas and large production per acre should cut overhead costs, lighten labour, lengthen the profitable life of the plantation, and reduce the time of waiting for the crop. To this end, select planting material with care, plant in large holes, and break up the ground as soon as possible after planting. To prevent the loss of top soil by erosion and to provide the bananas with a cooler and moister environment, plant a cover crop as soon as the weather permits and initial weed growth has been suppressed. This will hold the loose surface soil during the summer rains.

Young Plantations.—The correct follower or followers for each plant should be selected, if not already done, and all additional suckers suppressed. Cultivate to conserve moisture, and mulch with a cover crop. A complete fertilizer will improve the coming crop.

Old Plantations.—De-sucker to one follower to each plant. Apply a complete fertilizer, if not already done, and cultivate to conserve moisture.

General.—Bait for borers; be prepared for caterpillar plagues; watch for bunchy top.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

KEEP the orchards and vineyards in a thorough state of cultivation, so as to keep down all weed growth and conserve moisture in the soil. This is important, for if a long spell of dry weather sets in, the crop of summer fruit will suffer severely from the lack of moisture. Citrus trees should be irrigated where necessary, and the land kept in a state of perfect tilth. Spraying for codling moth should be continued, and all pip fruit trees should be bandaged by the beginning of the month; further, the bandages should be examined at frequent intervals and all larvæ contained in them destroyed. The neglect to spray thoroughly and to attend to the bandages properly is a cause of the increase in this serious pest in the Granite Belt, and growers are warned that they should pay more attention to the destruction of this pest if they wish to grow pip fruit profitably. Fruit fly may make its appearance in the cherry crop; if so, every effort should be made to stamp out the infestation at once. Unless this is done, and if the fly is allowed to breed unchecked, the later ripening crops of plums, peaches, apples, pears, apricots, and Japanese plums are bound to become more or less badly infested. Combined action should be taken to combat this the most serious pest of the Granite Belt, and growers should realise that, unless they take this action and see that careless growers do not breed the fly wholesale, they will never keep it in check, and it will always be a very heavy tax on their industry. A sharp lookout should be kept for brown rot in fruit, and, on its first appearance in a district, all ripening fruit should be sprayed with lime sulphur 1 in 120.

All grape vines, potatoes, and tomatoes should be sprayed with Bordeaux or Burgundy mixture, as required, for the control of downy mildew and anthracnose of the grapes, and Irish blight and target spot of the potato and tomato.

A "LIGHTNING" FENCE.

Here is a useful idea when a temporary fence is required, for example, to run a piece of netting round some green crop so that it can be fed down by sheep. Staples can be driven into stakes or posts, the wire or netting is pressed against the

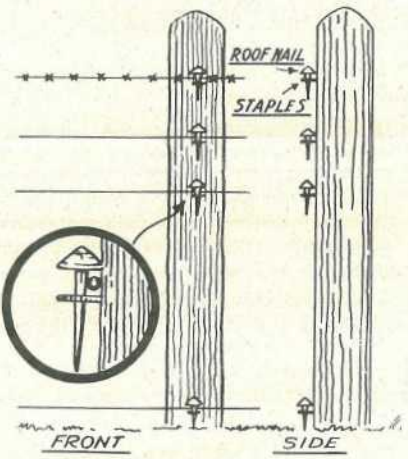


Plate 225.

post, and a roofing nail is dropped through the staples, as illustrated. In winter, when the stakes could be driven in with a mall and pulled out without difficulty, this would be an excellent form of "lightning" fence, which would be useful in many ways.

Maternal and Child Welfare.

Under this heading is issued each month an article, supplied by the Department of Health and Home Affairs Maternal and Child Welfare Service, dealing with the welfare and care of mother and child.

BABY CLINICS AND THEIR IMPORTANCE IN PREVENTIVE MEDICINE.

