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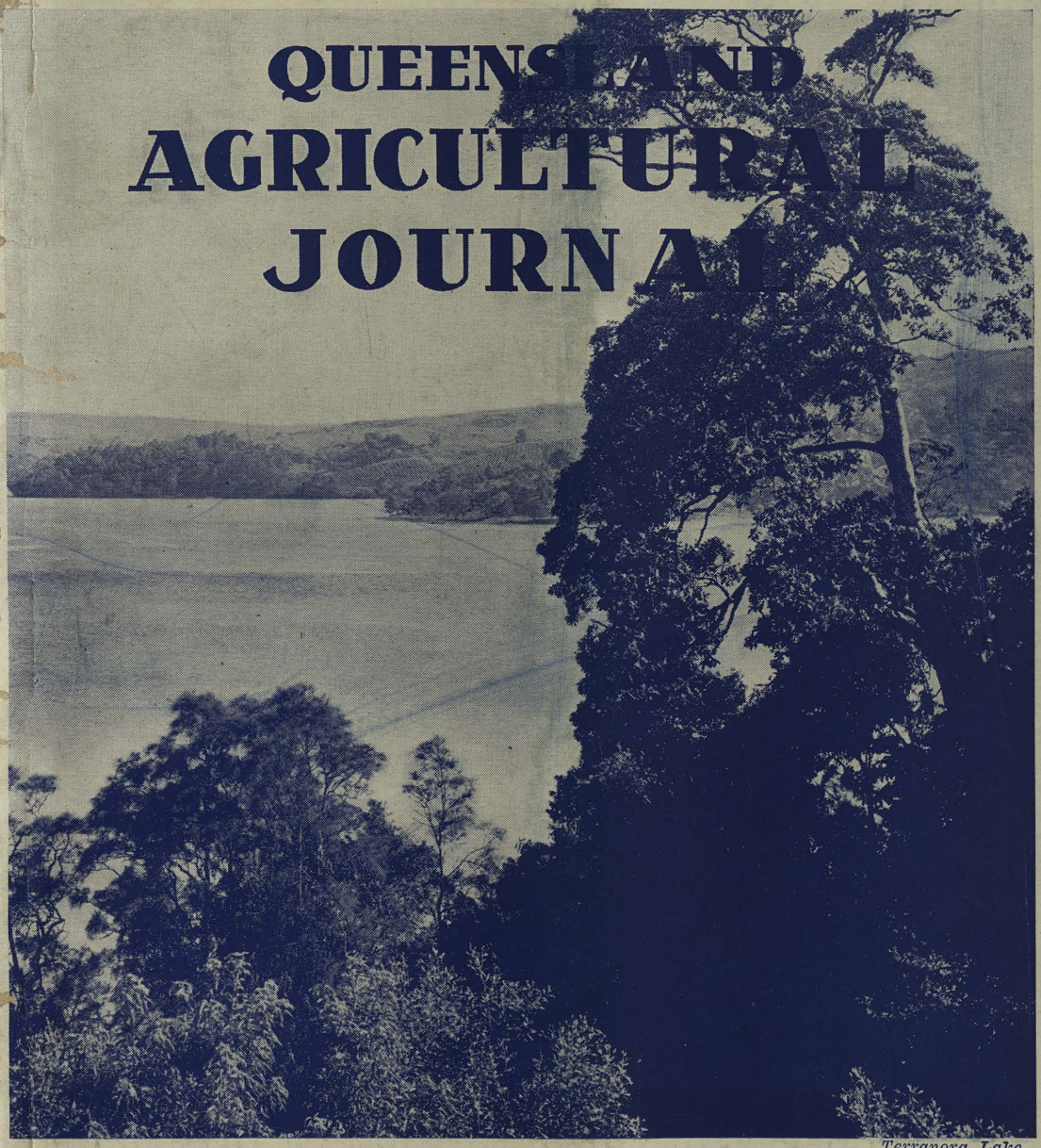
DEPARTMENT OF AGRICULTURE

QUEENSLAND AGRICULTURAL JOURNAL



Terranora Lake, Queensland Border.

LEADING FEATURES

Edited by J. F. F. REID

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Contents

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Event and Comment

National Cotton Needs.

IN the course of a recent statement to the Press, the Minister for Agriculture and Stock, Hon. Frank W. Bulcock, said that a very substantial increase in the production of Queensland cotton was required during the coming season.

The Minister pointed out that Australian consumption of raw cotton had increased so rapidly during the last two years that Queensland's production of cotton had been greatly exceeded. It had not only been an economic loss to this State that sufficient cotton had not been produced, but a serious drain on sterling exchange was now occurring through the necessity of having to purchase considerable quantities of cotton from non-sterling countries.

Mr. Bulcock stressed the fact that Queensland could grow cotton with most of the qualities of imported cotton, and it was therefore of national importance that all farmers who had suitable land should plant as large an acreage as they could properly cultivate. He added that the Queensland Government was seized with the necessity of increasing cotton production in this State and had embarked on a programme which aimed at stimulating the growing of cotton under conditions of supplementary irrigation facilities and the improvement of the average acreage yield.

As part of the programme covering cotton growing under irrigation, an officer trained in soil investigation in the irrigated areas of the southern States of Australia had been seconded from the Soils Division of the Council for Scientific and Industrial Research, to inquire into the suitability of the soils in areas proposed for growing cotton under irrigation in Queensland.

It was believed, Mr. Bulcock continued, that an appreciable acreage of cotton could be grown under irrigation by the use of individual pumping plants established on farms where ample supplies of either surface or underground waters are available. The Queensland Cotton Board had financed the installation of a few irrigation plants of this type during the last two seasons and encouraging results had been obtained.

The Government proposed, therefore, to investigate fully the merits of this system of cotton growing, and the Department of Irrigation and Water Supply had therefore developed a supply of underground water at the Biloela Research Station, in the Callide Valley, where a comprehensive programme of investigational work would be conducted by an officer especially appointed for this purpose.

The possibility of developing further supplies of underground water in the Callide Valley was now being explored by the Department of Irrigation, Water Supply and Sewerage, with the object of establishing demonstrational areas of cotton grown with supplementary irrigation under the supervision of officers of the Department of Agriculture and Stock. Complementary to these demonstrations, a series of experiments and demonstrations in the irrigation of cotton with surface water—such as streams or large lagoons—and in the northern districts, where water is easily obtainable at shallow depths in the alluvial deltas of rivers, had been planned.

Such a comprehensive programme, Mr. Bulcock thought, would provide sufficient data within a few seasons to determine the most efficient and economical method of growing cotton under irrigation. With such information available, the Government could then proceed with the development of the most practicable facilities for the extensive growing of cotton under irrigation.

Referring to the possibilities of growing cotton successfully without irrigation, Mr. Bulcock stated that the results which had been obtained by his Department from investigations related to growing cotton under rainfall conditions only, if practised in all of the areas of rain-grown cotton, would markedly increase the average acreage yield of cotton in this State. An increase in the extension activities of the department had therefore been planned. Obviously it would be impracticable to come in personal contact with all farmers who might be interested in growing cotton and it was stressed that farmers desiring detailed information should get in touch with the nearest agricultural officer. Qualified officers to advise on cotton growing are located—care of the Department of Agriculture and Stock—at Ayr, Mackay, Rockhampton, Biloela, Bundaberg, Monto, Gayndah, Kingaroy, Brisbane, and Bungeworgorai State Reserve, near Roma.

Mr. Bulcock mentioned that one of the outstanding results which had been obtained in the investigations by his Department had been the

demonstration of the benefits to be derived from a cotton-grass land rotational practice. Over a series of years and under a wide range of seasonal conditions, it had been demonstrated that cotton crops grown on cultivations in the first, second and possibly third year after the ploughing of old established grassland could usually be relied on to outyield crops grown on old cultivations of similar types of soil. In many instances, gains amounting to as much as 50 and even 100 per cent. had been realised.

Farmers intending to grow cotton, added the Minister, were, therefore, urged to plough up grassland for cotton cultivation if at all practicable. Farmers who engaged in dairying in the coastal areas around Rockhampton, in the Wowan district, Callide Valley, Upper, Central, South, and coastal sections of the Burnett, Brisbane Valley, the Fassifern, Lockyer, and along the southern slopes of the Main Dividing Range north and west of Toowoomba, should, he said, give careful consideration to this aspect of cotton growing. In all of these districts there were many farms on soils highly suitable for cotton production, which had an old pasture that was contributing little feed for the dairy herd and contained weed growth which often caused milk taint. By ploughing these old eaten-out pastures and planting them to cotton and sowing fresh pastures on some of the old cultivations, the farmer would not only aid in the national effort by growing cotton, but would improve the quantity and quality of his cream through grazing his herd on the newer pastures.

The Minister added that the Commonwealth Government had announced the new schedule of bounty payments for a period of five years as from 1st December, 1940. This provided the opportunity for Queensland to develop cotton growing on a scale that would be commensurate with the Australian requirements for raw cotton. It was particularly necessary, he emphasised, that under war conditions this be done, and farmers in the established cotton-growing districts should therefore make every effort to produce cotton on an efficient basis. By so doing, the value of cotton in the cropping rotations would be so thoroughly demonstrated that the cotton growing industry would be permanently established as a profitable rural enterprise.

Food for Britain.

THERE is every comfort in the reflection these days that every precaution is being taken to ensure the command of the seas. So far as the feeding of the people is concerned, the lessons of the last war are being applied skilfully and effectively. The Navy sees that the sea routes to Britain are kept open, a wise rationing policy is preventing waste—and these two factors are averting high living costs. In the meantime, foodstuffs are flowing into the British Isles with almost uninterrupted regularity. Protected by the might of the Navy, Australia and the other Dominnons can, if necessary, keep British pantries full of essential commodities. After all, it is the food supply of a nation that is a vital factor in war time, and the food supply of Britain is in safe keeping.

The Pineapple Soils of the Nambour, Woombye and Palmwoods Districts.

L. G. VALLANCE, M.Sc., Assistant Research Officer, and H. L. WOOD, B.Sc., Assistant to Research Officer.

CONTENTS.

I.—GENERAL DESCRIPTION OF THE AREA.

Location and Area.

THE area surveyed consists of approximately 2,200 acres in the Nambour, Woombye, and Palmwoods districts. These districts are located in the parishes of Maroochy and Mooloolah, county of Canning, south-eastern Queensland. The town of Nambour, which is the main centre, is situated on the North Coast Railway, 65 miles north of Brisbane. The smaller townships of Woombye and Palmwoods are respectively 3 miles and 5 miles south of Nambour, and both are also on the railway. Many portions of the area are within 10 miles of the coastline, and the heights of the railway stations at Nambour, Woombye,

and Palmwoods above sea-level are 52, 68, and 92 feet. The reference point for the parish—Lat 26° 40′ S., Long. 153° 00′ E.—is some 2 miles east of Woombye.

Topography.

The country is drained in the north by Petrie Creek, and in the west by Coe's Creek, which is itself a tributary of Petrie Creek. Woombye and the surrounding district is drained by Paynter Creek. This watercourse extends south to Palmwoods on the western side of the railway line and more or less parallel to it. The country is hilly, particularly in the Coe's Creek and Rosemount districts, which form the western and eastern flanks. South of Woombye the area which extends towards Palmwoods is characterised by the more gentle topography associated with the dark brown–red-brown soils.

In general, the dominating topographical features are the frequent ridges. These rise some 200 to 300 feet above sea-level and are 1 to 2 miles in length. They may be somewhat abrupt, but are usually long ridge slopes admirably suited for cultivation.

Geology.

Although it is flanked on the west by the basaltic uplands of the Blackall Range, igneous rocks of material importance do not occur in the area surveyed. Some minor intrusions were observed between Nambour and Rosemount.

The country rock of the area is a Mesozoic sedimentary series. This underlies both the dark brown–red-brown and the grey-brown soil groups. Coarse sandstones are of frequent occurrence, but there is a rather wide variation lithologically. Sometimes the structure is loose and incoherent, but quite often there is a considerable degree of compaction and cementation. These harder phases are usually ferruginous. Throughout the whole series, the joint planes and cracks are infilled with material rich in iron and silica which is much more resistant to weathering than the original rock. Soft greyish-white shales occur in close association with the sandstones. These usually contain plant remains similar to those of the shales of the Triassic Ipswich Coal Measures. Fossil wood is extremely abundant, and large trunks several feet in length occur throughout the district.

The soil formations are mainly secondary in relation to the sedimentary rock. The red-yellow-white mottled decomposition zone which directly underlies the soil proper must be regarded as the C or parent material. This feature is common to the major soil groups. The deepest observed depth of the mottled zone is 30 feet. In those cases where the sandstone is light-coloured and of a loose, incoherent nature, the mottled zone may be replaced by a BC horizon.

Vegetation.

An occasional development of tropical rain-forest occurs throughout the surveyed areas, particularly on the heavier soils of the Woombye series. Since these areas were amongst those first cleared for cultivation, however, the extent to which they originally occurred is unknown. The vegetation association of the greater part of the area is that of eucalypt forest. The most common eucalypts and macrovegetation are:—Tallowwood (*E. microcorys*), Yellow Stringybark (*E. acmenioides*), Blackbutt (*E. pilularis*), Red Stringybark (*E. resinifera*), Grey Gum

(*E. propinqua*), Spotted Gum (*E. maculata*), Red Bloodwood (*E. corymbosa*), White Bloodwood (*E. trachyphloia*), Turpentine (*Syncarpia laurifolia*), Paperbark (*Melaleuca leucadendron*), and the common bracken (*Pteris aquilina*).

Climatic Data.

Rainfall figures for the townships of Nambour and Palmwoods are given in Table 1. The nearest centre for which both temperature and relative humidity data are available is at Gympie, which is some 41 miles north of Nambour. Temperatures have also been recorded at Beerwah, 13 miles south of the area, and these are almost identical with those at Gympie. Temperature data for the latter station are given in Table 2.

TABLE 1.

RAINFALL DATA FOR NAMBOUR AND PALMWOODS.*

——	Jan.	Feb.	Mar.	April.	May.	June.
Nambour—						
Rainfall in Inches	9·62	9·74	8·99	6·32	4·68	3·75
Number of Wet Days	12	13	15	9	10	7
Palmwoods—						
Rainfall in Inches	10·01	10·90	8·71	6·70	4·39	3·78
Number of Wet Days	8	10	18	10	11	6

——	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Nambour—							
Rainfall in Inches	2·69	1·85	2·53	3·07	4·02	6·80	64·06
Number of Wet Days	6	7	8	7	6	8	108
Palmwoods—							
Rainfall in Inches	2·41	1·93	2·40	3·01	4·12	7·14	65·50
Number of Wet Days	5	6	6	8	9	6	103

* Averages for 41 and 42 years respectively.

TABLE 2.

TEMPERATURE DATA FOR GYMPIE.*

——	Jan.	Feb.	Mar.	April.	May.	June.
Mean Maximum	87·6	86·4	84·7	81·7	76·4	71·4
Mean Minimum	66·5	66·4	63·4	57·7	49·8	46·3
Rel. Humidity at 9 a.m.	74	76	77	77	77	78

——	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Mean Maximum	71·4	73·9	78·8	83·5	87·0	88·4	80·9
Mean Minimum	42·2	44·4	50·2	56·2	61·4	64·9	55·8
Rel. Humidity at 9 a.m.	75	73	68	65	65	68	73

* Temperature Averages for 24 years; Humidity Averages for 22 years.

Prescott (5) has shown that the formula "e = 260 s.d." expresses the relation between the saturation deficit "s.d." and evaporation "e" at a number of Australian stations.

The mean monthly evaporation calculated in this way from the mean monthly saturation deficit is compared with the mean monthly rainfall in Plate 6. It will be seen that the rainfall is greater than the evaporation for the major portion of the year—namely, from late November to July. During this period leaching is effective, and this is reflected in the low base status and high degree of unsaturation of the soils of the area.

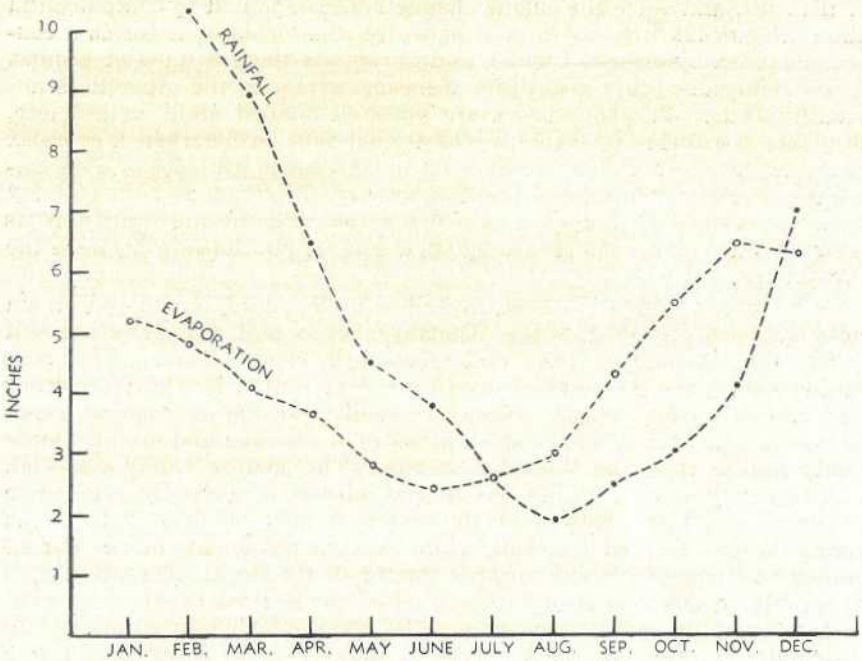


Plate 6.

Showing mean monthly rainfall and mean monthly evaporation in inches. The evaporation is calculated from the equation—

$$e = 260 \text{ s.d.}$$

The mean monthly rainfall during the spring months is less than the mean monthly evaporation. During this season the moisture-supplying power of the various soil types is of considerable significance.

The evaporation falls rapidly with the approach of the colder months and reaches a minimum in June. Autumn rainfall is considerable, though markedly less than in the summer. Consequently, soil phases characterised by an impeded water movement and a deficient aeration will have these tendencies accentuated during the winter months. Because of the xerophytic and epiphytic relationships of the pineapple plant (4), therefore, conditions such as these will result in serious injury to the roots of this crop during seasons of heavy winter rainfall.

The precipitation per wet day is 0·59 inch at Nambour and 0·64 inch at Palmwoods. This high intensity must considerably reduce the effectiveness of the rainfall to a figure much less than is implied by an annual precipitation of 64 or 65 inches.

II.—DESCRIPTION AND CLASSIFICATION OF THE SOILS.

The soils of the area fall naturally into two groups. These are:—

(1) The dark brown–red-brown soils, with reddish subsoils.

(2) The shallower soils with a grey-brown surface presenting a well-leached appearance and a characteristic yellow-brown subsoil.

The colour differences of these two groups form a noticeable feature of the soils, and since the colour change is accompanied by fundamental differences in texture, depth, and moisture relationships, it forms a convenient index by means of which to differentiate these two major groups. In the field, an abrupt transition from one group to the other does not usually occur. The boundaries are not well defined and, furthermore, they take the form of a general transitional zone rather than a complex of the two groups. A feature common to both is the presence of a decomposition horizon occupying a position between the solum and the country rock. This must be regarded as a C horizon, and the uniformity of its presence throughout the area suggests a genetic relationship between the two groups.

The group which has been described as the dark brown–red-brown soils has been classified as the Woombye Series and comprises two soil types—the Woombye loam and Woombye sandy loam. The soils falling within the grey-brown group are represented by the Palmwoods Series, Coe's Creek Series, Nambour sand, and the Rosemount sand. These occur generally on the steep hillsides of the area and are of a more sandy nature than the Woombye Series. The shallow sandy material, which usually overlies an impervious clay subsoil, is markedly susceptible to erosion. At the bottom of the slopes it may be deepened by the accumulation of silted material, while exposed pavements of the parent sandstone frequently occur towards the top of the slope. The prevalence of serious erosion renders the definition of the normal profile very difficult. Under these circumstances it is impracticable to attempt any systematic mapping of the soil type boundaries. On many slopes, due to the gradual building-up towards the bottom, the normal profile is best regarded as a more or less uniform catena, and this concept is quite a useful one when applied to all the soils of the area. It should be noted that, from an agricultural viewpoint, the variation within any of these soil types due to erosion is often greater than the variation between the types themselves.

The Rosemount clay loam is not included in the two major soil groups. It is an immature soil and its parent material is a coarsely laminated shale, which is not typical of the country rock of the area. The distribution of this soil with regard to the present pineapple-producing land is not very extensive. However, strict attention to its particular requirements of soil management will allow the successful production of pineapples on this soil type. For this reason it has been included in the survey.

Woombye Series.

The Woombye Series, with its characteristic red-brown colour, is a feature of the Nambour-Woombye-Palmwoods area. The major development is on the long, gentle, and unbroken ridges near the township of Woombye, and extending generally southwards to Palmwoods. It is developed on a sedimentary series of sandstone. This primary material is mainly obscured by a thick, mottled decomposition zone, which has

been observed in places to a depth of 30 feet. The series falls naturally into two types—Woombye sandy loam and Woombye loam. They are differentiated by the textural properties of their surface soils and subsoils. The influence of these properties on their moisture relationships is discussed subsequently.

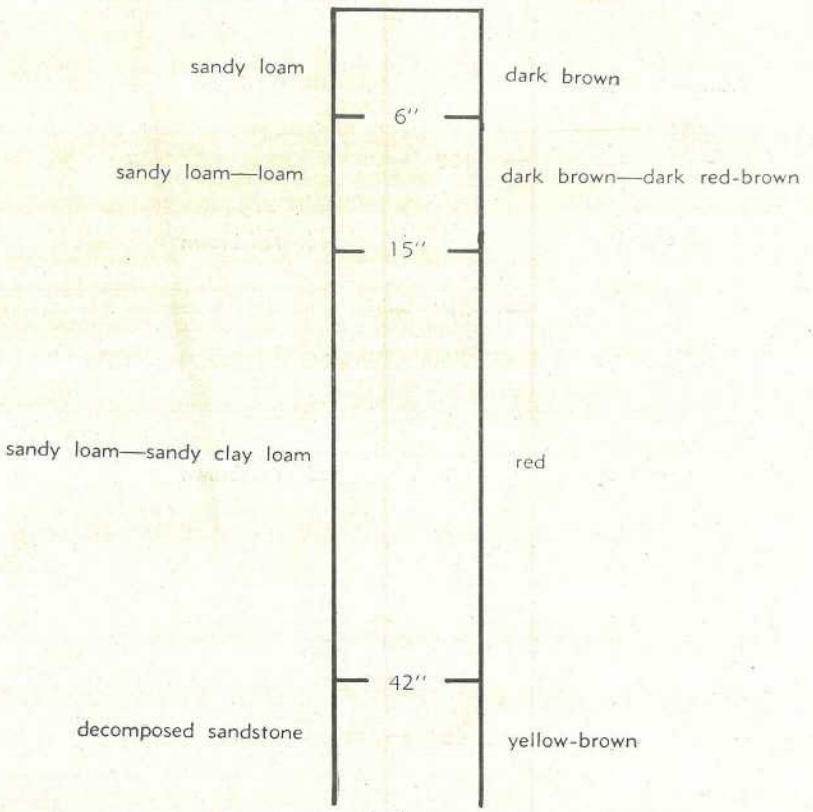


Plate 7.
Woombye Sandy Loam.

Woombye sandy loam.—A typical profile of this soil is diagrammatically represented in Plate 7. The surface is a dark brown sandy loam. This A_1 horizon grades uniformly into the A_2, which is slightly heavier in texture, and in which the red-brown colour becomes predominant as the organic matter decreases. Normally there is no A_0 horizon. In the normal profile the A horizon varies from 12 to 15 inches deep. The structure is not well defined but is usually in the form of soft, irregular aggregates. These break easily. They are friable and contribute to the porosity of the soil.

In the type profile the illuvial horizon begins at a depth of 15 inches. In common with the majority of the coastal soils of southern Queensland, there is no abrupt line of demarcation between the eluvial and illuvial horizons. The texture of the B horizon is sandy loam to sandy clay loam. The coarse sand is still predominant in the sand fraction. Due to the low percentage of fine sand and silt, the increased clay content imparts a sandy clay loam texture rather than a loam. However,

the drainage is not impeded and, usually, the subsoil is friable and open. The structure is similar to that of the A horizon, except that the irregular aggregates are firmer and somewhat larger. Root penetration through soil and subsoil is quite good.

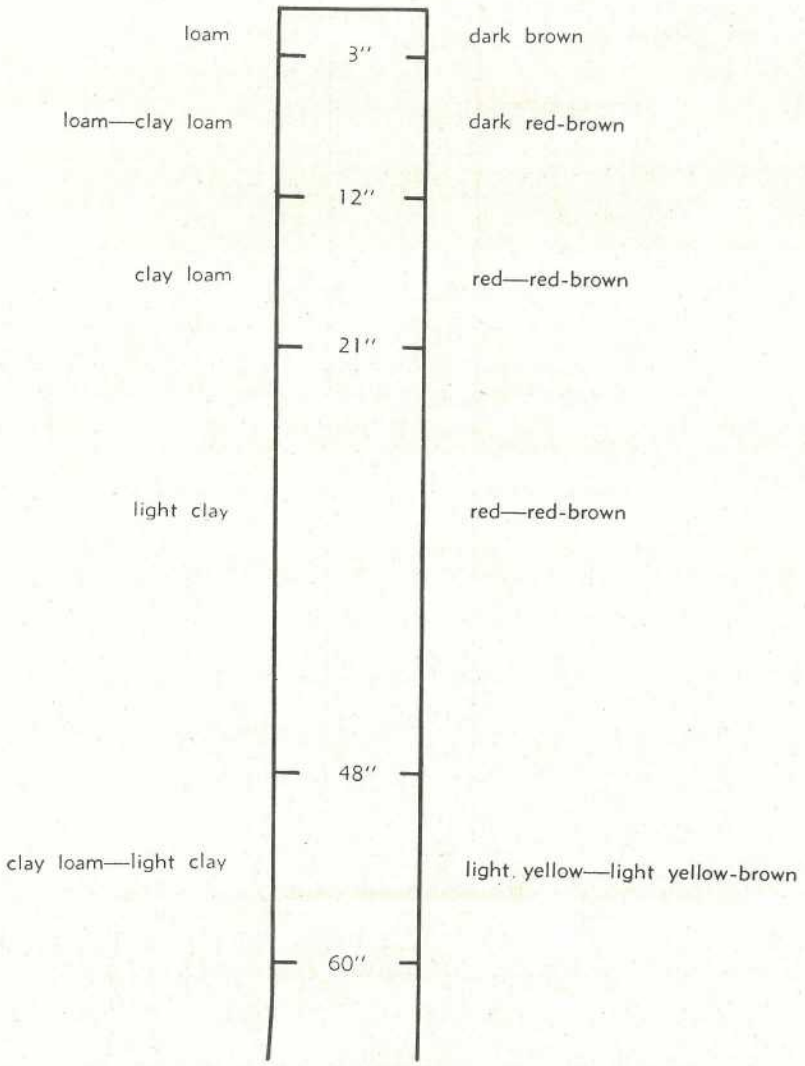


Plate 8.
WOOMBYE LOAM.

The C horizon is a mottled zone, mainly yellow-brown in colour, and consists of decomposed sandstone. This is sticky when wet. It is impermeable. The inorganic colloid separated from this horizon is yellow in colour and contrasts sharply with the bright red of the colloid of the A and B horizons. This higher degree of hydration of the iron oxides may be taken as an index of wet and anaerobic conditions. However, since this zone occurs at a depth of 3½ feet to 4 feet under normal conditions, it has little or no ill effect on the rooting system of the pineapple plant.

Stoniness is usually confined to the topmost portion of the A horizon. Quite frequently the surface is characterised by irregular-shaped pieces of "ironstone." These are more or less flat and are of an accretionary nature, consisting of sand grains cemented to a hard coherent mass by material which is mainly ferruginous. Normally, these are neither sufficient in number nor large enough in size to present any serious obstacle to cultivation.

Woombye loam.—This soil type occurs in close association with the Woombye sandy loam. Its topographical features are similar, and, although in some cases it may occupy a steep slope, it is generally characterised by gentle ridges and plateaux of limited area. It is distinguished from the sandy loam chiefly by its texture, which is consistently heavier throughout the profile until the C horizon is encountered. This may readily be seen by contrasting Plates 7 and 8.

The surface horizon in the type profile is a dark brown loam. A well-developed crumb structure is generally present. The profile becomes progressively heavier with depth, and at 12 inches the subsoil has the texture of a clay loam. The colour here is red to red-brown, and the bright colour of the inorganic colloid is not masked by organic matter. Reference to the Appendix shows that there is a marked decrease in the organic matter in the lower horizons; actually, the organic carbon below 3 inches deep is less than one-half of that in the surface (A_1) horizon.

At a depth of about 20 inches the texture becomes moderately heavy, and is best described as light clay. It is compact, and thus water movement is impeded. This is in direct contrast to the B horizon of the Woombye sandy loam, which is friable and open. Under normal conditions, as exemplified by the type profile, it provides a favourable environment for the root development of the pineapple plant.

Quite frequently, erosion has removed portion of the A horizon of the Woombye loam, so that this heavy material may occur within 12 inches of the surface. Under those circumstances, and in view of the prevailing climate, such soil conditions are definitely unfavourable for pineapple culture.

Palmwoods Series.

Towards the south of the area under review a group of soils occurs in close association with the Woombye soils which have been termed the Palmwoods Series. This series may be divided into two types—the Palmwoods sand and Palmwoods sandy loam. From the point of view of topography, parent material, and vegetation association, they possess many similarities with the Woombye soils. It would appear that the profile characteristics of the Palmwoods Series occupy an intermediate position between the two major groups, which have been described as the dark brown–red-brown soils, and the grey-brown soils with yellowish-brown subsoils. While some of the red colour of the Woombye Series is in evidence, a yellowish tinge is predominant, and the soils have a more highly leached appearance. Reference to the Appendix indicates a much lower content of Fe_2O_3 and a corresponding decrease of total sesquioxide (R_2O_3). Similarly, the texture of the surface soil becomes more sandy in the Palmwoods sand.

Palmwoods sand.—The surface soil of this type is a dark brown–yellow-brown sand. It is somewhat darkened by organic matter which decreases sharply in the A_2 horizon. In common with the other soils of

the area, there is no A_0 horizon. In the A_2 the clay increases slightly, and the texture is a sandy loam to sandy clay loam. In the type profile (Plate 9), the B horizon commences at a depth of 12 inches, and this sandy clay loam subsoil continues to a depth of 3 feet. The colour of the profile is characteristically yellow-brown to red-brown, with the exception of the surface horizon, which is coloured by organic matter.

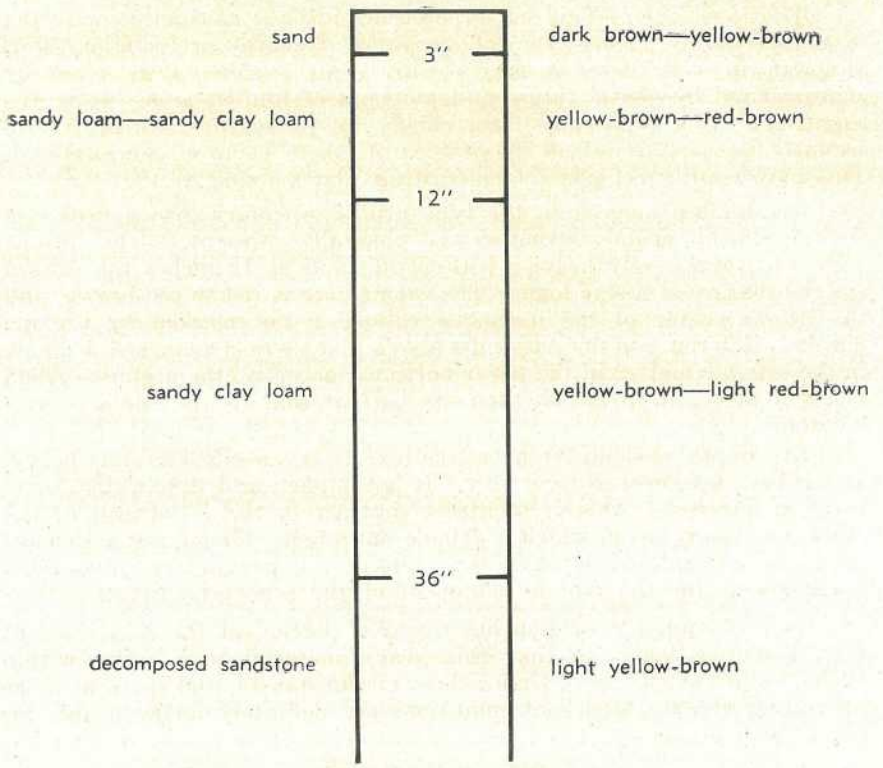


Plate 9.
PALMWOODS SAND.

The structure is of the single-grained type in the surface horizon, but becomes slightly cloddy with depth. In general, the structure is not well defined. On moderate slopes the drainage of the soil is good. It is, however, badly eroded in many cultivated areas, and in some cases the sticky sandy clay loam subsoil has been observed less than 4 inches from the surface. In such eroded areas the question of soil management is an important one, since the subsoil is at a shallow depth, even in the normal profile. On the lower levels, such as at the foot of a slope, this soil should not be planted to pineapples because the subsoil, which is never very permeable to water, may become saturated under these conditions.

Palmwoods sandy loam.—Texturally, this soil has many features in common with the Woombye sandy loam. In the field, however, it is readily distinguished by the dominant yellow tinge, and its departure from the red colour of the Woombye Series. That this colour is a

reflection of other fundamental variations is seen from the Appendix. The percentage of sesquioxides (soluble in 20 per cent. hydrochloric acid) is much lower than that of the Woombye soils.

The profile of the Palmwoods sandy loam is somewhat heavier than that of the Palmwoods sand. This is particularly the case with regard to the subsoil, which, in the type profile, shows an increase in clay content of approximately 11 per cent. The surface soil generally tends to the sandy loam range rather than sand, as in the former type. Mechanical analyses of the profiles of these two soils given in the Appendix are typical.

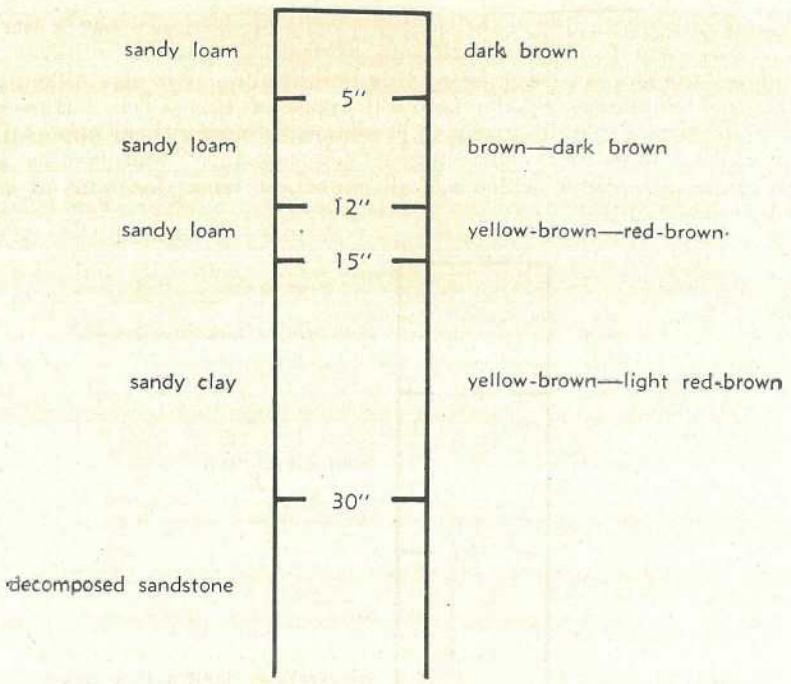


Plate 10.
Palmwoods Sandy Loam.

The type profile is represented by Plate 10. A sandy loam texture occurs to a depth of 15 inches. This material is quite open and friable, and normally well drained. There is no well-defined structure. A marked increase in the clay content occurs in the subsoil, and as this is compact and retentive of moisture, it considerably impedes drainage. The presence of this rather unfavourable subsoil considerably reduces the agricultural value of the Palmwoods sandy loam. The importance of correct field management with regard to drainage and layout of the plantation cannot be too strongly stressed. For this reason, the Palmwoods sand is often to be preferred to the Palmwoods sandy loam for pineapple culture.

Coe's Creek Series.

This series of sandy soils is typical of the grey-brown group of soils with yellow-brown subsoils. The profile has a podsolised appearance which is characteristic of many soils of coastal southern Queensland. The movement of iron and alumina is shown in the Appendix. The

sesquioxide content is much lower than that of the Woombye and Palmwoods Series. The red colour which characterises the Woombye soils is not present in the Coe's Creek Series because of the lower content of iron.

In this series, two distinct soil types may readily be recognised. These are the Coe's Creek sand and the Coe's Creek sandy loam. They occur in close association under the same topographical and vegetative control. The terrain is hilly, and slopes of one in five are quite common. As would be expected on such slopes as these, much havoc has been done by soil erosion.

It is difficult to define the normal profile of the Coe's Creek Series, since there is a gradual building-up of washed material towards the bottom of the slopes. Because of this building-up, it is also difficult to define the boundaries of the two soil types of this series. However, these soils form a definite group of considerable agricultural importance. They are attended by characteristic soil moisture relationships and fertilizer requirements, which are all-important from the point of view of pineapple culture.

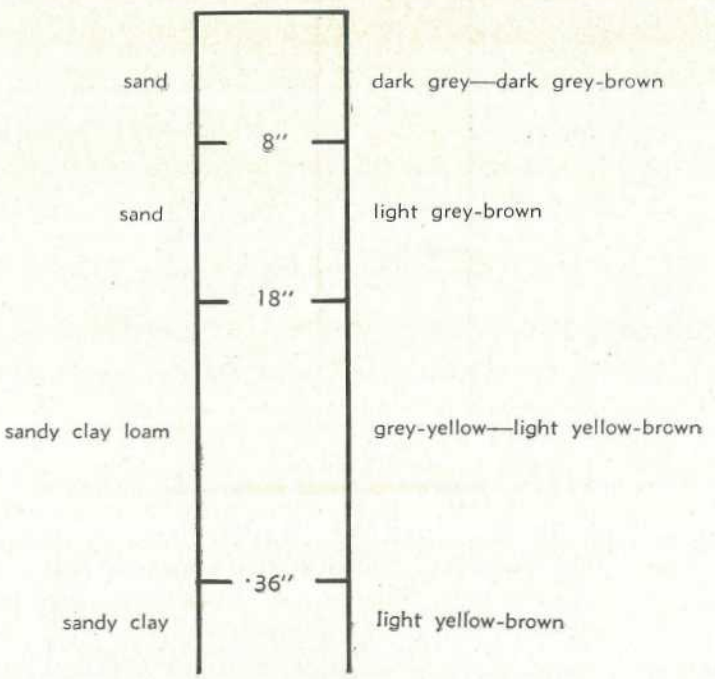


Plate 11.
COE'S CREEK SAND.

Coe's Creek sand.—The type profile of the Coe's Creek sand is diagrammatically shown in Plate 11. The profile has a sand content of approximately 85 per cent. to a depth of 18 inches. The very sandy nature of this material is further emphasised by the wide "coarse sand-fine sand" ratio. The colour is grey-brown, becoming lighter with depth as the organic matter decreases. The A_1 horizon is dark grey to dark grey-brown.

The clay fraction increases in the B horizon, but the sand content is still considerable, with the coarse fraction predominant. Underlying this horizon at a depth of 39 inches is the C horizon. The clay content of this markedly impermeable horizon, which is a decomposition zone, is normally high; throughout it hard pieces of undecomposed sandstone occur as "floaters." The surface soil has a single-grain structure and is therefore loose and open. The subsoil, which becomes increasingly compact with depth, is normally moist and plastic. When brought to the surface it dries hard and cloddy.

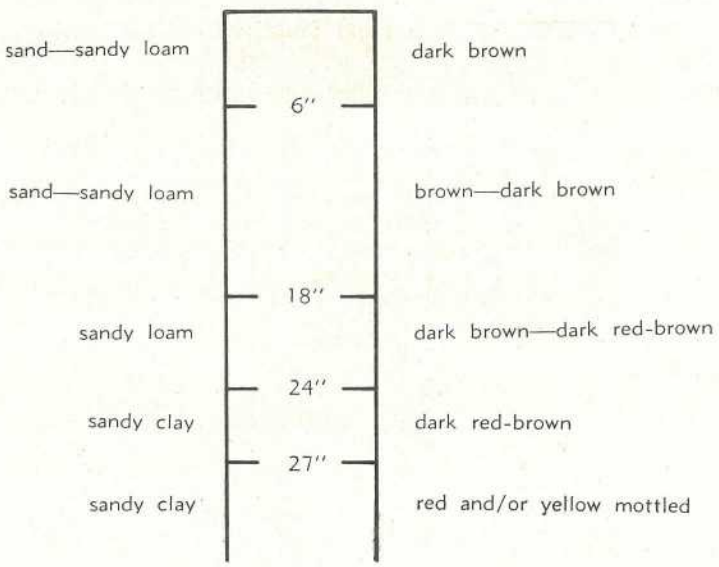


Plate 12.
Coe's Creek Sandy Loam.

Frequently the surface soil is characterised by a considerable degree of stoniness. Large waterworn quartz pebbles occur intermingled with sandstone fragments. In some cases a band of river gravel is met with at depths varying between 2 and 3 feet. In very few instances, however, is the concentration of stony material sufficient to hinder cultivation to any extent.

The value of this soil for pineapple-growing is determined by the amount of erosion which it has undergone. Even in its most favourable condition it is severely affected by droughty periods, since its moisture-retaining capacity is low.

Coe's Creek sandy loam.—This soil type is closely associated with the Coe's Creek sand. Its topographical features are similar, as also is its degree of stoniness. The texture of the profile is slightly heavier and the colour is darker. The surface soil usually contains about 10 per cent. of clay. It is best described as a sandy loam, although it is never far removed from a sand. Its colour is dark brown, and its organic content is normally greater than that of Coe's Creek sand. A single-grain structure is evident. The A horizon remains loose and open under cultivation.

In the type profile (Plate 12) the subsoil horizon becomes heavier, since the clay increases to 25 per cent. The colour is dark brown. Reference to the Appendix shows that the sesquioxide content is considerably higher than that of the Coe's Creek sand. This is reflected in the colour differences of the two profiles.

Since this soil may occupy steep slopes, denuded phases are common. In many cultivated areas the loss of the major portion of the A horizon presents a serious problem to the pineapple-grower.

Normally, the moisture reserve of this soil is quite good. Its natural drainage is also satisfactory. Since the subsoil is but slowly permeable, however, unfavourable topographical conditions create the need for controlled drainage and proper layout of crop rows. The soil is much less affected by dry weather conditions than is the Coe's Creek sand.

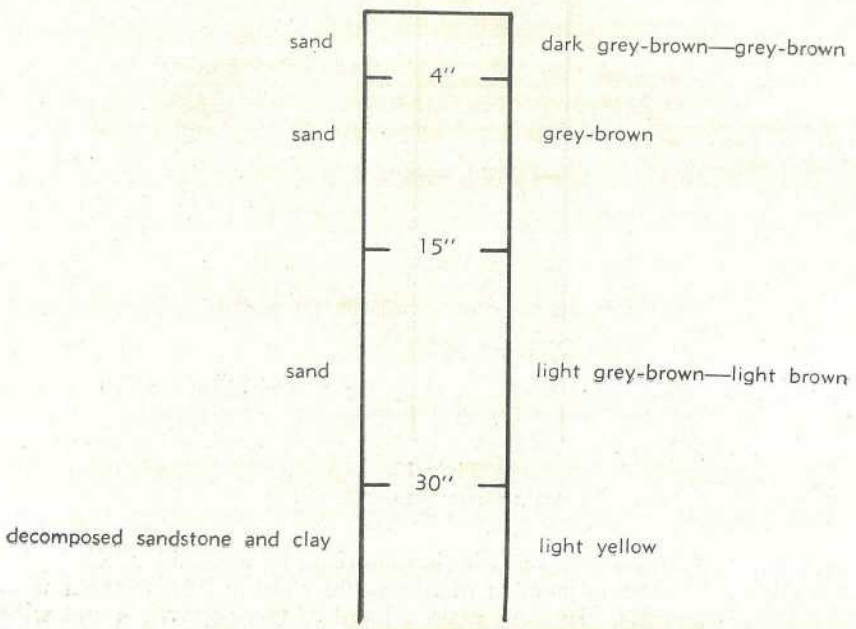


Plate 13.
NAMBOUR SAND.

Nambour Sand.

Of minor importance agriculturally, the Nambour sand is a soil type which is developed extensively in the Nambour-Woombye-Palmwoods area. Although a type name has been given to this soil, it covers a great deal of nondescript sandy country of low value. It occurs generally on a rather coarse-grained, incoherent sandstone. A distinguishing feature is the non-development of a true B horizon, the illuvial material taking the form of a BC horizon. The intimate admixture of the eluviated material with the decomposition horizon gives rise to a zone of highly restricted water movement.

The soil occurs on many steep slopes in the Rosemount area and also in close proximity to the town of Nambour. The general type of profile development is given in Plate 13. Any variation in the

field is usually with regard to depth, as the result of erosion. The soil is very sandy to a depth of 30 inches, the coarse fraction predominating. The colour at the surface is dark grey-brown to grey-brown, and this becomes lighter with depth. Below this sandy material is a mixture of rock brash with clay, usually light yellow, mottled with red. Because of its single-grain structure this soil is loose and porous. However, drainage in the zone of root penetration is determined by the depth of the impervious BC horizon and the topography. The moisture-supplying power of this soil is very low and, consequently, it is subject to severe seasonal variation. In this respect it is similar to the Palmwoods sand and Coe's Creek sand.

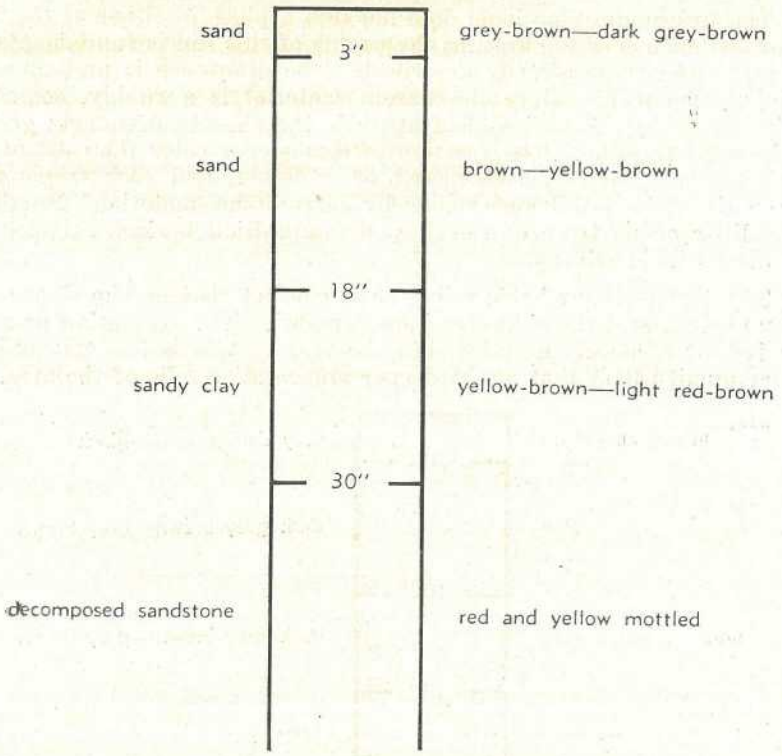


Plate 14.
Rosemount Sand.

Rosemount Sand.

This soil type is of minor importance and is not extensively developed in the districts surveyed. Its main occurrences are in the Rosemount and Diddillibah areas. It is formed from a coarse-grained sandstone somewhat similar to, though slightly harder than, that from which the Nambour sand is formed. It differs from this soil by the presence of a well-developed B horizon. This contains 35 per cent. of clay overlying a less clayey decomposition horizon. The feature which distinguishes it from the other sandy soils of the area is the dominance of a brown colour throughout the profile. In this respect it has some affinity with the Palmwoods sand, but it is much sandier in texture and does not possess the same tendency towards stickiness when wet.