IN 1917 four infant welfare centres known as baby clinics were established in Brisbane by the Queensland Government. From this small beginning child welfare work in the State has gradually grown until to-day there are 126 centres and branches spread over Queensland. These extend along the coast from Mossman in the north to Coolangatta in the south, into the interior from Mount Isa in the north-west to Cunnamulla and Quilpie in the south-west and along the railway lines connecting the interior with the coast. Child Welfare Service is still a growing one.

The gap in the supervision of the physical development of the child between infancy and school age is being gradually filled. For years our nurses have been making a study of the values of all common foods, including their vitamin and mineral content. This knowledge they have been disseminating in a practical manner amongst the mothers with whom they have come into contact during their work in various parts of the State. As a result of their efforts a better understanding of nutrition has come about.

Originally the activities of the Infant Welfare Service were concentrated on saving the lives of infants. It soon became evident, however, that the health of the infant was intimately bound up with the health and well-being of the mother. The efforts to save the lives of children and the attempts to render motherhood safe became merged into a

common endeavour. Hence it was that in 1929 two ante-natal clinics in connection with our baby clinics, and recently a number of branch clinics in the metropolitan area and suburbs, were opened.

For some time past it has been realised that the title "baby clinics" did not adequately designate the nature of the work undertaken. For this reason the Department of Health and Home Affairs has approved of the title Maternal and Child Welfare Centre instead of Baby Clinic being applied.

Sickness Prevention.

In spite of the fact that welfare centres have been in existence in Queensland so long there is still present in the minds of many people a misunderstanding regarding the objects for which they were established. There are still those who think that these centres exist for advice and treatment of those who are sick. This is not so. These centres have been established with the object of preventing sickness. It is inevitable that sickness will occur, but much can be prevented by a knowledge of the first signs and symptoms of disordered bodily function and of the methods by which disease is spread. It is in regard to the prevention of sickness that our nurses, who hold general, obstetric and child welfare certificates, are qualified to advise mothers.

The Expectant Mother.

One of the most important aims of the Maternal and Child Welfare Service is to help expectant mothers. It is not intended that the nurse should take the place of the doctor, to whose work the nurse's should be complementary. As the result of her special training in the principles of nutrition the welfare nurse is well qualified to advise the expectant mother in regard to the selection of food and its preparation. She is qualified to detect the early signs of departure from a state of health and refer the mother to the medical attendant.

The New-born Infant.

Another important object of the Maternal and Child Welfare Service is to visit as early as possible all mothers of new-born infants in the district in which each centre is situated. To enable this to be done a copy of the birth notice is received within a few days of the birth and this makes it possible for the nurse to see the mother at a time when advice is most needed. In the first place the welfare nurse advises the mother that she can feed her baby naturally either wholly or partly. She informs the mother that the baby who is fed naturally is healthier and happier than one who is fed unnaturally. The nurse invites the mother to visit the Clinic regularly for supervision. If the mother experiences any difficulty in regard to baby's care or management the nurse is able to advise her.

The Pre-school Child.

The Maternal and Child Welfare Service also supervises the management and the feeding of the toddler. When he reaches school age he comes under the supervision of the School Medical Service. Food plays a very important part in maintaining health. It must be of the right kind as well as sufficient in amount. The diet should include milk, meat, including fish, poultry, liver and kidney, eggs, cheese, butter, lettuce, grated carrot, tomatoes, cooked vegetables, including potatoes, peas, beans, cauliflower, marrow, pumpkin, chokos, uncooked fruit,

including apple, papaw, orange, wheatgerm meal or wholemeal bread. If the diet is deficient the teeth, as well as the general health, will suffer. In fact, the condition of the teeth may be regarded as an index of general nutrition.

Information on all matters relating to infant and child welfare may be obtained by visiting the nearest Maternal and Child Welfare Centre (Baby Clinic), or by writing to the Sister in Charge, or by communicating direct with the Maternal and Child Welfare Centre (Baby Clinic), Alfred Street, Fortitude Valley, N.1., Brisbane.