A typical profile is illustrated by Plate 14. The profile is quite sandy to a depth of 18 inches. The colour of the A horizon is grey-brown to dark grey-brown, changing to brown–yellow-brown with depth. There is a marked difference in the textures of the A and B horizons: in the latter the clay content is greatly increased. The colour assumes a reddish tinge and is yellow-brown to light red-brown. Reference to the Appendix shows the very large increment in sesquioxide content in the B horizon, particularly with regard to Fe_2O_3. In common with the other very sandy soils of the area, this soil has a low moisture-retaining capacity.

Rosemount Clay Loam.

The Rosemount clay loam does not find a place in either of the two major soil groups of the area, as the profile of this soil is fundamentally different from those already described. The difference is undoubtedly endodynamomorphic, since the parent material is a rubbly, coarsely-laminated shale. A noticeable feature is the absence of quartz grains in the sand fraction. The fraction of diameter greater than ·02 m.m., but less than 2 m.m., is composed of undecomposed rock fragments, frequently stained red and yellow by ferruginous material. Furthermore, little or no trace of the deep decomposition horizon common to the other soils is evident.

The topography of this soil type is characteristic. The slopes are never abrupt, and the ridge tops are rounded. The vegetation association is that of eucalypt forest, but the tree growth is less tall and of poorer quality than that of the deeper and sandier soils of the area.

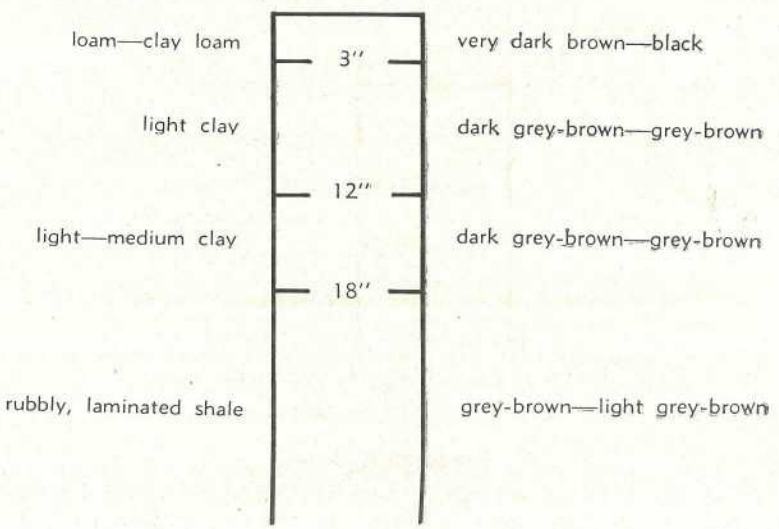


Plate 15.
ROSEMOUNT CLAY LOAM.

The surface soil is a very dark brown to black clay loam or loam. A stable state of aggregation is present, the particles being about 3-4 m.m. diameter. A high organic matter content is characteristic. Although the clay content is considerable, the surface soil breaks free and open when wet; it does not become sticky or plastic except when puddled. In the type profile (Plate 15) the clay content increases slightly in the A_2 horizon, while the colour becomes slightly greyer.

There is a sharp change texturally when the B horizon is reached at a depth of 12 inches. The colloid content increases, giving rise to a light to medium clay. When this material is dry a system of rectangular cracks occurs, but on wetting the swelling of the colloid reduces the pore space. This horizon is one of impeded drainage, and great care should be exercised when planting this soil type to pineapples. The natural drainage of the A horizon must be encouraged by artificial methods, and those areas which are topographically unfavourable should be avoided. By following approved methods it has been demonstrated that this soil can be planted to pineapples with reasonable success.

[TO BE CONTINUED.]

LEGUME INOCULATION.

The practice of including a legume crop in a rotation is common, and the general belief that the productivity of a soil is noticeably better after a legume than after a non-legume is true, but with the important qualification that this is the case only when an association exists between the roots of the host plant and a certain type of bacteria.

When this association obtains, characteristic swellings or nodules are formed on the root system of the host, and it is inside these nodules that nitrogen-assimilating bacteria obtain nitrogen from the air and manufacture compounds containing this element, which are then passed on to and utilised by the plant for growth. Two beneficial results are obtained from this association. Firstly, the legume itself is furnished with an additional nitrogen supply which enables it to make enhanced growth. This is particularly the case with lucerne when efficient inoculation with the appropriate bacteria greatly aids the rapid establishment of a good stand. Secondly, when the legume is turned in at an appropriate time an increase in soil nitrogen is obtained, due to the addition of the nitrogen gained from the air.

Unfortunately, it would appear that these beneficial bacteria are absent from many of our agricultural soils, and under these conditions seed inoculation with a pure culture of the organism—isolated from nodules by bacteriological methods—is essential. These cultures represent a carefully selected strain which has been tested and found to fix nitrogen to the greatest extent, for just as varieties of plants vary in their ability to produce a desired character, so strains of the nodule organism vary in their nitrogen-assimilatory capacity. While some strains may be very efficient in benefiting the host plant, others may be of relatively little value, and still others would appear to give no benefit at all. In addition to this, it is important to note that, while all nodule bacteria have the same general function of fixing atmospheric nitrogen, different cultures are required for different legumes—*e.g.*, a culture of the bacteria suitable for lucerne would be ineffective with cowpeas, and *vice versa*. Similarly, the strain of bacteria which beneficially associates with garden peas and field peas would be ineffective with white or red clover.

Three points, therefore, immediately suggest themselves—that it is incorrect to presuppose the presence of the appropriate strain of bacteria for one legume just because another legume well equipped with nodules has grown before on the same land; secondly, that if moderate or even good stands of a particular legume are obtained there is no reason to assume that a marked benefit would not accompany inoculation of seed with a selected strain for subsequent sowings; and thirdly, that it is highly desirable that only inoculated seed be sown on new land.

The actual operation of seed inoculation is simple, and consists firstly in obtaining a suspension of the bacteria by mixing the contents of the culture bottle with an appropriate quantity of skim milk. To this is added a small quantity of tricalcium phosphate which stimulates the bacteria to a more active stage, and the seed is then inoculated by pouring the suspension over the seed and mixing thoroughly by hand. In this way each seed is covered with a thin film of milk containing large numbers of bacteria.

Complete directions for carrying out the inoculation, together with the quantity of tricalcium phosphate necessary, accompany any inoculum supplied by the Department of Agriculture and Stock. Farmers intending to sow inoculated seed should write, indicating the amount of seed to be sown, at least ten (10) days before sowing is planned, as this time is necessary for the preparation and despatch of cultures.

Contour Furrowing.

A. F. SKINNER, Field Assistant.

THE practice of contour furrowing as a measure of erosion control, and also of pasture improvement, has been attended by considerable success overseas. As contour furrowing is not yet extensively practised in Queensland, the following explanatory notes should be of general interest:—

The Purpose of Contour Furrows.

By conserving free surface water on the land where it falls, contour furrows serve a dual purpose:—

(1) Lowland erosion prevention.

(2) Pasture improvement.

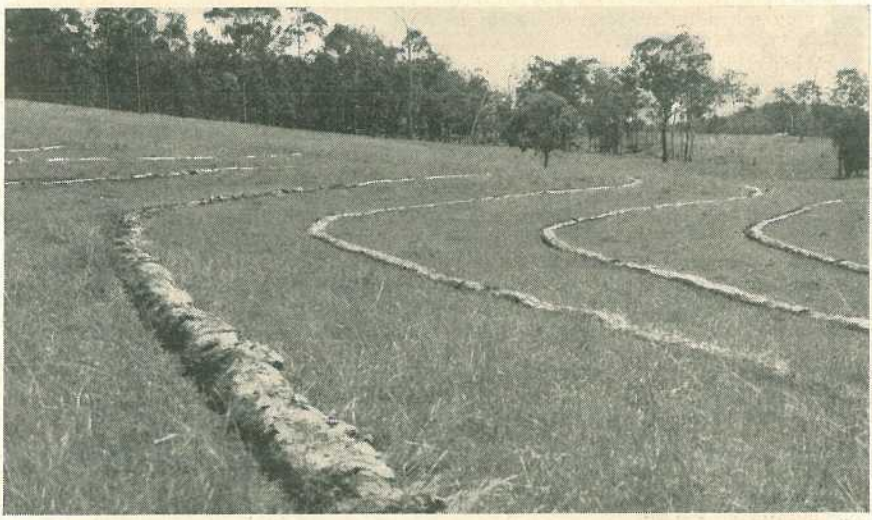


Plate 16.

A FURROWED SLOPE.—Contour furrows reduce the volume of "run off" storm water which often leads to erosion at lower points of concentration. (*Photograph taken on the property of Messrs. D. and J. Healy, Ormeau, Queensland, 27th March,* 1940.)

The volume of surface "run off" water from pastures in a catchment basin may be considerably reduced, and so relieve lower-lying areas of some of the original risk of flooding and injury by erosion. Such upland measures are essential reinforcements to the methods of control applied at lower levels where "run off" concentrates.

The quantity of water held by each furrow has time to soak into the soil, thereby narrowing the normally wide margin of difference between the rate of precipitation and the rate of absorption. Moreover, a more even distribution of water over the whole pasture is ensured. These factors not only stimulate the growth of grass, but also induce the growth of a greater variety of pasture plants.

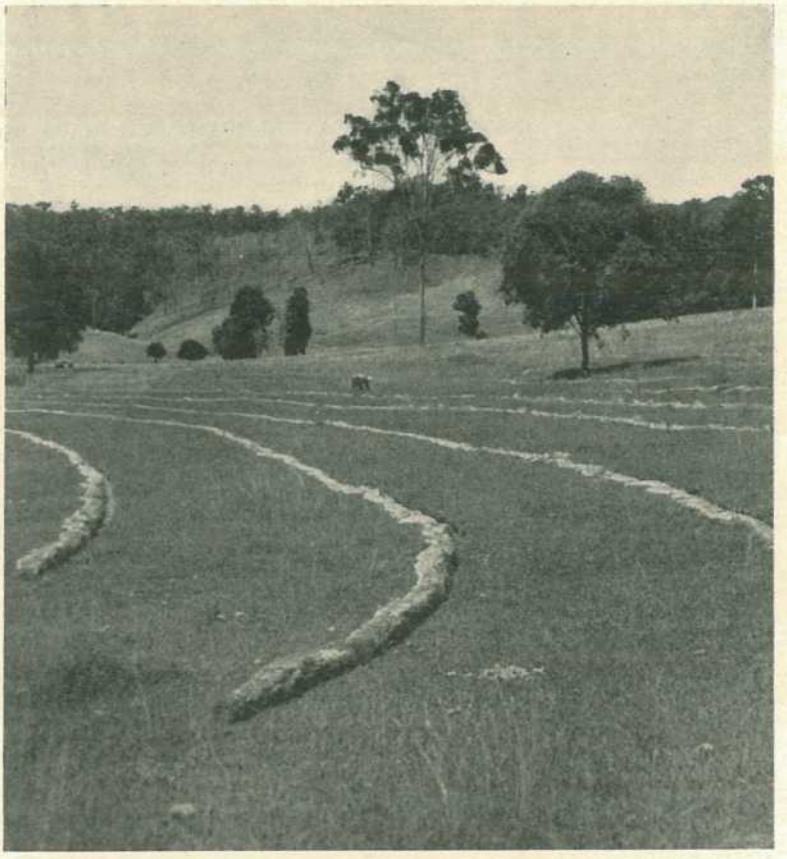


Plate 17.

Water-holding Furrows.—The value of a contour furrow depends on its capacity to hold water. This depends largely on depth, width, and the unbroken condition of the furrow slice.

Definition of "Contour."

To avoid any possible misinterpretation of the term "contour," it will be remembered that a contour is a line on the earth's surface linking all points of equal height. As water always finds its own level, the line traced by the margin of a waterhole is a simple example of a true contour line.

Briefly, a contour furrow is made by the opening of either single or double contour furrows at approximate intervals of from 10 to 20 feet down the slope. When the contour is followed, this spacing will naturally vary throughout the length of the furrows in accordance with the changes in slope of the land. For this reason, it is usual to describe the space between any two furrows as a vertical interval which must remain constant throughout their length. That is to say, a vertical interval of 2 feet between furrows on a 5 per cent. slope is the equivalent of an interval on the slope of 40·05 feet. Assuming that the slope varied to 20 per cent., the interval on the slope would be only 10·19 feet at the fixed vertical interval of 2 feet.

[*Reproduced from Misc. Pub., 338, U.S. Dept. Ag., by E. M. Rowatt.*

Plate 18.

CONTOUR FURROWS STIMULATE THE GROWTH OF GRASS AND OTHER PASTURE PLANTS.

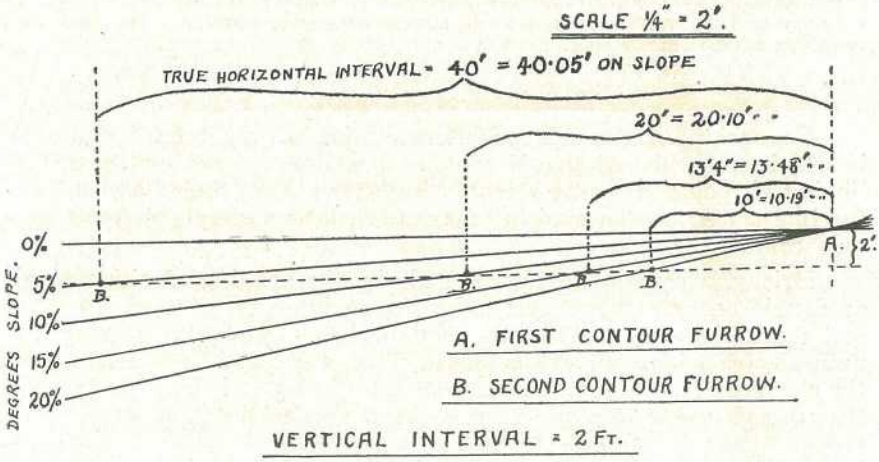


Plate 19.

DIAGRAM ILLUSTRATING THE VARIATIONS IN SPACING ACCORDING TO SLOPE BETWEEN TWO CONTOUR FURROWS WHILE THE VERTICAL INTERVAL REMAINS CONSTANT.

A marked reduction in slope will cause a considerable increase in the distance between furrows. In such cases, short intermediate furrows may be opened. The essential point to remember is that the greater the number of furrows the greater will be their aggregate holding capacity.

The area of land temporarily lost to grazing is worthy of consideration. The period of non-productivity may be shortened by doing the work some little time before the wet summer months, when the growth of grass will be most vigorous. Liming, fertilizing, and seeding of the open furrows and turned strip of sod are of undoubted value in promoting rapid and vigorous growth. If the work is done at the proper time, the planting of selected grasses and legumes should be practicable.

Plate 20.

THE UNSTUMPED CONDITION OF THIS HILLSIDE WITH A 21 PER CENT. SLOPE WAS NO DETERRENT TO EFFECTIVE CONTOUR FURROWING. (*Photograph taken on the property of Messrs. D. and J. Healy, Ormeau, Queensland, 29th March,* 1940.)

The construction of contour furrows is simple and inexpensive. The fact that the land may not be completely stumped does not prohibit treatment, as it is not essential for the furrows to follow on an unobstructed line. In fact, where such is the case it is a distinct safeguard to break the furrows at intervals of a chain or dam them with a shovelful of sod. The furrow ends should be turned slightly uphill. These precautions are necessary to restrict the draining of water from the furrows in the event of a break or the existence of a low spot in the furrow line.

For the purpose of defining contour lines, a home-made wooden level may be employed.

To use this level, the front leg is moved up or down the slope as required to obtain a level reading on the centre cross-member. The frame is then moved forward, placing the rear leg in the last position of the front leg. By driving a peg at each point, a contour line may be thus plotted.

An ordinary mouldboard plough may be used to open the furrows. A sharp disc coulter is helpful in cutting a clean furrow slice. If the ground is stony, however, a coulter is a disadvantage, as it lifts the plough. For best results on average slopes, the English type of plough with a long mouldboard is recommended. For very steep slopes, a reversible double-disc shave plough is the most suitable.

The furrow slice should be turned downhill on to the edge of the furrow. The less of this strip of sod is broken, the more effective will it be in holding back water. As on steep slopes there is always a tendency for a single-furrow slice to be thrown too far downhill, it is desirable to plough a double furrow. The capacity of the furrow will depend on its width and depth.

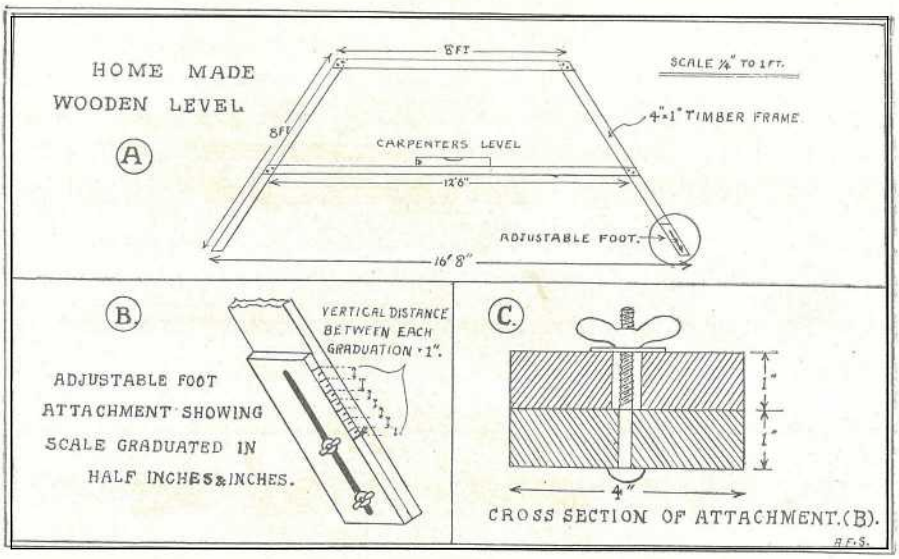


Plate 21.

Home-made Wooden Levels may be Used Successfully in Plotting Contour Lines.—Six spans of this level cover 100 feet.

A slow and steady pair of horses is of considerable help in turning the best furrow slice without throwing it too far.

It is a mistake to continue the furrow around such obstacles as stumps, logs, or rocks, as this means a deviation from the contour line.

In gullied fields, contour furrows may be successfully turned to keep back water from gullies, thereby checking their further development.

The volume of water that may be stored on a field is of interest. It is here referred to in terms of acre inches. The quantity of water absorbed by the soil while the furrows are still filling is not included. Assuming that the approximate dimensions of an ordinary furrow are 5 inches deep and 8 inches wide, and that the turned furrow slice increases the height of the lower wall of the furrow to 10 inches approximately, 1·75 inches of rain will be conserved on a 5 per cent. slope when the furrows are spaced at 10 feet; 1·16 inches at 15 feet; ·58 inches at 30 feet; and so on.

Greater storage capacity may be provided by increasing the water cross-section area of the furrow. Naturally, the closer the furrows, the greater will be the aggregate holding capacity.

Normally, only a guess can be made at the actual quantity of water absorbed into the soil from a measured precipitation. It will be observed, however, that as a result of contour furrowing the actual retention and absorption of a known minimum quantity can be assured whenever the precipitation is in excess of the aggregate holding capacity of the furrows. Furthermore, the distribution of water over the whole pasture can be largely regulated.

Normally, the penetration of moisture at the foot of a slope is much greater than at the crest, with the result that the higher levels frequently "give out" rapidly and are of comparatively poor grazing value.

MANAGEMENT OF WINTER PASTURES.

The choice of a pasture mixture for winter grazing has to be based on a number of factors, including the average winter rainfall of the district, the chemical and physical characters of the soil, the cultivation treatment the land has received, the length of time the pasture is expected to remain, and the aggressiveness of weeds. Once a suitable mixture has been established it must not be considered "fool-proof," but should be managed with due regard to the pasture itself.

The temptation to over-stock paddocks during winter when the "broad acres" are unproductive must be resisted. Such pastures should as far as possible be reserved for cows in milk, for breeding ewes, or for fattening stock. The pasture should not be stocked too early in the growing season, but should be allowed to make good growth before grazing. When a paddock is ready for grazing, the animals should be permitted to graze on it for about an hour each day and they should be removed sooner if they begin to lie down. Camping on the area should be prevented, as the pasture becomes fouled and distasteful to the stock. Sufficient stock should be put on to eat a paddock down within ten days or so, but the pasture must not be too closely grazed. "Flogging" a pasture of winter grasses and clovers will certainly be harmful. After the completion of a grazing, the harrows or wooden drag should be run over the paddock to scatter the droppings. The pasture must be given ample time to recover and produce good growth before being grazed again. Sufficient paddocks of winter pasture should be provided to permit rotational grazing and to supply green, nutritious feed continuously throughout the cooler months of the year.

Certain of the annual winter pasture plants—e.g., Italian ryegrass, Wimmera ryegrass, and prairie grass—are self-seeding, and toward the end of the growing season pastures of these grasses must be left unstocked in order to permit the seed to ripen and shed. Areas which have been so treated should be lightly harrowed in early autumn to make a seed-bed for the establishment of seedlings produced by the self-sown seed.

Factory Strawberries.

J. H. GREGORY, Instructor in Fruit Packing.

INSPECTION of factory consignments of strawberries during the present season has revealed considerable evidence of carelessness on the part of some consignors. The importance of careful packing should not need emphasis, as it is obviously an essential in successful marketing.

Estimates of production are usually called for during April, and growers are required to state the area under cultivation and the number of plants, so that a reasonably accurate forecast of probable market supplies may be made.

Strawberries should be consigned in half-bushel factory cases, which are obtainable from a local representative of the Committee of Direction of Fruit Marketing, or from its head centre in Brisbane. The cases are debited at 9d. and credited at 8d. on their return filled with factory fruit. Greaseproof paper is supplied with the cases. Strawberries are accepted on a weight basis.

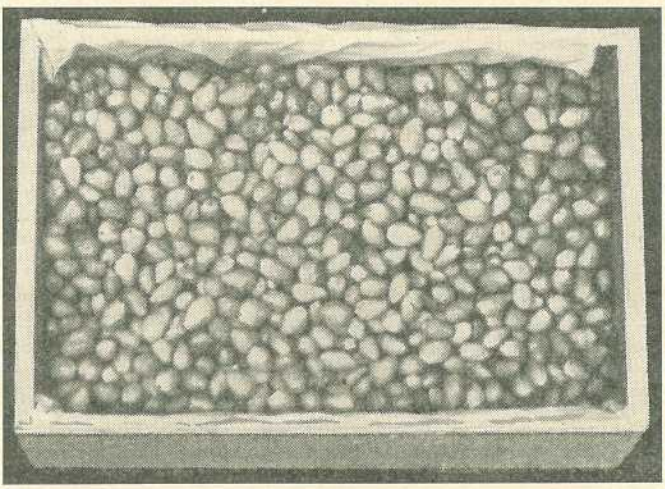


Plate 22.

A CASE OF WELL-SELECTED BERRIES IN GOOD CONDITION WITH NO "NESTED" FRUIT.—A new type of case with a centre partition is now being used.

Standards.

Two grades are taken by factories—canning and jam—the standards for which are:—

Jam.—All fruit must be (*a*) stemmed; (*b*) fully coloured and firm, free from dirt and leaves.

Canning.—Fruit to be (*a*) of a size not less than "fives"; (*b*) stemmed; (*c*) fully coloured, firm, free from dirt and leaves.

There is only a strictly limited demand for canning berries.

Selection of Berries.

Canning.—A special grade of berry is required for canning. The fruit must be sound and firm. A bonus of 1d. a lb. is paid for berries of the desired quality, which is indicated on the label for the guidance of the quality assessor.

Jam.—Berries used for jam-making are usually rejects from fresh fruit market consignments and consist mostly of small and damaged fruit. Smallness is not a detrimental factor. Over-ripe berries by the time they are delivered at the factory are useless for jam-making. Many growers wash their berries, and when this is the practice all berries with broken skins should be rejected, as they quickly develop mould. Berries showing signs of grey mould also should be rejected, as contamination quickly develops from this source. Many consignments of factory berries are unacceptable because of too high a percentage of damaged and mouldy fruit. It does not pay to sort good fruit from bad. Before marketing, growers should give serious consideration to the actual time and handling involved before deciding to include doubtful berries in a factory consignment.