IN THE FARM KITCHEN.

CHEESE FLAVOURING.

Cheese and Rice Croquettes.

Take 1 cupful grated cheese, 2 cupfuls cold boiled rice, 1 egg, 1 cupful milk, ½ cupful butter, one-third cupful flour, salt, paprika, chopped parsley, breadcrumbs, 1 egg.

Melt the butter in a saucepan, add the flour, and gradually stir in the milk, keep stirring until it thickens, add cheese, and stir till melted. Season to taste. Cool, add rice, and shape into croquettes. Roll in fine dry breadcrumbs, then in slightly-beaten egg, and lastly in breadcrumbs, and fry in smoking hot fat until golden brown. Garnish with chopped parsley.

Cheese and Cabbage.

Take 1 cupful grated cheese, ¼ cupful breadcrumbs, 2 cupfuls milk, 3 cupfuls cooked cabbage 4 tablespoonfuls butter, salt, pepper to taste.

Melt the butter, add the flour, and blend together. Stir in the milk till smooth and creamy, and simmer slowly for about ten minutes. Add cheese, cabbage, and seasoning to taste and mix thoroughly. Pour into a greased pie-dish, cover with bread-crumbs, place small dabs of butter on top, and bake in a moderate oven for about half an hour.

Cheese Sausages.

Take 1 oz. Parmesan cheese, 2 oz. cheddar cheese, 1 whole egg, 1 egg-yolk, 1 oz. butter, ¼ pint milk, 2 oz. flour, salt, cayenne, egg and breadcrumbs, deep fat for frying.

Melt the butter in a saucepan add the flour, then stir in the flour, and continue stirring until the mixture becomes thick and smooth and leaves the sides of the pan, then draw aside and cool the mixture a little. Add the egg-yolk, and, when well mixed in, add the whole egg and beat it well for a few minutes. Stir in the finely-grated cheese, add seasoning to taste, then turn mixture on to a plate and leave it till firm. Divide the firm mixture into twelve portions. Form them into sausage shapes, brush them with egg, and coat them with breadcrumbs, then put them in a frying basket and fry them in hot fat until golden brown. Drain the cheese sausages, and serve them garnished with parsley.

Cheese and Celery au Gratin.

Take 1 cupful cooked spaghetti, 1 cupful white sauce, 1 cupful grated cheese, ½ cupful breadcrumbs, 2 cupfuls diced celery, butter.

Mix celery and spaghetti, cut into small lengths, together. Stir in white sauce and grated cheese, mixing well throughout. Turn into a fireproof dish. Cover with breadcrumbs. Dab all over with tiny bits of butter. Bake in the oven till golden brown on top.

Golden Cheese Marbles.

Take 1½ cupfuls cheddar cheese, 2 egg-whites, 2 tablespoonfuls flour, paprika, ½ teaspoonful celery salt.

Beat the egg-whites till light, but not stiff, add the flour, cheese, paprika, and celery salt, then roll the mixture into balls the size of marbles, and fry till golden brown in deep fat. Serve on a hot dish lined with a lace paper doily.

Cheese Eggs.

Take 4 eggs, 1½ oz. butter, 1 teaspoonful chopped parsley, 4 dessertspoonfuls grated cheese, salt and pepper, hot buttered toast.

Make four pieces of hot buttered toast, and keep them warm. Beat up the eggs. Grate the cheese finely and add it to them. Wash, scald, and chop the parsley finely and add this also. Mix together and season with pepper and salt. Melt the butter in a small saucepan, add the eggs, &c. Stir over a very low gas until the cheese melts and the eggs thicken and set. Heap on the toast and serve at once.

Cheese and Onion Toast.

Take 3 oz. grated cheese, 1 oz. butter, 1 onion, 1 egg, ½ teaspoonful flour, pepper and salt, 2 slices toast, parsley.

Peel and boil the onion in a covered saucepan until tender. Drain well, then mince. Melt butter in a saucepan, and stir in flour and onion. Stir till frothy. Season to taste. Stir for a moment over heat, then cool slightly and stir in egg and cheese. Stir till cheese is melted. Serve on hot buttered toast, cut in half, and garnish with parsley.

Cheese Flakes.

Take 2 oz. cheese, salt, and cayenne, ¾ lb. flaky pastry, 1 egg-white.

Grate the cheese finely. Take a good flaky pastry and roll it out very thinly, then turn it on to the other side. Beat the egg-white until slightly frothy. Cut the pastry into small squares. Take one-third of the squares and brush them over with some of the egg-white. Sprinkle grated cheese over, then season with salt and cayenne. Place another square on top of each, press it down lightly, brush over with egg-white, and sprinkle with cheese as before, then cover with another square and again press lightly. Brush the tops with egg-white. Place on a baking sheet. Bake in a hot oven from ten to fifteen minutes.

Cheese Fritters.

Take 1½ cupfuls milk, ¼ lb. cheese, 1 teaspoonful paprika, 1 beaten egg, 9 tablespoonfuls flour, 1 small grated onion, 1½ teaspoonfuls salt, breadcrumbs.

Place the milk and flour in a saucepan. Stir till the flour is dissolved. Bring to the boil. Cook for two minutes. Add the finely-cut cheese, onion, paprika, and salt. Turn on to a greased plate and set to cool. It should take about three hours to become firm enough to mould into cutlets. Mould into shape. Roll in flour. Dip in beaten egg, then crumbs. Fry in hot fat until brown. Garnish with watercress.

NO "BUTS" ABOUT BUTTER.

Queensland's sunny climate and the green grass which grows all round (at most seasons) give to our butter a richness in Vitamin A which is denied to most colder countries.

Vegetable fats do not contain this vitamin, which is essential for full health and development. The minimum quantity of butter recommended is 4 oz. per head per week for each member of the family over seven years of age. This quantity can, with advantage, be doubled.

There is no doubt about the nutritional superiority of butter over jam or margarine. Butter has qualities that merit its favour for other reasons than as a fuel for the body.

Butter flavour is at its best when combined with fresh nutty wholemeal or wheat-germ bread. As an addition to cooked vegetables, the texture is improved by butter and the flavour enhanced. The same sunshine that makes Queensland butter so nutritious makes it necessary to store it in refrigerator or ice chest. Modern methods of distribution keep butter firm, but once delivered to the home, the responsibility is that of the housewife. Firm butter is a firm favourite.

With the tendency to reduction in the consumption of white bread and cakes, new uses for butter are needed if an adequate intake is to be maintained. One of the advantages of butter is that there is no waste; it is completely digestible. The modern system of butter inspection and grading gives a uniform product which never varies in texture, appearance, and wholesomeness.—*Queensland Nutrition Council.*