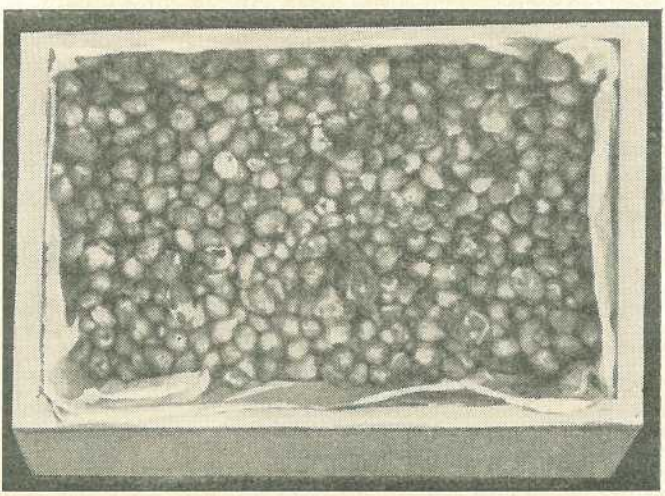


Plate 23.

A Case of Poorly-selected Berries.—Note the "nests" of damaged berries.

Factory Containers.

Containers are supplied by the Committee of Direction of Fruit Marketing, Turbot street, Brisbane. Each case is prepared for the grower and has the tare stamped on it. The lid is leather-hinged, and provision is made for tying the case with twine. Cases should never be tied with wire, as this causes waste of time at the factory. Lids should not be nailed, because of the lightness of the box; otherwise the grower is likely to have the price of the case deducted from his returns.

Labelling.

A label should be attached to all cases with the grower's name and address and an indication as to whether the berries are canning or jam-making. These particulars should be written on the label in pencil and not ink, for during wet weather the ink may wash out. The label should be attached to the case by the twine used in tying down the lid, and not to the case by nailing.

Handling.

Growers and others engaged in packing and transporting factory berries should at all times use care and judgment if the best return is to be obtained, and no deductions made for unsuitable packs.

CUCUMBER GROWING.

The warmth of the climate makes this crop a very suitable one for Queensland. In the coastal and northern districts several crops can be grown during the season.

Planting is carried out usually in the southern coastal districts from September to January, and on the tablelands from October to January; in the northern districts, on the coastal areas from July to January, and on the tableland and inland areas from August to January.

The Agricultural Chemist, in his pamphlet "Complete Fertilizers," states: Cucumbers may be grown on almost any soil so long as it is fairly light and loamy and plenty of manure is added. The pits or hills should be prepared by mixing a large amount of well-rotted stable manure, sheep or fowl dung, ashes, and bonedust with the soil. Apply, in addition to the following artificial fertilizer:—

1½ cwt. sulphate of ammonia or nitrate of soda;

3 to 4 cwt. Nauru phosphate—superphosphate mixture;

1 to 1½ cwt. sulphate of potash;

or 6 to 8 cwt. of a 5-12-5 mixture fertilizer per acre, or 2 to 3 oz. of the same mixture per square yard.

The terms "pits" or "hills" are used to represent groups of four or five plants. At one time the seed was sown always on hills raised above the ground level, but unless the ground is badly drained this practice need not be followed.

Four or five plants are sufficient to a "hill," and the seeds should be placed 3 or 4 inches apart and about 1 inch below the surface. The "hills" should be about 4 feet apart each way, and the whole surface left loosely cultivated.

Should the plants send out their runners to a distance of 2 or 3 feet without setting cucumbers, fruiting may often be induced by pinching out the tips of the runners.

Cucumbers should be harvested when nearly fully grown, before the seeds harden and the skin begins to turn yellow.

The time from planting to harvesting is usually about three months, and 1 lb. of seed set out as directed will plant an acre.

The varieties recommended are: For market purposes Imperial White Spine; for picking Early Green Cluster.

The Recent Burdekin Flood and its Lesson.

By H. W. KERR.*

THE Lower Burdekin district experienced the most disastrous flood in its history, following a cyclonic storm on the 7th April last. Torrential rains fell, and nearly 21 inches were recorded in the district. During the night of the 7th, the Burdekin River rose unusually rapidly, and by the morning of the 8th the water was 20 feet over the railway bridge. It continued to rise during the day, and broke its banks on both the Ayr and Home Hill sides. The rapid rise of the flood waters was, fortunately, not accompanied by loss of life, though there were a number of narrow escapes. Moreover, as little flood water reached the river from its higher tributaries, the subsidence of the stream was also comparatively rapid.

The effects of the cyclone and flood were particularly severe, and a survey of the area revealed the tremendous losses which some farmers had incurred. Not only were buildings and crops severely damaged, but erosion of the stream banks at many points allowed the waters to pour through and create new channels. At this period of the year, many farmers had already tilled their lands in readiness for early planting, while in some cases the fields had actually been planted. The rush of flood water over such lands was, of course, disastrous; in many places the entire surface soil was removed to plough depth, while in others the erosion removed the subsoil strata as well, to a depth of several feet. On certain farms, what were once fertile canefields are now lagoons; on others, the sand scoured by the stream from the alluvial subsoils was deposited from 1 to 6 feet deep in fields of mature cane. In a few instances, mainly on low-lying farms or fields, the checking of the speed of the waters permitted the deposition of silt. This had generally been carried from eroded fields, and it represented the most fertile portions of such lands. Though this valuable deposit was usually only one or two inches in thickness, one farm received a layer of twelve inches on a low-lying field.

Shortly after the calamity, visits were paid to the area by Messrs. Bell and Kerr, of the Sugar Experiment Stations staff. Mr. Bell was delegated to co-operate with local officials for the purpose of estimating the financial loss which the district had suffered. Dr. Kerr later inspected the majority of the damaged farms for the purpose of advising the growers what they might do to overcome the adverse field conditions which have been created. Samples of eroded soils and subsoils, sand and silt deposits, were transferred to Brisbane, where they were analysed, and reports submitted to the growers concerned. On the basis of these results a general report was also prepared and circulated amongst farmers whose lands had suffered damage.

Though, in many cases, the actual permanent damage to the farms may not be so great as was at first anticipated, a large area of what was formerly first class land must be at least temporarily thrown out of production. The irrigation question here introduces a complication from which other cane areas would be free in similar circumstances; and whereas only a small portion of many blocks may have been lost

* In *The Cane Growers' Quarterly Bulletin* (Bureau of Sugar Experiment Stations) for July, 1940.

through gullying, the land surface is now so seriously broken that further irrigation of the fields becomes such a problem as to render the practice uneconomic. After a period of years, and when the blocks have been extensively graded, it may be possible to bring them into production once more.

It should be pointed out that the damage done on many forest soil farms, though much less obvious and spectacular than that on the river alluvial lands, is actually much more serious in its effects. With deep silty soils, the loss of even 2 feet of original soil often exposes a fresh surface but little inferior in quality to that removed. But where 12 or 14 inches of grey forest soil is washed away, and a stiff, intractable clayey subsoil is exposed, the rehabilitation of such land would often be

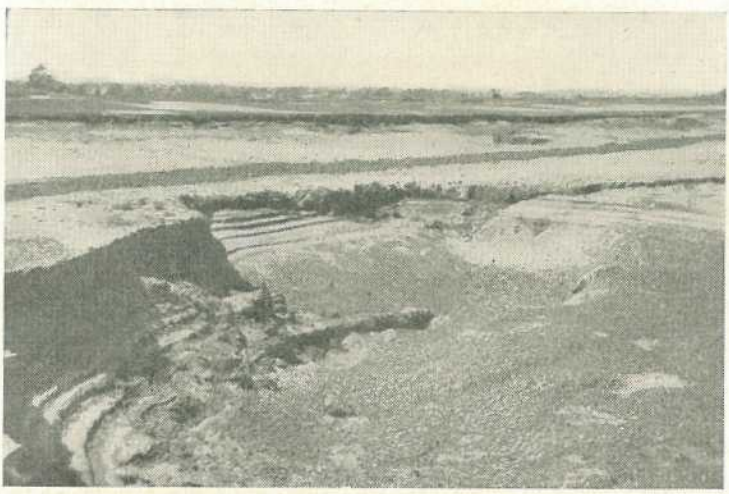


Plate 24.
SHOWING A DEEP GULLY ON A RIVER ALLUVIAL FARM. THIS WAS FORMERLY A FERTILE CANE FIELD.

so costly and laborious as to render it impracticable. While the Burdekin lands as a whole are notoriously deficient in humus and nitrogen, the forest subsoils are almost devoid of these constituents.

The analyses of the sandy deposits are very interesting. We have repeatedly pointed out that the Lower Burdekin soils are the richest of all the cane areas of the State: but it was not expected that the sands from the subsoil would exhibit anything like the reserves of plantfoods which were actually found. In no case was a fine sandy deposit tested which could be expected to derive any benefit at all from applications of phosphate and potash; but they do lack nitrogen, and any attempt to grow cane crops on such areas will fail, if due regard is not paid to the supply of this plantfood in the form of suitable manures. The use of dried blood (or meatworks manure) in the drill with the cane plants, followed by two or three top dressings of sulphate of ammonia will be essential for successful crops. The major problem which many of the sands present is their droughtiness, necessitating frequent irrigations: but if the cane crop can be carried along to the point where the roots penetrate the original buried soil, success should be assured. The depth and fineness of the sand is therefore dominant. A light sandy layer on

a heavy soil type must, on the other hand, be regarded as an advantage: when ultimately worked into the soil, the production and tillage qualities of the land should be distinctly improved.

Plate 25.

Illustrating the Manner in which the Surface Soil was Eroded from a Recently Ploughed Field; Forest Soil.

Plate 26.

A Deep Bed of Sand was Deposited on this Fallow Field and in the Adjacent Cane.

Though many farmers have suffered severe losses of both crop and land, and a few farms have been totally destroyed, the greatest menace to the future of the district lies in the presence of some ten or eleven openings in the river bank which would permit even a moderate flood to break through and devastate the farms which lie in the path of the

new channels. This is clearly appreciated, and the Government has lost no time in having the situation fully investigated by its officers, so that the danger may be removed.

The Lesson of the Flood.

What has happened this year in the Burdekin area is suggestive of what might befall any of our cane districts should the local streams become suddenly swollen to abnormal dimensions by unusually heavy deluges: and it is well to enquire into the causes of the damage which the Burdekin district experienced to deduce whether the losses were unavoidable, or in how far they may have been prevented; and to what extent clearings of natural vegetation, with cultivation of the land, have contributed to the damage.

Plate 27.
SHOWING HOW THE FLOOD WATERS WASHED OUT AND DESTROYED CONCRETE WATER-PIPING.

The subject of soil erosion generally is one which is daily receiving closer attention by agriculturists the world over. The discussion of the subject at the 1940 Conference of the Queensland Cane Growers' Association was timely, as it served to focus the attention of Queensland cane growers on a subject which has, to date, been treated in only a cursory fashion by those who should be vitally concerned with this menace.

The present problem of the Burdekin district is, primarily, one of preventing the erosion of the river banks, the breaks in which were responsible for the devatasting torrents making their way to lagoons or other low-lying areas. But a study of the results will teach us many useful points which cannot be disregarded.

In general, the banks were most extensively washed away at those points where the natural or artificial vegetative cover had been removed. It was interesting to observe particularly that where the banks were covered by grasses—notably Guinea—the matted roots of these species, combined with the check in flow which the stems offered, assisted very materially in preventing the loosening and removal of the soil. The

Plate 28.
This was formerly a Canefield, carrying an Excellent Plant Crop.

Plate 29.
Showing how an Irrigation Pump and Concrete Piping were Damaged when the Bank was Eroded.

presence of larger trees was also effective in one or other of these directions, and was most effective, of course, where the trees existed in association with Guinea grass, Japanese bamboo, etc. Where the farmer had destroyed the river bank vegetation or disturbed the bank, and particularly where the cultivation was carried to the top of the bank, devastating results followed. Under these conditions a swiftly running body of water readily removes the exposed, undisturbed soil; and where these river bank blocks had been ploughed just prior to the flood, the removal of soil to plough depth encountered no resistance whatever. With soils containing a moderate percentage of clay particles, repeated

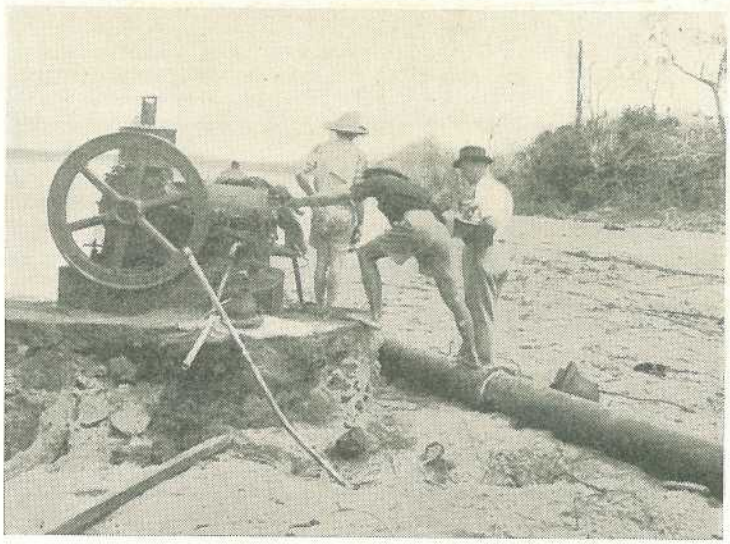


Plate 30.
THIS ENGINE AND ITS CONCRETE BED WERE MOVED BY THE FORCE OF THE FLOOD.

ploughing to a uniform depth had consolidated the underlying soil or subsoil to such an extent as to enable it to offer definite resistance to erosion, and many blocks of this nature were washed to the depth of the plough pan only; but river alluvial soils, containing a preponderance of silt and fine sand, lack this capacity, and were eroded to a depth of many feet in certain instances.

It was interesting also to observe the effects of the running water when it invaded mature fields of cane. Although the intervening field may have been badly eroded, the waters entering the cane were checked in velocity due to the obstruction of the cane stalks, while the matted roots also held the undisturbed soil together. The net result was a deposition of sand, due to the check in water-flow, but in few instances did such fields lose any soil.

The inference from these observations is clear; at all times the farmers concerned should keep the river banks clothed in vegetation, and Sudan grass appears to offer most in this particular district: cane cultivation should not be carried right to the bank of the stream, but should cease at least one chain further back, and the strip between the cane field and the river should be kept continuously under grass and

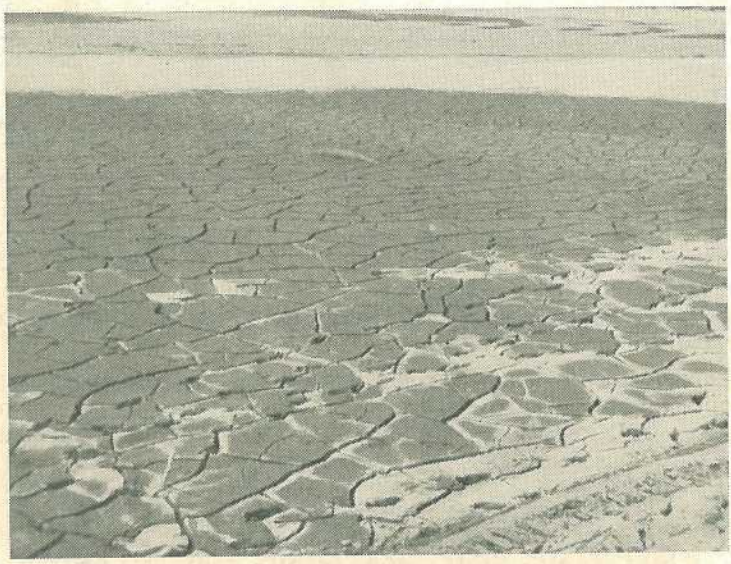


Plate 31.
A Low-lying Fallow Field which has Benefited from a Deposit of Silt.

Plate 32.
This Field Received a Deposit of Rich Silt Twelve Inches Deep.

forest cover; finally, it would be a further protection if river bank fields were allowed to remain undisturbed under volunteer ratoon cane until at least May of the year in which the field is to be broken up for planting. Admittedly, the last recommendation would handicap the farmer in the preparation of the land, as well as necessitating late planting; but the presence of the light ratoon growth, on an undisturbed soil, would be definitely effective should a similar emergency arise. In any

event, the cane crop makes rapid growth on rich alluvial soils, and under these conditions, also, repeated ratooning may be practised, again to advantage.

Though it is "gully" erosion such as occurred in the Lower Burdekin area which is most striking, farmers should not forget that the less obvious "sheet" erosion, which takes place on every field from which excess water flows at a measurable velocity, is responsible for even more damage over a period of years. An excellent example of the insidious nature of this cause is afforded by hillside areas of red soil, such as occur at South Johnstone and Childers. The decline in fertility on certain farms has already given cause for alarm, and where the process is allowed to go unchecked, the productivity of the land declines at an ever-increasing rate.

This subject is one which has already received the attention of the Bureau, and in the near future one of our officers will make a more intensive study of the causes and effects of existing conditions, and attempt to devise means for their amelioration.

CHECKING SOIL WASHING ON HILLSIDE BANANA LAND.

Cavendish and Mons Marie varieties of bananas are usually grown on hillsides and mostly in soils of a free, fine, shaley nature, which tend to wash very freely. Much of this soil can be saved by placing logs at intervals athwart the slope. On most clearings many logs remain unburnt and can be put to good use in this way.

All the straight lengths of timber up to, say, 8 inches in diameter, will be found very useful in checking the downhill rush of water during heavy rains.

After they have been levered or rolled across the hillsides they should be "anchored" in position against stumps or by stakes and, possibly, large stones. It is not always possible to place them directly across the slope, because of the unevenness of the land, but they will prevent loss of surface soil, even if placed somewhat at an angle.

Where the land is carrying large "floaters" the stones also can be used to advantage by placing them in half circles below the banana stools and filling in the intervening hollow with soil.

When the plantation is in its second year and stripping of the lower leaves or desuckering is done, the material also can be placed with advantage along the logs to aid in preventing erosion.

NOTICE TO READERS.

Because of the present necessity for strict economy in the use of paper, readers are requested to renew their subscriptions promptly. If renewals are unduly delayed, it may be impossible to supply back numbers of the Journal.

Address all renewals and other correspondence to the Under Secretary, Department of Agriculture and Stock, Brisbane.

The Planting of Cotton.*

W. G. WELLS, Director of Cotton Culture and Senior Research Officer.

ALL seed distributed for the planting of cotton is saved from only the higher grades of pure seed plots of each variety. After the seed is obtained at the ginnery it is first heated at 140° F. to kill all insect life, and a portion of the stocks are then delinted to remove sufficient fibres to allow of the seed being used in "walking stick" hand maize planters in the new scrub burns, and also in ordinary planters equipped with maize plates.

It is strongly recommended that delinted seed be used except where sowing in the dry soil is contemplated. Experiments at the Research Station have demonstrated that with delinted seed a more even distribution is obtained in the ordinary cotton planter, and a lighter rate of seeding can be used—12 lb. of delinted seed giving a germination of 3·7 to 4 plants per row foot, whereas 15 or more lb. of undelinted seed would be required for such a stand. It is recommended, however, that a slightly heavier rate of sowing be used on new cultivations or following fodder crops, for the more open soils will dry out sooner in the upper surface and possibly reduce the amount of germination. A quicker germination is also obtained with delinted seed, as shown in the following data obtained at the Research Station:—

TABLE I.

Seed.	Sixth Day.	Seventh Day.	Eighth Day.	Ninth Day.	Tenth Day.	Eleventh Day.	Twelfth Day.	Plants.
	%	%	%	%	%	%	%	per ft.
Delinted ..	49·1	65·2	69·4	72·4	73·8	75·2	76·3	4·5
Undelinted	7·9	25·7	33·9	40·9	44·9	49·6	52·3	2·0

* This extract from "Cotton Growing in Queensland," published by the Department of Agriculture and Stock, deals with the planting of a crop of major importance under existing war-time conditions. Copies of this bulletin, which deals with various aspects of cotton production in this State, are obtainable on application.

It is not recommended that delinted seed be sown in dry plantings, for, owing to the ability to absorb moisture better than the undelinted seed, light showers will start germination, and if sufficient rain to complete the strike does not fall the seed will rot, whereas the undelinted seed would be unaffected.

TIME OF PLANTING.

The most suitable time of planting in the cotton districts south of and adjacent to Rockhampton appears to be associated with the soil types. On old cultivations of fertile alluvial loams and clay loams, and on the average of the scrub soils, the best results over a series of seasons have been obtained from plantings made during late September and the first half of October in the Central District, and the latter half of October in the Southern districts. On old cultivations on the heavier clay loam slopes of the forest series, plantings up to mid-November can be made with good prospects of obtaining highly profitable yields. Likewise, plantings can be made later on new cultivations on all soil types; several instances of early December planting have been reported as having yielded excellently. No advantage appears to be obtained by planting in August or early in September, even if climatic conditions are favourable, for the low soil temperatures retard germination, and later rains chill the young seedlings so much that usually early October plantings catch up with them, and often have a much better stand. In some seasons a very heavy loss of terminals occurs in the early September plantings through insect attacks, while later plantings suffer much less damage.

METHOD OF PLANTING.

Several methods of planting cotton seed are used in this State, all of which give good results when favourable conditions exist. In most districts, however, it is believed that the best results will be obtained by waiting until good planting rains occur, harrowing to make a nice mulch, and then planting with a split-wheel type of planter equipped with disc openers. The harrowing not only warms the soil and thus hastens germination, but also checks an early growth of grass and weed seedlings, which is of marked advantage in reducing the costs of cultivation. Undoubtedly this is an important point and one which is not receiving sufficient attention by many farmers. The harrowing before planting is particularly necessary when cotton follows Rhodes grass, for if not done then the grass seedlings germinate with the cotton and soon require hand-chipping.

Growers planting large acreages of cotton are faced with the problem of getting their crops sown so that they will obtain the fullest benefit from the spring rains. As these seldom occur in more than 2-inch storms, and often lighter, it is frequently impossible to get planted on the one storm unless considerable equipment is available. Some growers therefore plant all their acreage in the dry soil prior to the spring rains; others plant half in the dry and half following the first good rains, while others plant as much as the soil moisture will allow following the first rain, and then wait for further rains to complete their plantings. The latter system is preferable in some respects, for it distributes the future operations over a longer period and thus eliminates a peak demand for a large amount of labour in any of the larger cotton districts. The spring rainfall is most uncertain,

however, and it is advisable to take full advantage of any rains occurring. It is believed, therefore, that the system of planting a portion of the acreage in the dry and the rest after good rains occur is the best. The proportions depend on the equipment available. Usually sufficient rain falls to allow of planting for at least three days under satisfactory germinating conditions. By planting in the dry all but the acreage that can be handled in three days it is possible to obtain a highly satisfactory strike over a large acreage from the one rain. It is pointed out, however, that the dry planting should be harrowed as quickly as possible after the rain, in order to eliminate weed and grass seedling growth, especially if the germinating rains do not occur until late October or November. The cotton seed will germinate quickly then, and any delay in harrowing may destroy some of the cotton seedlings. It undoubtedly is advisable to harrow the dry planted portion, for each season witnesses growers increasing their cost of cultivation simply through omitting this early harrowing. Dry planting has drawbacks, however, in that in some seasons much loss of seed is experienced through the spring showers being just enough to germinate the seed, after which there are no following storms to establish the seedlings. In wet springs severe crusting of the heavy soils occurs, often in the dry planted areas, even if harrowing is done, and frequently no strike is obtained or one just good enough to influence the growers to leave it, although the stand is not sufficient to allow of the soil producing the maximum possible yield. The problem is a difficult one, and the general district experiences for each soil type are the best indicators of the merits of each method.

Many growers of small acreages in the older agricultural districts, who have maize planters unsuited for planting undelinted cotton seed, have adopted the practice of opening shallow furrows, sowing the seed by hand, and then covering with either a harrow or scuffler. This system undoubtedly causes loss of moisture and undoes the benefit obtained from an early preparation of the seed-bed. It is suggested, now that delinted seed can be obtained, that where an ordinary one or two row maize planter is available, the plates be modified to make them suitable for planting cotton seed. This can be done by enlarging the holes in the six-holed plates and adjusting the gears to allow of the proper rate of seeding.