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1939 AND 1938, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of years' records.	Aug., 1939.	Aug., 1938.		Aug.	No. of years' records.	Aug., 1939.	Aug., 1938.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	0·89	38	0·19	0·98	Gatton College ..	1·09	40	..	1·25
Cairns	1·71	57	0·52	1·50	Gayndah	1·15	68	1·68	1·97
Cardwell	1·25	67	0·90	1·19	Gympie	1·70	69	1·85	1·55
Cooktown ..	1·18	63	0·23	0·53	Kilkivan	1·40	60	1·80	1·61
Herberton ..	0·63	53	0·16	0·63	Maryborough ..	1·66	68	1·39	1·82
Ingham	1·44	47	1·27	1·59	Nambour	1·86	43	3·36	0·74
Innisfail	4·99	58	0·73	9·64	Nanango	1·31	57	1·67	0·99
Mossman Mill ..	1·28	26	0·68	1·09	Rockhampton ..	0·81	68	1·18	1·42
Townsville ..	0·49	68	0·54	..	Woodford ..	1·63	52	2·25	0·63
Central Coast.					*Central Highlands.*				
Ayr	0·53	52	1·35	..	Clermont ..	0·68	68	1·17	1·41
Bowen	0·62	68	0·63	..	Gindie	0·63	40	..	0·85
Charters Towers ..	0·50	57	0·53	..	Springsure ..	1·01	70	1·07	0·85
Mackay P.O. ..	1·00	68	1·03	0·27	*Darling Downs.*				
Mackay Sugar Experiment Station	0·84	42	..	0·24	Dalby	1·19	69	1·08	1·20
Proserpine ..	1·38	36	0·31	1·88	Emu Vale ..	1·09	43	1·77	1·52
St. Lawrence ..	0·78	68	1·02	0·10	Hermitage ..	1·15	33	..	0·94
South Coast.					Jimbour	1·14	51	0·74	1·18
					Miles	1·13	54	1·05	2·92
Biggenden ..	1·09	40	1·55	1·89	Stanthorpe ..	1·78	66	2·18	2·27
Bundaberg ..	1·27	56	3·56	1·33	Toowoomba ..	1·62	67	1·73	1·62
Brisbane	1·95	87	2·29	1·21	Warwick	1·45	74	1·44	1·72
Caboolture ..	1·50	52	2·21	0·83	*Maranoa.*				
Childers	1·21	44	3·43	2·01					
Crohamhurst ..	2·16	46	2·52	0·92	Bungeworgorai ..	0·70	25	..	0·65
Esk	1·44	52	1·29	1·48	Roma	0·89	65	1·08	0·68

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—AUGUST, 1939.

COMPILED FROM TELEGRAPHIC REPORTS.

Districts and Stations.	Mean Atmospheric Pressure, at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·93	78	58	87	23	51	5, 11, 12, 29	23	2
Herberton	..	75	40	84	28, 29	28	4, 5	16	1
Rockhampton	29·96	76	49	90	28	41	4, 13	118	5
Brisbane	29·90	71	50	88	29	42	13	229	4
Darling Downs.									
Dalby	29·95	67	39	86	28	29	13, 15	108	3
Stanthorpe	..	57	34	77	28	22	13, 18	218	10
Toowoomba	..	63	40	83	28, 29	29	13	173	7
Mid-Interior.									
Georgetown	29·97	82	45	88	27, 28, 29	33	5	..	..
							5		
Longreach	29·99	74	44	92	28	35		80	2
Mitchell	29·95	67	39	87	28	29	12	141	3
Western.									
Burketown	29·99	83	52	92	21	43	4	..	..
Boulia	30·05	74	45	91	27	38	4, 5, 7, 9	3	1
Thargomindah ..	29·92	69	44	89	26, 28	33	5	50	2

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	October, 1939.		November, 1939.		Oct. 1939.	Nov., 1939.
	Rises.	Sets.	Rises.	Sets.	MOONRISE. Rises.	MOONRISE. Rises.
					p.m.	p.m.
1	5·33	5·51	5·3	6·9	8·12	9·49
2	5·31	5·51	5·2	6·10	9·7	10·45
3	5·30	5·52	5·1	6·11	10·3	11·34
4	5·29	5·53	5·0	6·12	11·0	..
					a.m.	a.m.
5	5·28	5·53	5·0	6·12	11·52	12·17
6	5·27	5·54	4·59	6·13	..	1·0
					a.m.	
7	5·26	5·54	4·58	6 14	12·24	1·45
8	5·25	5·55	4·58	6·14	1·33	2·26
9	5·24	5·56	4·57	6·15	2·21	3·9
10	5·23	5·56	4·56	6·16	3·6	3·52
11	5·22	5·57	4·56	6·17	3·51	4·39
12	5·21	5·57	4·55	6·18	4·35	5·28
13	5·20	5·58	4·54	6·18	5·19	6·18
14	5·19	5·58	4·54	6·19	6·4	7·10
15	5·18	5·59	4·53	6·20	6·50	8·4
16	5·17	5·59	4·53	6·21	7·41	8·58
17	5·16	6·0	4·53	6·22	8·31	9·52
18	5·15	6·1	4·52	6·23	9·23	10·34
19	5·14	6·1	4·52	6·23	10·17	11·36
						p.m.
20	5·12	6·2	4·52	6·24	11·9	12·26
					p.m.	
21	5·11	6·3	4·51	6·25	12·3	1·18
22	5·10	6·3	4·51	6·25	12·51	2·7
23	5·9	6·4	4·51	6·26	1·44	3·0
24	5·8	6·5	4·50	6·27	2·36	3·54
25	5·8	6·5	4·50	6·28	3·25	4·49
26	5·7	6·6	4·50	6·28	4·17	5·47
27	5·6	6·7	4·50	6·29	5·11	6·45
28	5·6	6·7	4·49	6·30	6·6	7·44
29	5·5	6·8	4·49	6·30	7·2	8·38
30	5·4	6·8	4·49	6·31	7·57	9·30
31	5·3	6·9			8·53	