The provision of delinted seed is of great assistance to the growers in the newly burned scrub areas, for it eliminates the necessity of treating the seed to make it suitable for using in the "walking stick" hand planters. There may be greater danger, however, in sowing the delinted seed in the dry ash before the planting rains occur, on account of the delinted seed germinating with less rainfall than would be the case with treated seed; hence in a spring experiencing light showery conditions considerable replanting might be necessary.

DEPTH OF SOWING.

The correct depth of sowing varies between 1½ and 2½ inches, depending on the condition of the seed-bed, amount of moisture in the surface soil, and the method of planting. The main objective is to get a good stand as quickly as possible. This requires planting the seed just deeply enough to have sufficient moisture to germinate them, and still not have the soil dry out before the young roots penetrate into the moist subsoil. For most soils under average conditions a depth of about

2 inches in moist, firm soil will allow of a good germination being obtained. This is especially true if a split-wheel type of planter is used. Where the seed is covered by scrapers, or by scufflers if planted in shallow furrows, 2½ inches will probably be better, as the soil is not compacted and there is a danger of the moisture being lost before germination is effected, particularly if drying winds are experienced.

If plantings are made at a greater depth than 2½ inches there is always a danger of the seed rotting in a cold, wet spring, and in a dry spring, while germinations may be obtained, the seedlings are frequently so long in coming through the surface that they are thin and spindly and of a pale yellowish colour rather than the usual healthy green. Such weakened seedlings are likely to be attacked by diseases if wet weather is experienced subsequently, and may wither if hot, dry winds prevail for any length of time. Generally speaking, the tendency is to plant too deeply, especially in the plantings in September and early October, when the soil temperatures necessitate quick germination and an early appearance of the seedlings above ground.

SPACING OF ROWS.

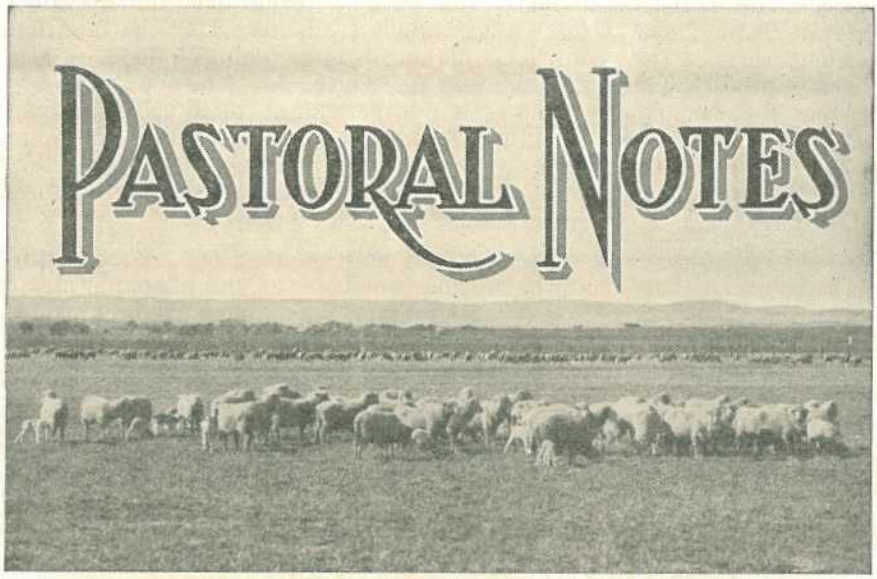
A spacing of 4½ feet between the rows is generally used in all the cotton-growing areas. Widths varying from 3½ to 5½ feet were used at first, but experiments and the general experience of growers indicate that around 4½ feet appears to be a fairly good row spacing for most soils over a series of seasons. It is possible, however, that where cotton is being grown on the clay loam forest slopes away from the immediate coastal areas, a spacing of 4 feet or 4 feet 3 inches may be suitable. Usually the plants do not grow so tall on such soils as on the alluvials; hence under moderate rainfall, ample sunlight and air movement may be obtained with the closer distances.

It is not recommended that spacings smaller than these be tried, for with heavy rainfall accompanied by prolonged cloudy weather in February there is a grave danger of a growth sufficiently rank being made to create dense shade. Experiences of past seasons have indicated that such conditions are conducive to insect attacks, accompanied by heavy losses from boll rots on the lower portions of the plants.

"BY OUR OWN RIGHT HANDS . . ."

Written in November, 1806, after the battle of Austerlitz, where Napoleon crushed Austria, the last remaining ally of Britain, the following lines by William Wordsworth might well have been written in June, 1940:—

"Another year! Another deadly blow!
Another mighty empire overthrown!
And we are left, or shall be left, alone;
The last that dares to struggle with the foe.
'Tis well! From this day forward we shall know
That in ourselves our safety must be sought;
That by our own right hands it must be wrought
That we must stand unpropp'd, or be laid low.
O, dastard, whom such foretaste doth not cheer!
We shall exult, if they who rule the land
Be men who hold its many blessings dear,
Wise, upright, valiant; not a venal band,
Who are to judge of danger which they fear,
And honour, which they do not understand."



The Adaptability of the Merino.

LARGE areas in Western Queensland carry a good covering of high-quality grasses, but are more or less devoid of either shrubs or trees. Fortunately, they are within reasonable distance of other areas which, while similar in other respects, are shaded by a variety of shrubs and trees. Many western holdings include both classes of country, and ewes and growing sheep can be held on the shaded areas, while wethers for wool production are run on the open plains. On holdings where no shade exists, fully-developed wethers are usually purchased from properties more favoured for breeding, and are then run for wool production.

In the southern division of the State, the country ranges from the cold granite and traprock country of the Stanthorpe district, to the rich plains along the New South Wales border. Intermediate types are the poor ridges interspersed between fertile plains, the vast areas of brigalow and belah which were held in the grip of the prickly-pear until a few years ago, and the excellent mulga country in the St. George-Charleville-Cunnamulla and far western districts.

Although the mulga country has a low carrying capacity, it is, when partly improved, suitable for breeding purposes, and supports some excellent stud flocks.

Brigalow country in its natural state is next to useless for sheep. When improved by ringbarking, it generally develops a rank weed growth. By stocking heavily with cattle, the weeds may be kept in check, and, subsequently, will give way to a good mixture of grasses, suitable for sheep. When cleared of excess timber, breeding can then be carried on successfully. As a general rule, however, the land should be seeded down to Rhodes or other suitable grasses after ringbarking.

The granite and traprock country is most suitable for running wethers for wool production. The extreme conditions under which merino wethers can be used to advantage is illustrated by the fact that wethers selected for wool production on the open plains of the West also do well on the high, cold country of the South-east. The type generally favoured for the western plains is a large-framed, plain-bodied, robust sheep which produces a good length of bold-growing, medium to strong wool. Wethers of this type thrive on treeless plains, with no protection of any kind, and suffer no ill effects when the shade temperatures are high for days, and sometimes weeks, at a time.

The sheep selected for the granite and traprock belt of the South-east are usually four tooths of the finer woolled type, but of similar strain to those selected for the West. Each season, after they have been placed on the granite or traprock country, their wool fines down, probably because of a combination of climatic influences and the finer nature and less nutritive quality of the grasses. They do not cut as heavy a fleece as western wethers; but, if kept free from parasites, they do well even on the cold bleak heights ranging up to 3,000 feet above sea level. The adaptability of the merino to such extremes of climatic conditions is quite remarkable.

SUITABLE EWES FOR FAT LAMBS.

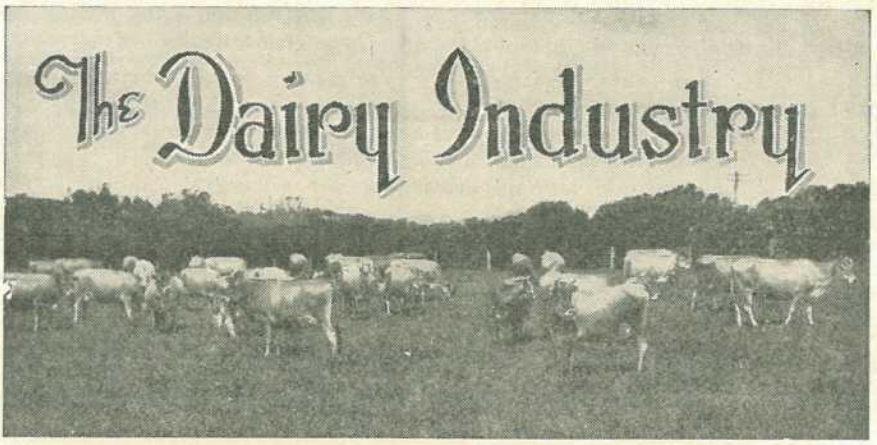
The greatest drawback to the production of fat lambs on the Darling Downs in quantity has been, and still is, the difficulty of purchasing good cross-bred ewes as the mother flock.

If a start has to be made with merinos, the best ewe for fat lamb raising is bred by the introduction of one of the long wools, such as Border Leicester, Lincoln, or Romney Marsh into the strong-woolled, robust type of merino ewe. The ewe lambs of this drop should then be retained as the future dams of the lamb-raising flock.

As to suitable ewes for the fat-lamb industry, it is believed that graziers on the fringe of the Darling Downs or further out would find it profitable to join long-woolled rams of British breed with their cast-for-age ewes with the idea of selling the progeny annually as fat lambs ewes on the Downs. Into the crossbred ewe flock, as described, should be introduced a ram of the Downs type. Opinions necessarily differ in the matter of crosses. The South Down is the fashionable lamb at the present time, but it should be remembered that this cross must suffer no check from birth to block. The Dorset Horn gives a very nice lamb, early maturing and hardy. The use of the Border Leicester should be encouraged in every way. In addition to producing an early-maturing lamb that fills every want, it must be remembered that the skin value of this lamb is worthy of consideration to a far greater extent than either the Dorset or the South Down.

Pure-bred Corriedale ewes are hard to come by, but should the opportunity occur a farmer would be well advised not to let it slip. Pure Corriedales are hard to beat, good mothers and heavy milkers, besides growing a profitable fleece.

Generally, the wool from a flock retained for fat lamb breeding is a secondary consideration when compared with the production of fat lambs.



Washing Milking Utensils.

THE general principles underlying the proper cleaning of all metal milk utensils are very simple, and once understood they can be adapted to the requirements of individual vessels and apparatus used in dairying. For this purpose it is essential to understand something of the nature and composition of milk and its products. Milk is a complex substance consisting of water, butterfat, lactose, or milk sugar, casein, albumen, and mineral salts. Cream contains the same constituents in different proportions, so that the problem of cleaning is confined to finding effective methods for the complete removal of fats, sugar, proteins, and salts.

The sugar and mineral salts, being mainly in solution, are almost entirely rinsed away in cold water, which will also remove a large part of the fat and proteins. Butterfat, however, occurs in the form of minute globules, and some of these adhere to the surface of milk vessels and require heat and emulsification before they can be washed off. Of the proteins, casein is in suspension in fresh milk (giving milk its white appearance), but it can be coagulated by acid or by rennet to form a solid curd, the hardness of which is increased by heating; albumen is in solution, but, like egge-white, it is readily and permanently solidified by the action of heat. Both these milk proteins possess considerable adhesive properties (casein is used commercially in the manufacture of paints and glues) and they will, *if the preliminary cold-water rinsing is omitted,* stick firmly to dairy utensils, where hot water washing and subsequent sterilization will only harden them on to the surface. Once fixed there, even in a very thin film, they form a protective layer where bacteria become lodged and breed, and where the sterilizing heat cannot reach them, to the detriment of milk and cream quality. Similar protection is afforded by a layer of fat in the form of grease, which can be tested for by passing a finger over the surface of dairy equipment, and which is caused by using insufficient hot water, water at too low a temperature or the lack of some soap or soda compound to free the fat.

There are, then, three stages necessary to the thorough cleaning of dairy utensils, as distinct from the sterilizing, which must follow in order to destroy the harmful bacteria. These three stages are:—

(1) *Cold Water Rinsing.*—Utensils should be well rinsed as soon as possible after use. This is very important, for milk once allowed to dry is much harder to remove completely. Soaking in cold water for a reasonable time is advisable if washing is not to be done immediately—this will loosen all milk solids and facilitate washing.

(2) *Hot Water and Soda.*—Washing soda, caustic soda, soap or soap powder are suitable cleansers for farm use (besides many proprietary preparations sold under trade names). Care should be taken to avoid cleansers containing any gritty substance, for this will permanently damage the surface by scratching, and will rapidly remove tinning. The water should be really hot, and enough soap or soda should be used to emulsify the grease, so that no globules of fat can be seen floating on the surface of the water. A stiff brush should be used on each utensil and all loose parts such as taps and strainer discs should be dismantled for scrubbing.

(3) *Hot Water Rinsing.*—A final rinse, using fresh hot water, is needed to remove the soda water before sterilizing.

Milk utensils, if not properly cleaned and sterilized, are by far the most fruitful sources of contamination in the course of milking and handling milk and cream, and it should be remembered that both processes are equally essential, for satisfactory and complete sterilization is not possible without first thoroughly cleansing along the right lines.

WET OR DRY MILKING?

Many milk producers, careful in every other way to avoid contamination, still continue the unhygienic practice of wet-handed milking. Moistening the hands with milk direct from the teat, or, worse, by dipping into the milk pail, is a deplorable habit, which is responsible for much contamination as well as loss of quality of milk and cream. It is, of course, more serious if washing of the udder and of the milker's hands have been neglected, for then the dirt becomes intimately mixed with and well distributed throughout the milk. A glance at the accumulation between the fingers of a worker engaged in milking an unwashed cow wet-handed will be sufficient evidence of the truth of this statement.

Where washing of the udder and teats and discarding of the foremilk have been carried out and the milker's hands have been washed, "wet" milking is less objectionable, but the fact remains that all the cleanest and most efficient up-to-date dairy farmers milk dry handed, and this is a necessity for the production of milk for sale as "Tuberculin Tested" or "Accredited" in England, and for the majority of organised milkers' competitions. "Dry" milking means that the hands are washed immediately before starting to milk and after completing each cow, being left slightly moist after washing, and kept as free from milk as possible.

Some farmers, mostly those who have not persevered with dry milking long enough to give it a fair trial, object to it as being slow and

difficult, especially as regards stripping. It has, however, been found by hundreds of others to be equally rapid and simple, after a little practice, provided that the hands are left damp and the teats sufficiently moist after washing to make them pliable.

It is true that there are individual cows with badly-formed abnormal teats, or with one or more sore teats, which are difficult to milk dry-handed. For dealing with these, the clean milker uses a small quantity of ordinary vaseline applied to each teat after washing, which not only serves as a lubricant, but also assists in the healing of the damaged skin, and helps to prevent particles being rubbed off into the milking pail. Teat sores should be treated with some antiseptic ointment between milkings. This also prevents their becoming more serious through being worried by flies. Great care should be taken by the milker to wash his hands thoroughly after each cow, for, obviously, this is a great factor in checking the spread of infectious sores and the transfer of bacteria picked up from the cow's coat, leg ropes, stool, walls, &c., to the freshly-washed udder of the next animal. (If a towel is used, it should be changed often enough to make sure that it is an asset to the hygiene of the milking shed. The clothes of the milker may also constitute a source of danger to milk quality—if, for instance, the same clothes are worn for milking as for feeding the pigs, grooming the cows, and removing manure. A pair of overalls or a sugar-bag apron, kept for milking only, and washed out at least once a week, is within the reach of all.)

Vaseline may be found of assistance to the man who has made a long practice of wet-handed milking when he first attempts the "dry" method, especially in stripping. It is preferable to use vaseline if, by thus easing manipulation, it prevents excessive downward jerking of the teats, which is often resorted to by an impatient milker, and which is not only quite unnecessary, but ruinous to the delicate udder tissues. After a time, however, it will be found that dry milking can be carried out easily and rapidly with no lubricant other than the moisture supplied by washed teats and hands.

This is being done on hundreds of modern dairy farms, where greater efficiency and increased keeping quality are aimed at, and, once established, this method is seen to be far superior to the old, which appears unhygienic, messy, and insanitary by comparison.

CALVING TROUBLES.

Cases of difficult calving are fairly common, and before the usual calving time arrives, a few hints may be useful.

When about to calve the cow leaves the herd and seeks a quiet spot. There she will become restless—getting up and lying down—and show evident signs of pain.

As labour advances the back is arched, the hindquarters are drooped, and straining becomes violent and continous. Meanwhile blood may appear on the vulva and tail, and the waterbags protrude between the lips of the vulva. They increase rapidly and the feet of the calf may be seen within them.

The waterbags furnish a soft uniform pressure for the preliminary distention of the womb and passages, and prepare the way for the delivery of the calf. In normal presentations, it is wrong to break these bags prematurely.

When the cow calves standing up, the navel string breaks when the calf falls to the ground; but, when she calves lying down, the string is broken when she rises. A few hours after calving normally, after-pains commence and the placenta or afterbirth is expelled. If this is not expelled within twenty-four hours, it should be removed by careful traction. A good method is to take two sticks about 2 feet long, between which the end of the afterbirth is grasped, and rotated around them until close to the vulva, when gentle traction is applied, from side to side, and backwards and downwards, care being taken not to break it. A vaginal douche of boiled water at blood heat, to which has been added a mild antiseptic, should be given. A cheap and efficient outfit for this purpose consists of about 4 feet of ½-inch rubber hose and an ordinary funnel. The end of the hose should have its edge pared off with a sharp knife, and, after having been smeared with carbolic vaseline, it is introduced into the vagina, and gently pressed forward as far as the womb. The funnel is then placed in the other end of the hose and held above the cow's back, the douche being poured into it.

It is well, at all times to allow nature to do its work without interference; but, when calving is protracted, and progress is not being made, a careful examination is necessary.

The operator should wear a clean sleeveless shirt, and his arm should be smeared with carbolised vaseline, or an antiseptic oil. This protects the arm from poisoning and the cow from the introduction of infective material into the passage.

The hand should now be introduced into the vagina and a careful examination made. It may be found that (1) the waterbags have burst, and that neither the feet nor head of the calf are presented, or that there is a presentation of (2) one fore foot and head; (3) both fore feet, and head back; (4) head with both fore feet back; (5) one hind foot without the other; or (6) other abnormal presentation.

Whatever part is presented should first be secured by a rope with running noose, so that it will not be lost during subsequent manipulation, and may be readily brought into position when the missing parts are found. If the cow is standing, her head should be turned downhill so that the fœtus and abdominal organs lie forward to give more room to bring up the missing head or limb. If lying down, she should be turned over on to the side opposite to that on which the limb is missing. When the missing part is located, no attempt should be made to bring it up during a labour pain, but after the pain has ceased, an effort should be made to secure it before the next pain comes on.

If the pains are continuous and violent, they may be checked by putting a tight surcingle round the body in front of the udder. If it is found that the passages are dry, pure olive oil may be run into the womb through a rubber tube. If the head is back, the limbs which are presented should be first secured with a rope having a runing noose, then the foetus should be pushed as far back as possible and an attempt made to secure the head with a noose or hook, and to bring it up into the passage. Having brought the limbs and head into a suitable position, traction should now be applied in a downward and backward direction, but only when the cow is straining.

Pulling when the cow is not straining should not be attempted. Patience and care are necessary. The extraordinary practice of attaching a draught horse or motor-car to the fœtus and pulling it out by sheer

force is not only cruel, but usually results in the death of both the cow and the calf. After a protracted calving the cow will be exhausted, and she should be provided with a warm rug and bed, also a few bottles of warm gruel.

Points to remember are—

Do not interfere too soon.

When interference is necessary, exercise patience and take time.

Do not use force until the fore feet and head or the hind feet are secured in position.

Remember to pull only when the cow is straining.

DAIRY FARM COMPETITION.

The 1939-40 Dairy Farm Competition under the auspices of the Royal National Agricultural and Industrial Association of Queensland resulted as follows:—

1. Major B. C. Bell's Blackrock farm, Coochin, Boonah.
2. Mr. E. D. Lawley, Arley, Maleny.
3. Mr. W. Aplin, Cloverdale, Maleny.
4. Mr. H. H. Napper, Pimpama; Mr. L. Nicholls, Redlands, North Tamborine (equal).

The competition provided for inspections in April, 1939, October, 1939, and March, 1940, and the prizes were awarded to the farms which showed the greatest improvement over the period of inspection.

The judging had regard for the following points:—

1. *As affecting the dairy herd.*—The use of a Herd Book registered sire with good dam production record, type and conformation of the herd, the quality and care of the stock bred on the farm, the health of the cattle, herd-recording and production, recording, and the pig section of the dairy farm.
2. *As affecting the layout of the farm.*—The layout of the paddocks, condition of fences and gates and water facilities, the dairy premises, milking yards, the care and condition of the dairy plant and utensils, the farm buildings, drainage and provision for conserving rain water, horse-farming machinery and general plant, including its care and condition, the layout of the buildings and the general tidiness of the farm, and shade and shelter trees.
3. *Regarding the pastures—conservation of fodder.*—The competition specially covered the provision of sown pastures, topdressing of natural pastures and renovation and topdressing of paspalum pastures, conservation of fodder (including hay, silage, or grain), farm crops in their relation to stock foods and methods of feeding.
4. *The practical results* arising from the *economic working of the farm in its relation to its capital value* and the profitable application in dairy farm sidelines, such as poultry, bees, vegetables, fruit.

The final judging was undertaken by a Judging Committee—Messrs. A. M. Hunt, E. B. Rice (Acting Director of Dairying, Department of Agriculture and Stock), J. A. Heading, and H. W. Watson. In the preliminary judging the committee was greatly assisted by the reports of the dairy inspectors of the Department of Agriculture and Stock in their respective districts.

Blackrock Farm, comprising 350 acres, was previously part of Coochin Coochin Station. The cultivated paddocks include 70 acres of maize and pumpkins, 40 acres of lucerne, and 20 acres of oats. All crops were well grown, and had been assisted by the correct admixtures of required fertilizer. A great quantity of lucerne hay is stored in a well-built hayshed; the maize stored in tanks was easily the best maize feature seen on any farm. The dairy herd comprises eighty very good pure-bred and grade Jersey cows, and there are sixty well-bred sows on pasture. The link between the dairy and the piggery on this farm is remarkable, and had achieved excellent economical results. The milking yards and accommodation for the brood sows are extensive, and the drainage well done. The farm contains the most recent

improvements of any farm inspected. The judging committee was impressed with the enterprise of Major B. C. Bell in establishing such soundly managed farms under his control—viz., Blackrock Farm, Lagoon Farm, Coochin Farm, and Aroo Farm. Each farm contains almost similar characteristics, carrying about eighty cows and sixty brood sows, but Blackrock farm stands out as the property carrying the more recent improvements.

Arley, Maleny, comprises 84 acres, subdivided into seventeen paddocks, all paddocks, other than the cultivation paddocks, opening into the receiving yards adjoining the milking bails. The herd comprised twenty-nine A.I.S. registered cows of exceptional dairy quality, and both bulls were from Advanced Register cows. Mr. Lawley exhibited the champion A.I.S. bull at the 1939 Royal National Show. The bails are exceptionally good, with extensive concrete floors; even a small cowyard had been concreted. A water scheme, with a creek as the source of supply, provides an efficient service for the home, the dairy buildings, and the piggeries. Pig pens, calf bails, feeding stalls, and requisite services are soundly constructed and planned. Paddock land, 35 acres in area, has been stoned. In general neatness and tidiness, the farm home surroundings and dairy buildings are exceptionally impressive.

Maleny is a good farm of 200 acres, subdivided into twenty paddocks, which have been topdressed and renovated. The bails and dairy buildings are well built, and the recording system is excellent. Veterinary instruments and aids are a very valuable part to the dairy farm plant. A good herd of seventy-five cows is pastured on this farm, and the two Jersey bulls are from registered dams. Much fencing has been renewed, and electric fences are in use and are effective in the subdivisions of pig paddocks and pastures. A hot-water system, the planting of shade trees and windbreaks, an ample timber stack were other features which interested the judges.

Pimpama and *Redlands*, North Tamborine, gained fourth place with an equal number of points.