Phases of the Moon, Occultations, &c.

6th	Oct.	☾	Last Quarter	3 27 p.m.
13th	,,	●	New Moon	6 30 a.m.
20th	,,	☽	First Quarter	1 24 p.m.
28th	,,	○	Full Moon	4 42 p.m.

Perigee, 11th October, at 11 a.m.
Apogee, 23rd October, at 9 a.m.

On 22nd October Saturn will be in apposition to the Sun, rising as the Sun sets.

About 9 p.m. this most interesting planet would be in a favourable position for telescopic observation of its ring-system, which since 1936 has widened out until it is nearly half-way towards its greatest phase, when it will be opened to its fullest extent (1943). Since its discovery by Galileo with his "optic glass" (which showed him a small detached globe on either side of the planet). Great astronomers with powerful instruments have found the true nature of this beautiful and altogether unique ring-formation. Only fifty years after Galileo's discovery, Huyghens in 1655, announced in a latin cryptograph that Saturn "was surrounded by a ring, thin and flat, nowhere adhering and inclined to the ecliptic." Later it was seen that the system consisted of three rings, and lastly that these could not be rigid but must be composed of tiny particles revolving around the planet.

Of a partial eclipse of the Moon on the 28th, visible in Europe and North and South America, very little will be seen on the east coast of Australia, the Moon rising (at Warwick) when leaving the darkest shadow.

Mercury rises at 5.54 a.m., 21 min. after the Sun and sets at 6.20 p.m., 29 min. after it, on the 1st; on the 15th it rises at 6.1 a.m., 43 min. after the Sun, and sets at 7.8 p.m., 1 hr. 9 min. after it.

Venus rises at 5.57 a.m., 24 min. after the Sun, and sets at 6.21 p.m., 30 min. after it, on the 1st; on the 15th it rises at 5.52 a.m., 34 min. after the Sun, and sets at 5.44 p.m., 56 min. after it.

Mars rises at 12.46 p.m. and sets at 2.36 a.m. on the 1st; on the 15th it rises at 12.24 p.m., and sets at 1.5 a.m.

Jupiter rises at 5.28 p.m. and sets at 5.36 a.m. on the 1st; on the 15th it rises at 4.24 p.m. and sets at 4.35 a.m.

Saturn rises at 7.26 p.m. and sets at 6.54 a.m. on the 1st; on the 15th it rises at 6.26 p.m. and sets at 6.7 a.m.

4th	Nov.	☾	Last Quarter	11 12 p.m.
11th	,,	●	New Moon	5 54 p.m.
19th	,,	☽	First Quarter	9 21 a.m.
27th	,,	○	Full Moon	7 54 a.m.

Perigee, 8th November, at 7.0 a.m.
Apogee, 20th November, at 5.0 a.m.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhat about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.