Pimpama is a very good 200-acre farm with facilities and conveniences which the supply of electric light and current to rural areas has made possible. The dairy buildings are in very good order, the bails and yards being in a somewhat difficult hillside position. At every shed large storage tanks had been installed and an adequate water supply ensured the general cleanliness of the dairy buildings. The grasses on this farm are paspalum and clover, Kikuyu, and Rhodes. The dairy herd comprises about seventy well-bred Illawarra cows and two very well-bred sires. Electric lighting in outbuildings and electric fences, even in cattle subdivisions, are features of this farm.

Redlands is 68 acres in area, subdivided into sixteen paspalum paddocks. All the land had been cleared within five years. There are two springs on the property, one well, and five cultivation paddocks. The herd is pure-bred Jersey, all T.B. and C.A. free. The sire was imported from Victoria, and his dam showed 500 lb. butter-fat production. Mr. Nicholls tests his own cattle, and has had no second-grade cream. The dairy buildings were judged as the cleanest premises seen in the competition; the tidiness of the farm buildings called for special commendation. The pastures are mainly paspalum, which had been topdressed and superphosphated to great advantage. There are 30 tons maize silage in a good plaster silo constructed by the farmer. Oats and field peas were grown together, and there were good maize and root crops. Salt and iodine lick were in the bails, and sterilised bonemeal was available in an automatic feeder at the exit of the bails. This property stood out remarkably in the allocation of those points affecting the economic working of the farm in relation to the capital value of the property.

There were thirty-seven entrants in the competition, and the dairy farmers concerned are to be commended for efforts made to improve their farms along the general lines specified in the points scale. The judges were pleased to notice the practice on many farms of providing aids for the maintenance of the health of the stock.

In the non-prize-winning farms the following commendable features were observed:—

1. A profitable poultry section run as a sideline to a dairy farm.

2. A pasture farm of 292 acres divided into twenty-nine paddocks provided an excellent example of rotational grazing and pasture management on a property on which cultivation is impracticable.

3. A well-conducted dairy farm with a productive and well-laid-out vegetable garden.

4. A farm on which a neat stack of 500 new fencing posts is kept ready for repairs.

5. A farm on which 130 tons of lucerne hay are stored.

6. Several mountain farms on which appropriate grasses had been planted to bind watercourses to prevent erosion.

7. Several farms on which special attention has been given to the housing of brood sows.

8. On most farms the homestead and farm buildings had been painted.

9. One farm with an extensive electric-lighting installation comprising lights in the cowbails, the engine-room, and hayshed, as well as eight points in the home.

10. A farm with a complete machinery and implement plant.

THE COWYARD AND MILK AND CREAM QUALITY.

Numerous experiments in various countries have shown that so long as the cowyard and floor of the milking shed are kept clean, the bacteria which fall into the milk from the air have not such a contaminatory effect as might be expected. This is because the germs transported on dust particles, unless they are resistant species, are destroyed by the exposure to direct sunlight, absence of moisture, and scarcity of food. Fortunately, too, such hardy species only bring about slowly changes in milk.

Inspection of dairy premises on any day may reveal, however, that there is a lack of appreciation by many farmers of the potential contamination to which milk or cream may be subjected if produced and held in surroundings in which the cowyard is not kept as clean as practicable. If manure be allowed to accumulate, dry, and become pulverised in the cowyard, the movement of the animals and the wind will soon distribute dust particles literally teeming with millions of objectionable bacteria, many of which will lodge in the dairy utensils during milking. The milk or cream, if subsequently held in such a dust-laden environment, should be conveyed as soon as possible after milking to a covered milk stand or dairy well away from the yard. Incidentially, manurial bacteria—known technically as the coliform bacteria because of their normal habitat being the colon, or large intestine, of animals—are the most undesirable organisms in cheese manufacture, giving a pin-holey curd and off-flavour to the infected cheese. They also may cause the de-grading of cream—*i.e.*, gassy or fermented cream.

Two other factors which cause contamination on some farms because of direct exposure of the utensils and milk to a dust-laden cowyard atmosphere are—

(1) The placing of utensil draining and storage racks alongside the cowyard fence. (If, on a windy day, a finger is wiped on the inside of the utensils, even when they are turned upside down, in such an environment the serious contamination of milk subsequently placed in the utensils will be apparent.)

(2) The practice, adopted by some suppliers to cheese factories, of leaving the night's milk on a stand near to the cowyard fence instead of keeping it as prescribed by the Dairy Regulations.

Both these practices are strongly condemned. Regular attention to the cowyard to prevent the accumulation of manure in such close proximity to the bails also assists in minimising fly infestation. Flies entering milk carry into it innumerable germs. Regular limewashing of the bails helps in checking the fly pest.

It should be remembered, moreover, that cow manure is too valuable as fertilizer to be wasted in the cowyard. Daily heaping of manure should be a routine duty in every cowyard. It takes only a few minutes to clean up—in fact, cleaning-up of the cowyard is a requirement under the Dairy Produce Act.

How to Make a Rope Pig-net.

In compliance with numerous requests, the subjoined notes on the making of a pig-net, by Mr. E. J. Shelton, Pig Section, are reprinted from the Journal for September, 1938:—

WHEN transporting pigs in an open wagon or truck, a net or cover of some type is required. The rope-net illustrated herein is the type usually recommended for the purpose. It is convenient to use, cheap, durable, and easy to make and keep clean.

It is not a sunshade, however, and will not protect pigs from the sun when they are exposed to its direct rays. This suggests the necessity of providing some form of shade or protection for pigs in transit, even if it is only a few green bushes or a hessian or bag cover.

The method of making a pig-net is simple. The materials required are hemp or manilla rope, a length of softwood or hardwood board rounded at the edges, 12 to 18 inches long and of the same width at both ends. This piece of board is referred to by net makers as the mesh stick, its principal use being to keep all the meshes the same size. In actual use a mesh stick 2 inches wide will make a 4-inch mesh; a 3-inch stick a 6-inch mesh, &c. The objective is to have the stick half the width of the mesh it is intended the net shall carry.

In measuring the meshes it is necessary to draw them out to a diamond shape. The 4-inch mesh is preferable for bacon or pork pigs, a smaller mesh for suckers and weaners. Where fishermen set out to fashion a fishing net they use a long needle and the cord is held on a reel or short length of board, but in the case of a pig-net the rope had better first be rolled up in the same way as the ordinary rope clothesline or sash cord is when purchased; it will then be a simple matter to pass the hank of rope through the loops when making the knots at the corner of each mesh, for the knotting is rapidly performed by an experienced worker.

In setting out to make the net, first tie a loop in one end of the rope as in A, Fig. 1. Place this knot on a strong spike or hook attached to a post or wall or some other convenient place as at A in Fig. 2. Now place the mesh stick under the loop as at B, put the rope around the mesh stick, then pass the rope through the loop and pull rope tight, proceeding to place the thumb of the left hand on the rope beyond the loop as at A in Fig. 3, and with a turn of the wrist of the right hand throw the rope to the position shown at B. Next pass the rope behind the loop C, and then through the bight of B and down as at D; draw knot tight, which should now assume the shape indicated in Fig. 4. This figure shows the knot made loosely to enable the method of making it to be clearly seen and readily understood. The rope must be held firmly with the thumb at A, Fig. 3, when pulling up the knot, as on this depends the uniformity of the shape and size of mesh.

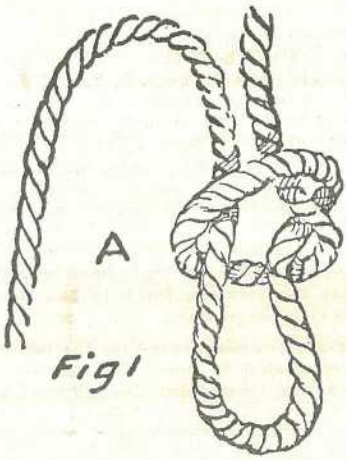


Fig 1

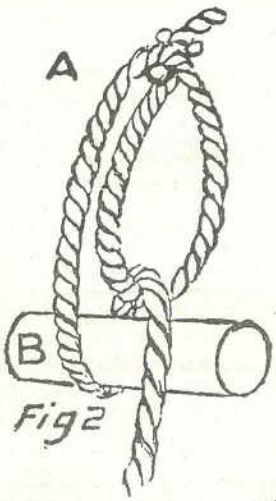


Fig 2

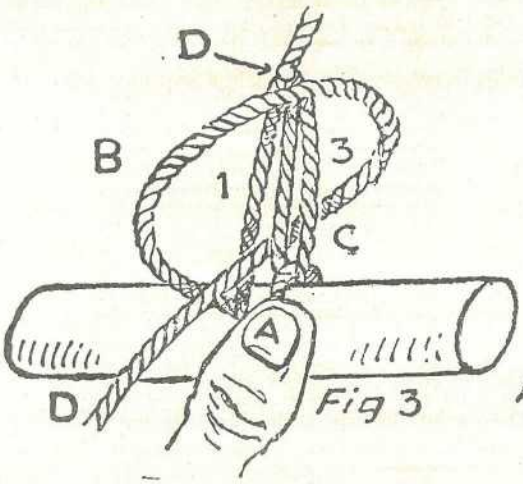


Fig 3

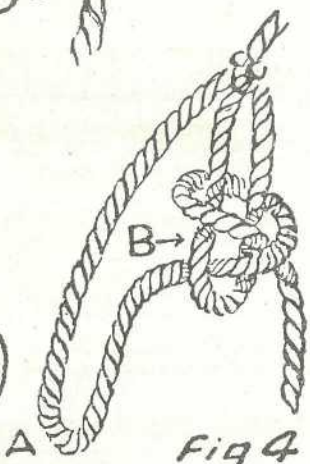


Fig 4

Fig 5

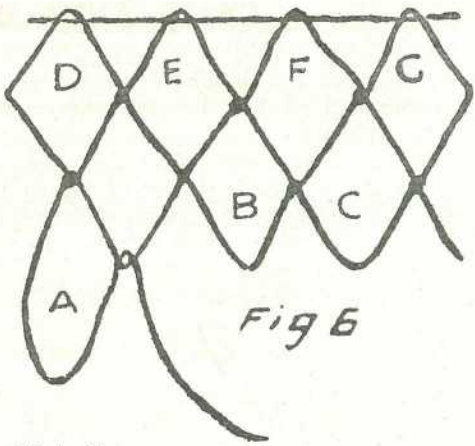


Fig 6

Plate 33.

To continue the netting, the stick is withdrawn and placed under A, Fig. 4. The rope is then passed around the stick as in Fig. 2 and brought through the loop A, Fig. 4, and the process shown in Fig. 3 is repeated to form another mesh, this being continued to make a chain of meshes, say, the width of the conveyance to be used when transporting the pigs to rail or sale. The loop A, Figs. 1, 2, and 5, first tied is then untied and it will be found that all the meshes are equal in size. Next, the chain of meshes is opened out at right angles to the line in which it was made, as shown in Fig. 6; in other words, remove the chain of meshes from a vertical position as in Fig. 5 and place them in a horizontal position as in Fig. 6. A line is run through the meshes D, E, F, G and secured between two posts to hold the net while continuing the meshing. Working across is then begun by making a mesh at A, Fig. 6, then at B, C, and so on until the length of the first lot of meshes has been reached, when the right-hand side of the net is turned around and placed where the left-hand side was and the left-hand side placed where the right-hand side was. Another row of meshes is started on the left-hand side (facing the net) and worked until the one under A has been reached on the right-hand side.

The net is turned again, and another row of meshes commenced on the left-hand side, and so on until there are enough rows of meshes to cover the vehicle. To secure the net to the vehicle use rope plough lines, and reeve them through each mesh and around the side and end rails of the body of cart. The method described herein of making the meshes is the same as is used in making ordinary hammocks.

The net and bags used for shade should be at least 1 foot above the backs of the pigs, otherwise the net may rub and injure the flesh and blister the skin. Every possible care and attention should be given to see that this does not happen.

In loading, secure the net on both sides and in front, first leaving a good length of plough rein free to tie the net to rail of tailboard when pigs are loaded and vehicle is clear of the loading race.

For the information of those who prefer to purchase a ready-made pig-net, the following details will be of interest. This quotation is from the Poultry Farmers' Co-operative Society Ltd., Red Comb House, Roma street, Brisbane:—

Pig-nets—	*s.*	*d.*
6 feet by 4 feet, N.Z. hemp	12	3
7 feet by 5 feet	18	0
In pure manilla rope—		
6 feet by 4 feet	17	0
7 feet by 5 feet	25	3

Railage ex Roma Street, Brisbane, would have to be allowed for; this would not exceed 2s. 6d. for each net. Manilla rope varies in size and price—approximate price, 1½d. to 3½d. per yard. The size of the rope is measured by the circumference not the diameter.

CASTRATION OF PIGS.

Male pigs should be castrated while they are very young, so that they may be fit for slaughter on attainment of the correct weights. The age recommended for the operation is six weeks, or two weeks before they are weaned.

As many beginners do not know how to perform the simple operation of castration, the Department of Agriculture and Stock has made available, free of cost, a very useful and well illustrated pamphlet—"Castration of Pigs"—which gives detailed instructions in convenient form and in everyday language.

Demonstrations may be arranged, on application, in the course of the instructors' itineraries, either at gatherings where facilities exist for performing the operation, or at a slaughter-yard where young pigs are available. In the latter case it is preferable to demonstrate on a pig carrying more age—say, up to four months—and which can be killed and dressed beforehand. Demonstrating on a dressed porker simplifies procedure, and enables the instructor to explain it without the inconvenience of handling a live pig.

That a better knowledge of the operation of castration is essential is emphasised frequently by bacon curers, meat exporters, and slaughtering inspectors, who often come across carcases of male pigs which have been castrated improperly. Partial, if not total, condemnation of the hindquarters—the result of abscess formation, the formation of tumours in the scrotum, callous or improperly healed tissue, or some other abnormality—is the inevitable result.

Castration should be done during cool dry weather and before flies —blowflies in particular—become numerous. Absolute cleanliness in all details, proper equipment, healthy growing pigs, and a correct knowledge of the job are necessary for success in the performance of the operation.

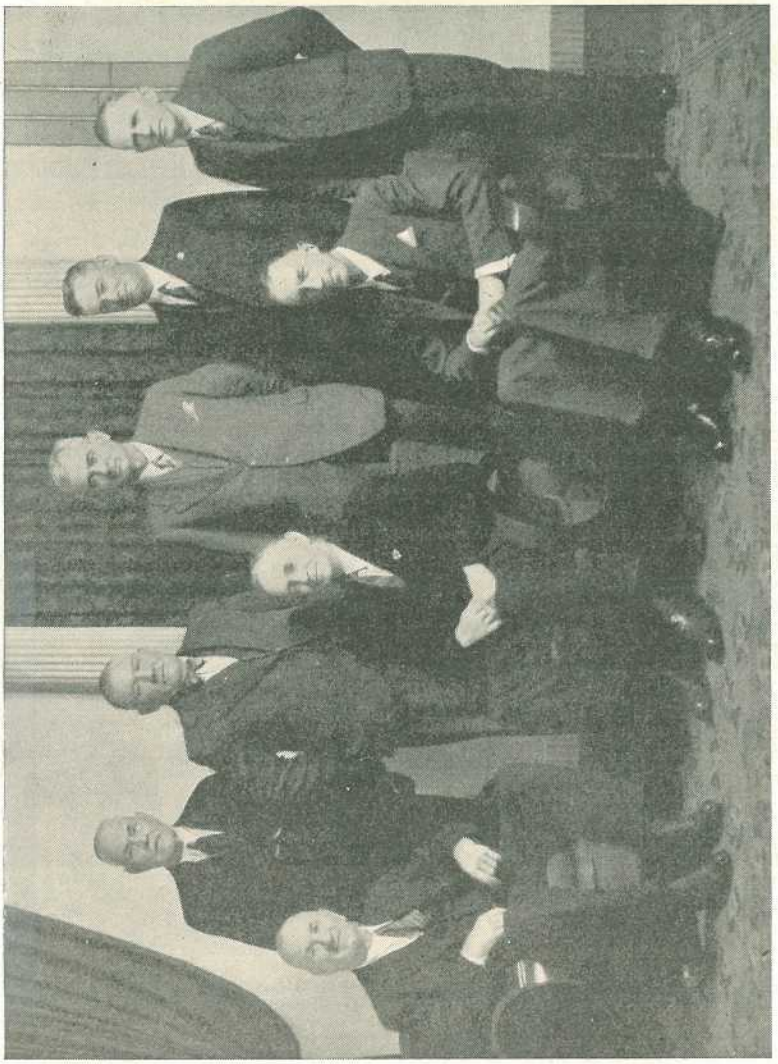


Plate 34.

QUEENSLAND CO-OPERATIVE BACON ASSOCIATION.

Standing: Directors J. Hardcastle, W. Beckmann, R. L. Boyd, R. E. Stephens, C. A. Stock.
Sitting: A. C. K. Cooke (Vice-Chairman), James A. Heading, D.C.M., M.M. (Chairman), H. W. Sanderson (Manager).

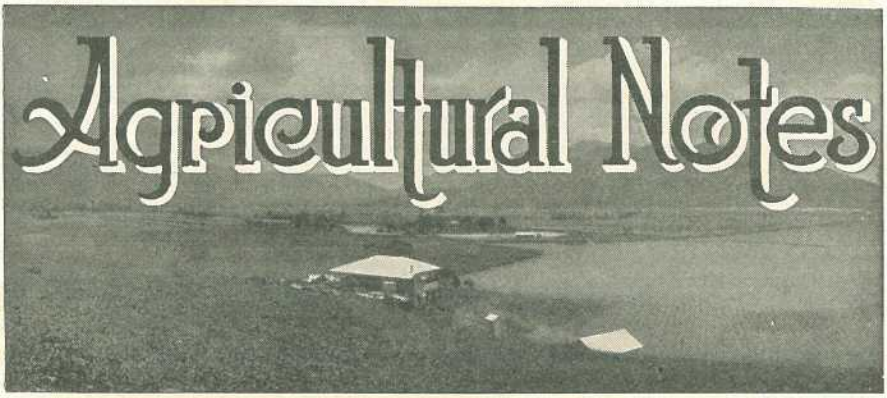
Name and Address.	Name of Hatchery.	Breeds Kept.
G. Adler, Tinana	Nevertire ..	White Leghorns, Australorps, Rhode Island Reds, and Langshans
F. J. Akers, Eight Mile Plains ..	Elmsdale ..	Australorps
E. J. Blake, Rosewood	Sunnyville ..	White Leghorns, Australorps, White Wyandottes, and Rhode Island Reds
W. Brown, Waterworks road, Ashgrove	Strathleven ..	White Leghorns
A. F. Buchler, Milman	Pinerow ..	White Leghorns
J. Cameron, Oxley Central ..	Cameron's ..	White Leghorns and Australorps
M. H. Campbell, Albany Creek, Aspley	Mahaca ..	White Leghorns and Australorps
J. E. Caspaney, Kalamia Estate, Ayr	Evlington ..	White Leghorns
J. L. Carrick and Son, Manly road, Tingalpa	Craigard ..	White Leghorns and Australorps
N. Cooper, Zillmere road, Zillmere	Graceville ..	White Leghorns
R. B. Corbett, Woombye ..	Labrena ..	White Leghorns and Australorps
T. G. Crawford, Stratford, via Cairns	Rho-Isled ..	Rhode Island Reds
B. Cross, Apple Tree Creek, Childers	Spring Hill ..	White Leghorns, Australorps, and Langshans
Dr. W. Crosse, Musgrave road, Sunnybank	Brundholme ..	Australorps, White Leghorns, and Rhode Island Reds
O. M. Dart, Upper Brookfield ..	Woodville ..	Australorps, White Leghorns, Langshans, and Rhode Island Reds
Dixon Bros., Wondecla ..	Dixon Bros. ..	White Leghorns
W. Easson, Formosa road, Tingalpa	Grassdale ..	White Leghorns and Anconas
E. O. F. Eckert, Laidley ..	Laidley ..	Australorps, White Leghorns, and Langshans
F. G. Ellis, Old Stanthorpe road, Warwick	Sunny Corner ..	Australorps
Elks and Sudlow, Beerwah ..	Woodlands ..	White Leghorns and Australorps
B. E. W. Frederich, Oxley road, Corinda	Glen Albyn ..	Australorps
W. H. Gibson, Manly road, Tingalpa	Gibson's ..	Australorps and White Leghorns
Gisler Bros., Wynnum ..	Gisler Bros. ..	White Leghorns

Name and Address.	Name of Hatchery.	Breeds Kept.
G. Grice, Loch Lomond, via Warwick	Kiama ..	White Leghorns
J. W. Grice, Loch Lomond, via Warwick	Quarrington ..	White Leghorns
Mrs. M. Grillmeier, Mount View, Milman	Mountain View	Australorps, Minorcas, and Rhode Island Reds
C. and 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 ..	White Leghorns and Anconas
H. Hufschmid, Ellison road, Geebung	Meadowbank ..	White Leghorns, Brown Leghorns, Minorcas, Australorps, and Rhode Island Reds
S. W. Kay, Cemetery road, Mackay	Kay's	White Wyandottes, Light Sussex, Rhode Island Reds, Australorps, White and Brown Leghorns
F. W. R. Longwill, Birkdale ..	Nuventure ..	Australorps and White Leghorns
J. McCulloch, Whites road, Manly	Hindes Stud Poultry Farm	White Leghorns, Brown Leghorns, and Australorps
W. S. MacDonald, Box 208, Babinda	Redbird ..	Rhode Island Reds and Anconas
F. McNamara, Vogel road, Brassall, Ipswich	Frammara ..	White Leghorns and Australorps
A. Malvine, junr., The Gap, Ashgrove	Alva	Australorps and White Leghorns
H. L. Marshall, Kenmore ..	Stonehenge ..	Australorps and White Leghorns
W. J. Martin, Pullenvale ..	Pennington ..	Australorps, White Leghorns, and Langshans
C. Mengel, New Lindum road, Wynnum West	Mengels ..	Australorps
J. A. Miller. Racecourse road, Charters Towers	Hillview ..	White Leghorns
F. S. Morrison, Kenmore ..	Dunglass ..	Australorps, White Leghorns, and Brown Leghorns
Mrs. H. I. Mottram, Ibis avenue, Deagon	Kenwood Electric	White Leghorns
J. W. Moule, Kureen	Kureen ..	Australorps and White Leghorns
D. J. Murphy, Marmor ..	Ferndale ..	White Leghorns, Brown Leghorns, Australorps, Light Sussex, and Silver Campines
S. V. Norup, Beaudesert rd., Cooper's Plains	Norups ..	White Leghorns and Australorps
H. W. and C. E. E. Olsen, Marmor	Squaredeal ..	White Leghorns, Black Leghorns, Australorps, Brown Leghorns, and Anconas
A. C. Pearce, Marlborough ..	Marlborough Stud Poultry Farm	Australorps, Langshans, Rhode Island Reds, Light Sussex, White Wyandottes, Khaki Campbell Ducks, Indian Runner Ducks, and Bronze Turkeys
E. K. Pennefather, Douglas street, Oxley Central ..	Pennefathers ..	White Leghorns and Australorps
G. Pitt, Box 132, Bundaberg ..	Pitt's Poultry Breeding Farm	White Leghorns, Brown Leghorns, Australorps, Langshans, White Wyandottes, Rhode Island Reds
G. R. Rawson, Mains road, Sunnybank	Rawson's ..	Australorps
J. Richards, Atherton	Mount View ..	White Leghorns and Australorps
H. K. Roach, Wyandra ..	Lum Burra ..	Australorps and White Leghorns
C. L. Schlencker, Handford road, Zillmere	Windyridge ..	White Leghorns
E. Searle, New Cleveland road, S.Tingalpa	Tingalpa ..	White Leghorns and Australorps

Name and Address.	Name of Hatchery.	Breeds Kept.
A. Smith, Beerwah	Endcliffe ..	White Leghorns and Australorps
A. T. Smith, Waterworks road, Ashgrove	Smith's ..	Australorps and White Leghorns
T. Smith, Isis Junction	Fairview ..	White Leghorns and Langshans
H. A. Springall, Progress street, Tingalpa	Springfield ..	White Leghorns
J. Steckelbruck, The Gap, Ashgrove	Cosy Nook ..	White Leghorns and Australorps
A. G. Teitzel, West street, Aitkenvale, Townsville	Crescent ..	White Leghorns
W. J. B. Tonkin, Parkhurst, North Rockhampton	Tonkin's ..	White Leghorns and Australorps
P. and K. Walsh, Cleveland ..	Pinklands ..	White Leghorns
W. A. Watson, Box 365 P.O., Cairns	Hillview ..	White Leghorns
G. A. C. Weaver, Atherton ..	Weaver's ..	Australorps, White Leghorns, Buff Leghorns, Wyandottes, Anconas, Indian Game, Rhode Island Reds, Barred Rocks, Buff and Black Orpingtons
H. M. Witty, Kuraby ..	..	White Leghorns and Australorps
P. A. Wright, Laidley ..	Chillowdeane ..	White Leghorns, Brown Leghorns, and Australorps
R. H. Young, Box 18, Babinda	Reg. Young's ..	White Leghorns, Australorps, and Brown Leghorns

Plate 35.

LAKE MANCHESTER, NEAR BRISBANE.



The Preservation of Concrete on the Farm.

CONCRETE floors and feeding troughs on the farm often show signs of wear soon after being laid down, a fault which is often due to the action of various acids in milk and some other foods. If the farmer does nothing to prevent further wear, the concrete becomes pitted and quickly breaks up.

This deterioration of the concrete may be delayed successfully by the correct use of a special type of silicate of soda, which is cheap and easy to apply. When mixed with water the solution thus obtained is sprinkled on the surface of the concrete to be treated, is absorbed, and combines with the concrete, forming a tough coating which is impervious to water and acids under ordinary farm conditions.

One gallon of the special silicate of soda is thoroughly mixed with 4 gallons of water. The 5 gallons of solution will suffice for three applications to an area of 300 square feet of average concrete. Very dry or porous concrete will require a fourth application.

In making new concrete floors, the work should be finished off so that the surface is not very smooth, otherwise the stock will be liable to slip when it becomes wet. When the concrete is firm and nearly dry the solution of silicate of soda in water is applied by means of a spray pump, a watering can with a fine sprinkler or a mop. Do not flood the solution on, but apply just as much as the concrete can absorb readily. A second, and later a third application of the solution should be made as the surface dries out each time. For new concrete three coats should be sufficient.

Worn floors and troughs may be renovated in the following way:— First, the surface should be thoroughly scrubbed with soap and hot water to remove grease and dirt. Then the area is coated over with a mixture of one part cement to three parts clean, fine sand. When the concrete is firm and drying, treat with the silicate of soda solution as for new concrete.

Floors and troughs in sound condition will benefit by treatment with silicate of soda. The surface should be freed from grease as before

mentioned; four applications of solution will probably be necessary, and twenty-four hours after the last application any solution remaining on the surface should be removed with a mop.

Concrete floors and troughs treated in this way last longer, are easier to clean, and dry more quickly than untreated concrete. For best results, the concrete should receive a light treatment once each year following the initial treatment.

When purchasing silicate of soda for conditioning concrete, the purpose for which it is to be used should be definitely stated to ensure obtaining the correct material.

PNEUMATIC TRACTOR TYRES.

During recent years the use of rubber tyres for tractors as well as farm implements and vehicles has made marked advances, and in Queensland to-day many new units are purchased with this equipment. In overseas countries they have been even more extensively applied, and cane growers will doubtless be interested in a review of a Bulletin recently issued in Iowa, United States of America, which sets out to summarise performances of some 200 tractors fitted with pneumatic tyres. These had been in use for periods up to five years, and were operated for a number of purposes under a variety of conditions.

Considerable variation existed in the rate of tyre wear; avoiding excess slippage was stressed in order to assure a long service. The estimated useful life varied from three to fifteen years, with an average of seven; in terms of hours of service, this amounted to 6,765.

Estimated fuel savings, in comparison with steel wheels, averaged 22 per cent.; the estimated saving in labour was 23 per cent. Fifty-four per cent. of the farmers reported the use of a higher gear for most operations.

The new high lug treads were reported as being generally more satisfactory, particularly for adverse traction conditions. The use of water to increase the wheel weight was found generally satisfactory.

The main advantages claimed by users were: Reduced fuel and labour requirements; higher speeds; easier operation on hard-surfaced roads, meadows, and pastures; decreased tractor breakage and wear, and greater comfort.

The chief disadvantages were: Higher first cost; possibility of delay and expense from accidental damage; the expense of equipping at least part of the drawn equipment with rubber tyres; lower maximum drawbar pull under many conditions; excessive bouncing under certain conditions; more objectionable tracks in loose tilled soil, and decreased stability for belt work.

The most effective use of a rubber-tyred tractor requires the highest practicable speed, the widest implement which can be pulled satisfactorily by the engine and tyres at this speed, and enough wheel weight to provide effective traction.

Over 98 per cent. of users were satisfied with the performance of rubber tyres, and most were agreed that they showed satisfactory durability and field performance.

H.W.K.

(In *The Cane Growers' Quarterly Bulletin* for July.)

GRAIN SORGHUMS ARE DOWNY MILDEW RESISTANT.

The exigencies of disease control work have compelled the control of maize plantings in the Bundaberg area. The high susceptibility of maize to sugar-cane downy mildew is now well known by all growers who have had experience with this serious disease. It must be recognised, however, that in this district cane is the major crop and maize the minor one, and it would be foolhardy to continue paying levies to the Disease Control Board for the eradication of downy-mildew in cane, while wholesale plantings of the more susceptible maize were still allowed in diseased areas.

The question of replacement of maize by a more suitable fodder and grain crop arises, and the possible answer appears to be in grain sorghums. The growth of grain sorghums is in its infancy in this district, but the varieties so far tried have distinct promise. It is suggested that growers endeavour to obtain small supplies of seed for an early spring planting. The varieties differ in type; some are leafy and are more suitable as green fodder, whereas others are less leafy and are best for grain production. They are very heavy grain producers, and their principal value over a maize crop lies in the fact that they will ratoon. The grain is—in the best types—about three sixteenths of an inch in diameter and is round. American literature states that the feeding value is very little below that of maize.

The grain sorghums we have tested so far are highly resistant to downy mildew—in fact, no symptoms of the disease have been discovered in them at all, although subjected to heavy infection from surrounding diseased cane.

The grain is easily separated from the heads by means of a peg drum. During the wet months of this year a crop of grain sorghums on the experiment station was badly affected by peach moth after coming into head. Earlier plantings will be made this year to see whether the attack will be escaped by controlling the time of planting.

It is anticipated that supplies of seed of four or five of the most suitable varieties for the area will be available in the coming spring. Interested farmers should communicate with the Director of Agriculture, Department of Agriculture, Brisbane, at that time.

N.J.K.

(*The Cane Growers' Quarter Bulletin* for July.)

MIXED SEEDLINGS OF GREEN MANURES.

While Poona pea has become highly regarded as a green manure species in practically all cane districts, it is appreciated that its early maturing character is a handicap in the wetter areas of the State. Under these conditions many farmers are successfully using a mixture of Poona pea seed with giant cowpea to overcome the drawback. Two bushels of giant cowpea with one bushel of Poona pea provides a satisfactory mixture. The Poona pea gives a rapid early cover and controls weeds; while the prolonged growth period of the giant pea enables the farmer to turn under a good mass of green matter towards the end of the wet season.

It should be noted that if a Poona pea crop perishes after it has made its growth, but before it can be ploughed under, not all of the benefits of the crop are lost, as many farmers suppose. The supply of nitrogen which it has accumulated still remains in the dead leaf and stems, or is washed into the soil by the rain after the death of the plants. Unquestionably, best results will follow where it is possible to turn the crop under at the height of its succulent growth.

H.W.K.

(*The Cane Growers' Quarter Bulletin* for July.)

RATIONING OF POTASH.

DURING the war of 1914-1918 potash imports—an essential farm fertilizer requirement—ceased. The potash-producing districts of the world were in enemy occupation.

At the outbreak of the present war, a measure designed to conserve and control supplies of materials essential to agriculture was enacted by the State Parliament, in anticipation of conditions arising which might interfere with imports of essential substances. This measure is known as *The Agricultural Requirements Control and Conservation Act*.

At the same time, action was taken by the Minister for Agriculture and Stock and interested importers to build up reserves of potash against the possibility of a future shortage.

The Act gives power to control the sale and use of any material gazetted as an "essential agricultural requirement," and, generally, to ensure that the quantities of materials on hand will be used to the best advantage of the State.

Soon after the passing of the Act, potash and sulphate of ammonia—both fertilizing materials—were gazetted as essential agricultural requirements, and provision was made for the immediate operation of this legislation if deemed necessary.

When war broke out, France and Palestine were the chief sources of supply of potash to Australia. Germany and Spain had been eliminated from the field. France also has now ceased to be a source of supply, and because of the expected heavy drain on Palestine supplies and the difficulty of obtaining goods from Mediterranean countries, it is not certain that further supplies of potash will be obtainable.

Because of the supply accumulated, however, and of the Act and machinery designed to deal with the situation, Queensland will be able to use potash in her agricultural industry for—it is estimated—approximately two years, without relying on further imports.

An Order in Council has been issued under the Act setting out the method by which potash will be conserved. In brief, the following are its main requirements:—

Potash must not be sold or used as a straight fertilizer—that is, it must be purchased in a mixed fertilizer with other ingredients.

No potash may be sold or used in a mixed fertilizer for any crop other than sugar-cane, pineapples, bananas, tobacco, vegetables, potatoes, strawberries, cotton, citrus fruits, deciduous fruits, papaws, custard apples, passion fruit, and avocadoes.

No sulphate of potash may be sold or used in a mixed fertilizer for any crop other than pineapples, tobacco, potatoes, and strawberries.

In fertilizer mixtures for sugar-cane, up to 14·5 per cent. potash is allowed on the red volcanic soils—which are low in potash—at Babinda, Innisfail, Childers, and Bundaberg; no potash is allowed in the Burdekin area—where potash in the soil is adequate—and up to 7·5 per cent. potash is allowed for cane in any other area.

In fertilizer mixtures for bananas, up to 6 per cent. potash is allowed, and for pineapples up to 10 per cent.

In fertilizer mixtures for cotton, potash is allowed only with special permission of the Department of Agriculture and Stock.

With all other crops for which potash is allowable, but for which a specific percentage is not laid down, up to 7·5 per cent. potash is allowed.

A tolerance of 10 per cent. is allowable over the maximum percentages of potash declared to be present—that is, the excess of potash over the amount guaranteed in any fertilizer mixture sold or used must not be more than one-tenth.

Power is given to the officer charged by the Minister with the administration of the Act to give written permission to allow potash to be sold and used in exceptional cases.

Officers have been appointed under the Act in order to put the requirements outlined into effect; these officers include the principal officer in charge, the deputy of this officer, and inspectors.

This rationing scheme has been drawn up by officers of the Department after very careful consideration of every aspect of the matter, and buyers who are not receiving their usual amount of potash in mixed fertilizers should realise that the interests of Queensland as a whole are being served by rationing.

Here are the details:—

AGRICULTURAL REQUIREMENTS CONTROL AND CONSERVATION ACT.

RATIONING OF POTASH (FERTILIZER) SUPPLIES.

An Order in Council issued under the abovementioned Act restricts the sale and use of potash in all its forms.

The following provisions are included:—

Potash in any of its forms must not be sold or used as a straight fertilizer—that is, it must be sold or used in a mixed fertilizer with other ingredient/s.

The sale and use of potash in the culture of crops is restricted, as set out in the following table, taking into consideration only the present available forms of potash—namely, sulphate and murite:—

Name of Crop and Area where Cultivated (where Applicable).	Forms of Potash Allowable in Fertilizer Mixtures.	Maximum Potash Allowable in such Fertilizer Mixtures.
		Per cent.
Sugar-cane—		
Ayr Petty Sessions District (Burdekin)	Nil	Nil
Red volcanic soils in the Petty Sessions Districts of Cairns, Innisfail, Bundaberg, and Childers	Muriate only	14·5
Other areas	Muriate only	7·5
Pineapples	Sulphate and Muriate	10·0
Bananas	Muriate only	6·0
Tobacco, Potatoes, Strawberries	Sulphate and Muriate	7·5
Vegetable Crops, Citrus Fruits, Deciduous Fruits, Papaws, Custard Apples, Passion Fruit, Avocadoes	Muriate only	7·5
Cotton	Muriate only	7·5. Only by permission of Principal Officer in Charge
Other Crops	Nil	Nil

In particular cases other than as set out above, the principal officer in charge may authorise the sale and use of potash.

Any person who contravenes or fails to comply with any requirement of an Order in Council under the Act is liable to a penalty of not more than £200, and, in addition, to a penalty of not more than £50 for each and every day during which the offence is committed.

It should be noted that this statement is explanatory only; the full legal requirements are as set out in the Order in Council gazetted under *The Agricultural Requirements Control and Conservation Act* on 13th July, 1940.

The Planting of Bananas.

THE best aspect for banana-growing is one varying from easterly to northerly, and even north-westerly, provided that the plantation is well sheltered from strong winds. As southerly slopes are usually cold, banana plants, if grown on them, develop slowly, and the fruit is generally inferior; hence land with a southerly aspect is not worth considering if other land is available.

Logging and hoeing operations should, if possible, be followed by a thorough grubbing. Grubbing is essential if the plantation is to be established in forest soil. It is necessary for the aeration and drainage of the soil and the maintenance of a supply of moisture for the plants. Many growers look askance at forest soils for bananas, but plantations on such soils, if worked thoroughly and desuckered carefully, can produce fruit of first-class size and quality.

It is now possible to plant bananas in many localities. If bits or butts are being utilised, careful attention must be paid to baiting for the banana weevil borer to ensure the planting of clean material. Growers in need of advice on the selection and preparation of planting material should get in touch with the nearest fruit inspector or banana agent.

Holes for planting should be, roughly, about 15 inches square by 15 inches deep. The surface soil from the top side should be raked back into the hole and the sucker placed in the loose soil and tramped firmly all round. The top of the sucker need only be covered lightly with loose earth, and the hole should not be refilled completely.

An application of about 1 lb. of fertilizer when planting will hasten and strengthen the growth of the young plants. The actual time of planting will depend on the conditions in the different districts. On a slow-growing aspect, October planting is best, while on warmer slopes November and December may be more suitable.

Where grubbing has not been done previously a circle around each plant with a radius of approximately 3 feet should be worked. This gives the plant both sufficient sunlight and freedom from smothering weeds. Planting 10 feet by 10 feet is a good average distance.

Generally, the best method of spacing followers is that known as "one bunch one follower." This enables the grower to regulate and handle his fruit cutting and packing with convenience, as it is more or less confined to the winter months. For about the first twelve months after planting, all but one or two followers should be kept back, and thus all energy is directed into one plant and its bunch. The folly of allowing as many suckers as may appear to develop cannot be condemned too strongly.

MARKETING BANANAS.

During hot weather, bananas which have been cut and left exposed to the sun for only a short period soon become quite unfit for sale, and the pulp is eventually reduced to a soft, "boiled" condition. Cutting should be done in the early morning, before the heat becomes severe, and care should be taken to keep the fruit covered completely, even from the early morning sun, while waiting to be carried or wired to the packing shed.

The fruit should at all times be handled with the greatest care—in fact, the less it is handled the better—and for this reason it is wise to have the packing shed right in the plantation, if possible. On cutting the bunch it should not be laid carelessly at the foot of the stem, which usually means it rests on a bed of sticks and dead weeds. A bed of leaves is easily and quickly formed if the bunch must be set down in the plantation, although a better plan is to carry it straight into the shed or to the end of the wire and there place it upright on bags or trash with the stalk leaning against a rail provided for the purpose. In this way, possible damage will be reduced to a minimum.

On being dehanded, the fruit should be allowed to "drain" for a few hours. Packing immediately after dehanding sweats the fruit in the case and makes bruising much easier. Care should be taken to ensure that fruit which is "sprung" or in the early stages of ripening is not packed, as it will quickly be reduced to pulp and be unsightly in a case of otherwise sound bananas. No fruit should be packed for Southern markets from bunches in which some of the fingers are already showing colour indicating ripening. The fruit should be dehanded just at the collar joining the fingers to the main stalk. The most suitable knife for this work is one of a sharp, flexible, and very narrow type.

There is a right and wrong way to separate the hands into singles, if a "single" pack is desired. Tearing the bananas apart endways often peels part of the skin from the fruit and also bruises the stem, thus setting up an entrance for organisms which cause blackend. The correct method of separating into singles is to grasp the cluster firmly with both hands at the stem end, then twisting one hand forwards and the other backwards, the fruit is separated easily and without any damage to the stalk end.

On completion of packing the cases should be placed on their sides in a cool, shady position to await transport to rail or market.

Should it be desired to use the "cluster" pack, the same method should be adopted, separating three or four instead of the single finger. If a cluster of three or five is used, a single banana should be added to make it a four or six. The secret of clusters is to have the fruit in twos.

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.

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—Nonpariel, which has a long oval shape; and Crimson Globe—a turnip-rooted, early beet, suitable for hot districts.

Plate 36.

CLOSE TO THE JOB.—Swedish rototiller at work mixing fertilizer with the soil on Benyenda Citrus Orchard, near Gayndah.

THE FRUIT MARKET.

J. H. GREGORY, Instructor in Fruit Packing.

COLD weather has slowed up fruit sales to some extent. Fruit also is harder to ripen at this time of the year. In the colder South, these conditions are, of course, intensified. Queensland growers are asked to cease sending green pineapples, papaws, and tomatoes to market. All of these fruits may be allowed to show colour with safety. Excellent consignments of strawberries are being marketed, but factory supplies leave much to be desired. Suppliers persist in placing a percentage of soft and damaged berries in each box. This percentage, on arrival in Brisbane, is sufficient to cause rejection. Notes dealing more fully with this trouble are published elsewhere in this issue. Custard apples are now nearing the end of their season. Firm values have been maintained throughout. Frosts have been heavy, and damage has been caused to beans, peas, and tomato crops. Prices for these crops should remain firm during most of the marketing season.

Ruling market prices during the last week of July, 1940:—

TROPICAL FRUITS.

Bananas.

Brisbane.—Cavendish: Small, 13s. to 18s.; Sixes, 13s. to 20s.; Sevens, 15s. to 23s.; Eights and Nines, 18s. to 24s.

Sydney.—Cavendish: Small, 14s. to 18s.; Sixes, 14s. to 20s.; Sevens, 16s. to 22s.; Eights and Nines, 20s. to 28s.

Melbourne.—Cavendish: Sixes, 19s. to 22s.; Sevens, 21s. to 23s.; Eights and Nines, 23s. to 25s.

Adelaide.—Cavendish: Sixes, Sevens, Eights, and Nines, 25s. to 30s.

Newcastle.—Cavendish: Sixes, 23s. to 24s.; Sevens, 25s. to 27s.; Eights and Nines, 29s. to 30s.

Bunches, 5d. to 8½d. dozen.

Growers would be well advised to allowed the fruit to fill as much as possible before harvesting.

Lady's Finger.—1d. to 10½d. dozen.

Sugars.—2d. to 4d. dozen.

Pineapples.

Brisbane.—Smoothleaf, 4s. to 5s. case; choice, to 7s.; loose, 1s. 6d. to 5s. 6d. dozen; Ripley, 4s. to 5s. case; loose, 6d. to 2s. 6d dozen.

Melbourne.—Smoothleaf, 8s. to 10s.

Some poorly coloured green lines of fruit are being received, to the detriment of market values.

Adelaide.—Smoothleaf, 14s. to 18s.

Papaws.

Brisbane.—Yarwun, 5s. to 7s. tropical case; Gunalda, 3s. to 4s. 6d. bushel; Local, 2s. 6d. to 3s. 6d.; Specials higher.

Sydney.—9s. to 15s. tropical case.

Melbourne.—Ripe coloured, 13s. to 15s.; Green, 8s. to 12s. Sales slow. Fruit hard to ripen.

Some green lines being received. These will not ripen satisfactorily at this time of the year.

Custard Apples.

Brisbane.—4s. to 5s. half-bushel. Poor grades lower.

Sydney.—8s. to 10s. Poor lines lower.

Melbourne.—8s. to 10s.

Monstera Deliciosa.

3s. to 4s. 6d. dozen.

Avocados.

Brisbane.—5s. to 7s. 6d. half-bushel.

Granadillas.

5s. to 10s. dozen.

CITRUS FRUITS.

Oranges.

Brisbane.—Navels, 4s. to 7s. 6d.; choice higher; Commons, small, 3s. to 4s.; large sizes to 7s.

Mandarins.

Brisbane.—Emperor, 2s. 6d. to 8s. Many lines soft and washy. Ellendale, 10s. to 14s.; Glens, 8s. to 12s.; Scarlets, 3s. to 8s.

Sydney.—Glens, 8s. to 10s.; others, 5s. to 8s.

Melbourne.—9s. to 12s.

Most interstate lines of mandarins are showing signs of reaching full maturity.

Grapefruit.

Brisbane.—5s. to 8s. bushel.

Melbourne.—5s. to 12s. bushel.

Lemons.

Brisbane.—Small, 4s. to 6s.; Choice, 7s. to 10s.

Melbourne.—10s. to 16s. bushel.

DECIDUOUS FRUITS.

Apples.

Brisbane.—Jonathan, 5s. to 10s.; French Crab, 3s. to 7s.; Granny Smith, 7s. to 11s.; Democrat, 6s. to 9s.; Delicious, 7s. to 11s.; Sturmer, 5s. to 7s.; Aromatic, 5s. to 7s.

Too much small fruit has been received on the Brisbane market, particularly varieties such as French Crab, which are not popular at any time.

Pears.

Brisbane.—Gleau Morceau, 8s. to 11s.; Packhams, 8s. to 11s.; Winter Cole, 8s. to 13s.; Winter Nelis, 6s. to 10s.; Josephine, 8s. to 11s.

OTHER FRUITS.

Strawberries.

Brisbane.—4s. to 8s. dozen boxes; some specials higher; 4-lb. boxes jam, 1s. 9d. to 2s. 6d.

Tomatoes.

Brisbane.—Ripe, 4s. to 6s.; Choice coloured to 7s. half-bushel; Small ripe, 2s. to 3s.; Green, 2s. to 4s. half-bushel.

Sydney.—4s. to 6s.; Specials to 8s.

Melbourne.—West Australian, 7s. to 12s. per case.

Passion Fruit.

Brisbane.—First grade, 8s. to 12s.; Seconds, 5s. to 7s.

Melbourne.—8s. to 10s.

Cape Gooseberries.

6d. to 7d. lb.

MISCELLANEOUS, VEGETABLES, ETC.

Cucumbers.—6s. to 8s. bushel.

Pumpkins.—4s. to 5s. bag.

Marrows.—1s. to 4s. dozen.

Lettuce.—1s. 6d. to 2s. dozen.

Cabbages.—2s. to 3s. dozen; small lower.

Cauliflowers.—5s. to 12s. dozen.

Beans.—Brisbane, 3s. to 7s. bag; Sydney, 4s. to 8s. case; Melbourne, 2d. to 3½d. lb.

Peas.—4s. to 8s.; choice higher; Melbourne, 4d. to 5d. lb.

Beetroot.—3d. to 9d. bundle.

Chokos.—4d. to 10d. dozen.

Parsnips.—9d. to 1s. 6d. bundle.

Carrots.—3d. to 9d. bundle.

Celery.—South Australian, 12s. to 16s. crate; Local, 1s. to 1s. 6d. bundle.

Rhubarb.—8d. to 1s. 6d. bundle.

Plate 37.

YOUNG FARMERS AT THE SYDNEY SHOW.—The group includes members of Queensland Project Clubs chosen to represent the State at the New South Wales Junior Farmers' Movement Camp on the Sydney Showground, under the leadership of Mr. J. P. Kahler, Project Club Organiser of the Department of Public Instruction.

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 June, 1940 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
Mature Cow (Standard, 350 lb.).				
Callangulong Aster	C. Fleming, Callangulong, Jondaryan	7,768·85	435·599	Nestle's Royal Badge
Corunna Dainty (243 days)	J. H. Anderson, Southbrook	11,329·66	435·153	Gambol of Wilga Vale
Fairlie Chance 7th (236 days)	Sullivan Bros., Pittsworth	10,236·03	389·151	Rosenthal Carbine
Wakeful of Glen Eva	E. O. Jeynes, Raceview	10,274·15	386·669	Cork of Oakvale
Murray's Bridge Shamrock	A. T. Paull, Bowenville	8,102·03	373·342	Valiant of Greyleigh
Senior, 4 Years (Standard, 330 lb.).				
Evansvale Olive	J. F. Evans, Malanda	10,771·2	353·24	Malanda of Glenore
Junior, 3 Years (Standard, 270 lb.).				
Valera Milkmaid	Sullivan Bros., Pittsworth	6,693·56	303·576	Kilbirnie Royalist
Senior, 2 Years (Standard, 250 lb.).				
Envy 26th of Blacklands	A. Pickels, Proston	7,835·15	345·531	Parkview Viceroy
Rosenthal Lilac 9th (241 days)	J. H. Anderson, Southbrook	7,871·45	328·958	Rosenthal Credence
Applegarth Evelyn III.	W. Nicholas, Monto	7,761·15	324·357	Greyleigh Crowner
Valera Bonny 2nd	Sullivan Bros., Pittsworth	8,318·47	311·238	Kilbirnie Royalist
Ardilea Kitty (238 days)	W. Henrichsen, Ardilea, Clifton	7,102·75	283·058	Midget Sheik of Westbrook
Junior, 2 Years (Standard, 230 lb.).				
Fairlie Princess 34th	C. B. Mitchell, Fairlie, Rosenthal	6,137·93	275·698	Rosenthal Credence
Fairlie Fairy 12th	C. B. Mitchell, Fairlie, Rosenthal	6,138·5	260·646	Rosenthal Credence
Trevor Hill Patty	Geo. Gwynne, Umbiram	6,348·71	231·257	Corunna Supreme

JERSEY.

Mature Cow (Standard, 350 lb.).				
Ocean View Wait-a-while Fairy	J. Sigley, Millaa Millaa	8,247·35	435·552	Rocky Glen Wait-a-while
Junior, 4 Years (Standard, 310 lb.).				
Westbrook Tulip 70th	Farm Home for Boys, Westbrook	8,015·65	428·65	Oxford Golden Dreamer
Senior, 3 Years (Standard, 290 lb.).				
Trecarne Jersey Maid 3rd	T. Petherick, Lockyer	7,271·78	431·724	Trinity Some Officer
Junior, 3 Years (Standard, 270 lb.).				
Meadowvale Magnet	Young Bros., Proston	5,874·2	300·407	Banyule Development
Senior, 2 Years (Standard, 250 lb.).				
Trecarne Eileen 7th	T. Petherick, Lockyer	7,001·1	460·773	Trinity Some Officer
Trecarne Safety 2nd	T. A. Petherick, Lockyer	6,299·1	381·292	Trinity Some Officer
Kingsford Frances	W. E. C. Meier, Rosevale, Rosewood	6,477·05	318·719	Trinity Ambassador
Junior, 2 Years (Standard, 230 lb.).				
Oxford Sybil III.	E. Burton and Sons, Wanora	6,504·45	361·242	Oxford Peer
Kingsford Angeline	W. E. C. Meier, Rosevale, Rosewood	5,430·8	302·84	Oxford Aster's Remus
Oak Park Titania	J. Nowlan, Lindum	4,933·85	282·872	Banyule Lord Tiddlewinks

VETERINARY MEDICINE REGISTRATIONS.

The Registrar of Veterinary Medicines, Mr. F. B. Coleman, has supplied a further list of veterinary medicines, which have been registered under "*The Veterinary Medicines Acts, 1933 to 1938,*" for the period January, 1939, to December, 1941.

List No. 3 (supplementary to List No. 2 issued December, 1939).

	Reg. No.
Buzacotts (Queensland) Limited, Brisbane—	
Bio Gastric Distemper Mixture	1437
Bio Worm Powders for Horses	2452
Denhams Proprietary Limited, Brisbane—	
"Poultry's" Chicken Pox Preventative	427
Goldsbrough Mort & Co. Ltd., Brisbane—	
Wurm-Ez-Ol Sheep Drench	1062
Carbene Sheep Drench	1063
Cee-Tee-Cee Sheep Drench	1064
To-Cu-Sul Sheep Drench	1719
Too-Partz Double Strength Sheep Drench	2132
McDonald and Company, A. H., Brisbane—	
Vetamac Medication	2501
Vetamac Pink Eye Powder	2723
Nobles Proprietary Limited, Brisbane—	
Sykes's Abortex	1084
Osmond and Sons (Australia) Proprietary Limited, South Brsbane—	
Osmond's Antiseptic Pessaries	134
Osmond's Aphrodisiac Powders	1918
Osmond's Bot Capsules	210
Osmond's Chlorosyl	2167
Osmond's Compound Santonin Worm Powders for Pigs	1477
Osmond's Foot-Rot Paste	1074
Osmond's Grease Wash	2168
Osmond's Improved Blister	477
Osmond's Saltona Blood Salt	330
Osmond's Special Scour Cordial	481
Osmond's Special Worm Drink for Horses	482
Parke Davis and Company, Brsbane—	
Bio 882 Blackleg Aggressin	2601
Salmond and Spraggon (Australia) Proprietary Limited, Brisbane—	
Bob Martin's Cat Powders—Tasteless	2611
Bob Martin's Worm Capsules	2613
Spedosol Supply Company, Brisbane—	
Spedosol Powder	26
Stimson, J. L., Coolangatta—	
Stimson's "Eezoil" Mange Mixture	2685
Taylors Elliotts and Australan Drug Proprietary Limited, Brisbane—	
Cylol	1977A
Doyle's Distemper Mixture	167
King's Greyhound Tonic	2172
King's Pad Paint	2173
King's Worm Capsules	2171

Vitaforce Products (Queensland), Brisbane—

Vitaforce Distemper Capsules	2557
Vitaforce Dog Soap	2556
Vitaforce Greyhound Tonic	2561A
Vitaforce Puppy Worm Syrup	2559
Vitaforce Worm Capsules	2560

INDEX OF BRANDS

that are not indicated in the foregoing list by the Primary Dealers name:—

Brand.	Primary Dealer.
Bio	Buzacotts (Qld.) Ltd.
Bio	Parke Davis & Co.
Bob Martin's	Salmond & Spraggon (Aust.) Pty. Ltd.
Doyle's	Taylors Elliotts & Australian Drug Pty. Ltd.
King's	Taylors Elliotts & Australian Drug Pty. Ltd.
Poultry's	Denhams Pty. Ltd.
Sykes's	Nobles Pty. Ltd.
Vetamac	McDonald & Co., A. H.

CARE OF THE DIP.

Cattle owners in ticky country often neglect their dipping vats. Consequently, they lose money without realising it, for cattle dipped recently in a dirty vat lose their bright, clean appearance, which helps the seller when the bidding in the sale ring is brisk.

In the course of time, a dipping vat will accumulate a considerable quantity of filth which settles slowly on the bottom as a deposit of sludge. It may become so bad that an owner is forced to empty the vat, and is then put to the expense of recharging.

This can be avoided by cleaning the vat periodically. For this purpose, a kerosene tin is cut in half diagonally to make a scoop, which is attached to a handle with wire. Small holes are cut in the bottom and sides. After dipping cattle, the surface of the fluid may be skimmed with the scoop and floating hair and dirt removed. This helps to keep the vat clean for a long time.

After dipping, the sump should also be cleaned and dirt prevented from accumulating.

A white mark should be placed on the side of the vat to show the height of the fluid. It will be noticed, particularly in hot weather, that evaporation is very rapid, and the surface of the fluid will fall far below this mark. Before next dipping, water may be added until the dipping fluid is again at the correct level. It is only the water that evaporates—not the concentrates.

General Notes

Staff Changes and Appointments.

The transfer of Mr. A. F. Moodie, inspector of dairies, from Mackay to Hughenden, has been cancelled, and Inspector G. K. L. Clark, Murarrie, will be attached to Hughenden.

Mr. J. Davies, inspector of dairies, Gayndah, will be transferred to Ipswich.

Mr. W. Grimes, care of the Fairymead Sugar Co. Ltd., Bundaberg, has been appointed millowners' representative on the Fairymead Local Sugar Cane Prices Board, vice Mr. T. W. Pulsford, resigned.

Constable E. F. P. Duncan (South Kolan) has been appointed also an inspector under *The Slaughtering Act*, and Constable W. M. McNaught (Mackinlay) has been given the additional appointment of inspector under *The Brands Acts*.

Messrs. G. A. Zahmel (Finch Hatton) and L. A. M. Patterson (Silkwood East) have been appointed honorary protectors under *The Fauna Protection Act*.

The following additional assistant cane testers have been appointed for the present sugar season at the mills indicated:—

Messrs. C. W. Miller (Cattle Creek), L. Hoffman (Isis Central), C. Eales (North Eton), H. B. Beaman (Mulgrave), J. J. Devlin (Mount Bauple), and B. N. Stuart (Qunaba).

Misses J. Ker (Racecourse), T. H. Shield (Gin Gin), F. M. Wilson (Maryborough), L. Oakes (Invicta), and D. M. Mittelheuser (Bingera).

Transfers of cane testers and assistant cane testers:—

Mr. L. J. G. Becker has been transferred from Plane Creek to Pleystowe as cane tester.

Mr. H. C. Jorgensen has been transferred from Pleystowe to Plane Creek as cane tester.

Assistant cane testers:—

Mr. R. Anderson from Kalamia to Fairymead.

Mr. L. C. J. Clifton from Fairymead to Kalamia.

Mr. W. C. Cocking from Qunaba to Proserpine.

Miss F. Foubister from Racecourse to Pleystowe.

Mr. H. J. Heidke from Proserpine to Qunaba.

Mr. G. E. Rogers, inspector of slaughterhouses, is to be retired from the Public Service as from 31st December, 1940.

The following police officers have been appointed inspectors under *The Brands Acts*:—

Sergeant N. Munckton, of Lowood.

Constable T. A. McNaught, of Kajabbi.

Constable E. W. Bateson, of Dobbyn.

Constable W. F. Aplin, of Urandangie.

Constable J. P. Wilkinson, of Burketown.

Mr. L. E. F. Walter, temporary inspector under *The Diseases in Stock Acts*, Department of Agriculture and Stock, has been transferred from Normanton to Kajabbi.

Constable F. L. C. Golledge, Yuleba, has been appointed also an inspector under *The Slaughtering Act*.

Miss M. A. Morris, cane tester, has been transferred from Cattle Creek mill to Marian mill.

Mr. D. Walton, assistant cane tester, Pioneer mill, has been appointed cane tester at the Cattle Creek mill.

Miss P. K. O'Mara has been appointed an assistant cane tester at the North Eton mill, and Messrs. H. R. Dark and L. Kelso have been similarly appointed to the Pioneer and Mulgrave mills, respectively.

Mr. F. B. Coleman, Officer in Charge of the Seeds, Fertilizers, &c., Branch of the Department of Agriculture and Stock, has been appointed also Principal Officer in Charge, Officer in Charge, and Inspector under "*The Agricultural Requirements Control and Conservation Act of* 1939." Under the same legislation, Mr. R. A. Taylor, Inspector and Examiner, has been appointed Principal Officer in Charge and Officer in Charge at any time during the absence of Mr. Coleman, and also an Inspector. Messrs. F. P. C. Bell and R. J. Holdsworth, Inspectors under *The Seeds, Fertilizers, Veterinary Medicines, Pest Destroyers, and Stock Foods Acts*, and A. C. Peel, Acting Inspector under those Acts, have been appointed Inspectors.

Constable T. Cavanagh, Yelarbon, has been appointed also an inspector under *The Slaughtering Act.*

Mr. D. R. L. Steindl, assistant pathologist, Bureau of Sugar Experiment Stations, has been transferred from Brisbane to Bundaberg.

Messrs. F. W. Blake, P. M. O'Connor, M. J. Waddell, and C. R. M. Clelland, Clerks of Petty Sessions at Babinda, Gordonvale, Tully, and Gin Gin, respectively, and chairmen of the Babinda, Mulgrave, Tully, and Gin Gin Local Sugar Cane Prices Boards, respectively, have been appointed also agents of the Central Sugar Cane Prices Board for the purpose of making enquiries under *The Regulation of Sugar Cane Prices Acts* in respect of sales and leases of assigned lands.

Messrs. W. L. B. Morgan, Mount Pleasant, Dayboro'; A. Morton, manager, Dynevor Downs, Eulo; and G. Ahern, Lakeview, Goomeri, have been appointed honorary protectors under *The Fauna Protection Act.*

Mr. J. W. Black, Pioneer sugar mill, Pioneer, via Townsville, has been appointed millowners' representative on the Pioneer local sugar cane prices board.

Mr. A. M. Taylor, Police Magistrate, Ayr, has been appointed chairman of the Invicta, Kalamia, Pioneer, and Inkerman local sugar cane prices boards and an agent of the Central Sugar Cane Prices Board, in place of Mr. T. E. Dwyer, transferred.

Mr. T. E. Dwyer, Police Magistrate, Ingham, has been appointed chairman of the Victoria and Macknade local sugar cane prices boards and an agent of the Central Sugar Cane Prices Board, in place of Mr. A. E. George, transferred.

Messrs. B. J. Bourke, N. Courtice, and D. James, inspectors for the Bundaberg Cane Disease Control Board, have been appointed temporary inspectors under "*The Diseases in Plants Acts*, 1929 *to* 1937."

Miss F. Atherton and Mr. J. H. Murtagh, assistant cane testers, have been transferred from Moreton to South Johnstone and from South Johnstone to Moreton, respectively.

Constable F. T. W. Crawshaw, Hebel, has been appointed also an inspector under *The Slaughtering Act.*

Mr. J. M. Kennedy, health inspector, Innisfail, has been appointed also an honorary protector under *The Fauna Protection Act.*

Banana Industry Protection Board.

An Order in Council has been issued under *The Banana Industry Protection Acts* providing for a levy on banana-growers to be used for the maintenance of the Banana Industry Protection Board. The levy, the same as that approved last year, is at the rate of 1½d. a case for bananas marketed in the case, or 2d. in the £1 or part thereof for bananas marketed in the bunch.

Wild Life Preservation.

Under "*The Fauna Protection Act of* 1937" two new sanctuaries have been declared:—

1. The property held by Mr. Charles E. Nason of Surat.
2. Lamberts Beach and Amhurst Township.

The Fertilisers Act.

An amendment of Regulations under "*The Fertilisers Act of* 1935" approved recently relates to the method of declaring magnesia (MgO) on labels of fertilizers and/or lime for agricultural purposes, and the provision of a standard for dolomite and/or lime for agricultural purposes containing magnesia (MgO).

Plate 38.
MR. L. D. CAREY.

Mr. L. D. Carey has been appointed Chief Inspector of Stock in succession to the late Lieut.-Colonel A. H. Cory, M.R.C.V.S. Mr. Carey was born and educated on the Darling Downs, and joined the field staff of the Department of Agriculture and Stock as Inspector of Stock in 1918. In 1920 he was promoted District Inspector and in that capacity served in the North, North-West, Central, Central-West, and Toowoomba stock divisions of the State. In 1934 he was appointed to the newly established position of Staff Inspector. Mr. Carey is keenly interested in country show societies and has acted as a stock judge on many occasions.

Mr. H. A. Iliff, Senior Clerk, Stock Department, who has been appointed Registrar of Brands in succession to the late Lieut.-Colonel A. H. Cory, M.R.C.V.S., has had long and meritorious service in the Department of Agriculture and Stock. He was appointed Deputy Registrar of Brands in 1916, and was associated closely with Colonel Cory in the administration of the veterinary and correlated services of the Department since 1925. When legislation to provide for the registration of veterinary surgeons in Queensland was passed in 1936, Mr. Iliff was appointed Registrar of the Veterinary Surgeons Board, a position which he retains in addition to his new appointment.

Plate 39.
MR. H. A. ILIFF.

Answers to Correspondents

BOTANY.

Replies selected from the outgoing mail of the Queensland Botanist, Mr. C. T. White, F.L.S.

Sida Retusa.

A.J.B. (Ipswich)—

1. *Sida retusa* is widely spread over the warm regions of the world. It is a native of Asia. It was collected in Australia many years ago, and there is just a chance that it is also a native here. It was supposed to be naturalised in New South Wales from Mauritius.
2. It is a valuable fibre plant. It also is quite a useful fodder and in New South Wales is frequently known as "Paddy's Lucerne."
3. It thrives best in the sub-tropical parts of the State, on the coast and near-coast, and does particularly well on alluvial flats or country suitable for cultivation. It does not seem to occur to a great extent in the near tropical parts of Queensland, where it is replaced by an allied species, *Sida acuta.*

"Wild Sunflower"—A Poisonous Weed.

E.M. (Roma)—

The specimens represent *Verbesina encelioides,* a native of North America, now a very common naturalised weed in Queensland. It is usually popularly known as wild sunflower. In recent years it has spread to an alarming extent in parts of the Darling Downs and Maranoa districts. It has been proved poisonous to sheep, but they do not usually eat it in sufficient quantities to cause trouble. Losses, however, now and then do occur. The plant should be controllable by spraying, particularly with arsenical sprays, but there is always risk in using these where stock are running.

Green Panic. "Smother Grass."

M.R.M. (Mundubbera)—

1. *Panicum maximum* var. *trichoglume,* known as Green Panic or Slender Guinea Grass. A short note on this grass was in this Journal for February, 1938, under the heading "The Varieties of Guinea Grass Cultivated in Queensland."
2. *Dactyloctenium* sp., often called "Smother Grass." In Africa it is known as *Dactyloctenium mucronatum.* This species belongs to the same genus as the common Button Grass of Western Queensland. It is at present sparsely scattered throughout the subtropical seaboard. Little is known about its use as a fodder species, except that cattle seem to like it, and also it is an aggressive grower and spreads fairly rapidly. It has been used as a lawn grass in the Brisbane Botanic Gardens, particularly for covering the bare ground under trees and similar places where other grasses will not thrive.

Mat Grass.

F.A.T. (Murgon)—

As far as can be seen from your specimen, the grass is *Hemarthria compressa,* often called Mat Grass. In the absence of seed heads, however, it is difficult to be sure of the determination. The seed heads of Mat Grass are rather difficult to see. They appear as extensions of the stem projecting above the uppermost leaves, with the seeds very closely appressed and a little over ¼ inch long, the whole forming a cylindrical spike, about 3 inches in length.

As you mention, the grass is restricted to creek banks and low-lying areas with a moist soil. It is generally regarded as of moderate fodder value, and is a useful fattening grass. However, it would not be advisable to allow it to enter your cultivation if on low-lying land subject to flooding.

Blackleg.

C.W. (Gatton)—

The lesion described is an unusual manifestation somewhat rarely observed in cases of blackleg.

"Bullamon Lucerne."

E.H.A. (Mitchell)—

"Bullamon Lucerne" has been identified as *Psoralea eriantha*, a native legume with a fairly wide distribution in Western Queensland and New South Wales. It was originally collected in the neighbourhood of St. George by Sir Thomas Mitchell.

Blue Panic Grass. Purple Chloris.

"Sap" (Townsville)—

1. *Panicum antidotale*, Blue Panic Grass. This grass has attracted considerable attention in recent years, and seems to have good possibilities as a fodder. We should say a small plot of it would be valuable for periodical cutting or feeding-off. It may also be worth trying in fresh burns in the same way as Rhodes Grass.
2. *Chloris barbata*, Purple Chloris, also known as Wild Rhodes or Purple Rhodes Grass. It is closely allied to Rhodes, but has nothing like the same fodder value. It is quite a good grass in the young stages, but in the seeding stage becomes dry and innutritious.

A Common Weed in North Queensland Pastures.

M.McC. (Proserpine)—

The specimen is *Herpestis chamaedryoides*, a small plant which has become a fairly common weed in North Queensland pastures. It is not known to possess any poisonous or harmful properties, and apparently is of no value as a fodder, at least to any extent. No particular treatment of this weed is recommended, but it may be smothered with a creeping grass. Para Grass (*Brachiaria mutica*), better known in Queensland as *Panicum muticum* or Giant Couch, should be suitable. If the land is of only second-class value, Buffalo Couch or Broad-leaved Carpet Grass (*Axonopus compressus*) would be as good as any. This latter species is not regarded as a particularly valuable fodder, but is quite a good grass for second-class country.

Red Ash.

J.W. (Kingaroy)—

The specimen is the Red Ash (*Alphitonia excelsa*). This plant is generally regarded as an excellent fodder for stock, and our experience has been that horses and cattle eat it greedily. We have been told by an experienced pastoralist in the Brisbane Valley that his stock would not eat it in a dry time, although they seemed to eat it freely along with grass in an ordinary season. Another pastoralist has informed us that stock would not eat it when the plant was in berry. It is known by various local names, such as White Myrtle, Silver Ash, White Ash, and other local names.

Zamia.—Seeds Poisonous to Stock.

F.C.H. (Bald Mountain)—

The specimen is a cycad, *Macrozamia Paulo-Gulielmi*. The specific name "Paulo-Gulielmi" is Latin for Paul William. The plant was named by a German botanist after Prince Paul William, of Wurtenburg. It is commonly known as Wild Pineapple or Burrawong, also Zamia. Species of Zamia are known to cause rickets in stock. The seeds are poisonous, and some years ago serious losses occurred among a mob of travelling sheep eating the seeds of a species allied to yours, *M. spiralis*, of New South Wales.

Seeds of some of our Cycads were ground, made into flour, and used as food by the aborigines. The flour was placed in running water and afterwards cooked. Heat seems to dispel the poison. The poisonous principle has not been isolated.

Creeping Saltbush.

F.L. (Gogango)—

The specimen is of Creeping Saltbush (*Atriplex semibaccata*), a fairly common plant in many parts of Queensland, and generally regarded as a good fodder, although stock sometimes have to get used to the taste of the plant before eating it in any quantity. They seem to prefer it when it is dying off rather than when it is green and luxuriant.

Rural Topics

A Travelling Rabbit Freezer.

Although rabbits are not a very serious pest in Queensland, this item will interest many Downs farmers and landowners along the Border—A portable rabbit chilling plant has been established in the rabbit country of the Flinders Ranges, South Australia, consisting of a large motor-truck with a huge trailer which houses all the freezing machinery and the chilling room, including an engine to drive the compressor. The plant is capable of treating 6,000 rabbits every twenty-four hours; the chilled rabbits are transported to market in motor lorries and arrive in good condition. This is said to be the first mobile chilling plant to operate in Australia.

Money in the Bag.

"Save your sacks! Handle them with care!" That's the message being impressed on New Zealand farmers to-day, and for Queensland farmers it should have the same appeal. In the past many sacks, when emptied, have been left lying around to rot, or become useless otherwise. Only a small proportion of the bags went back into commercial use. Now, as a result of the war, sacks are saleable. One New Zealand farmer who looked after his sacks carefully, recently netted £120 for the stack of bags he had saved. When handled and stored carefully, heavy jute sacks have been known to be refilled with fertilizer as often as ten times, and those of lighter hessian material up to six times. "Waste not, want not," applies to empty bags in terms of real money to-day.

Give "Denis" His Due.

More than any other animal, the pig depends on his owner for the conditions under which he has to live. Dirt is not his own responsibility, because it will be many years before we can breed a race of pigs capable of cleaning out their own sties and then taking a shower bath without assistance.

"All Flesh is Grass."

Grass is man's most important item of diet. Of course, we don't browse with the cows, but we eat bread which is made from wheat and which is a grass; we eat sugar which is made from cane which is another grass; and we eat a thousand and one other foods made from grains which are grass. What grass we don't eat first-hand, we eat second-hand—in the form of eggs and bacon, roast lamb, and other meats. Yes, "all flesh *is* grass."

A New Angle on Farmers' Problems.

Do farmers regard some of their problems as trials or troubles instead of recognising that these problems are really interesting studies? This was how it was put by a man who has ploughed many a furrow on a prosperous property, as reported in *The New Zealand Farmer Weekly*—"We hear a great deal," he said, "of the 'problems' of the breeder, and of his difficulties in solving many questions of breeding, feeding, financing, and marketing, but, generally, I am inclined to believe that we have not been using the right word. 'Problems' in this case is a misnomer, and is a bit misleading. True enough, the breeder who desires really to succeed, to produce good cattle, to improve his herd, and to profit financially, does have a lot of questions that must be answered correctly, but these things are not really problems in the sense that they are trials or troubles. Rather, can't we look upon them as interesting studies, in whose correct solution we can find pleasure and enjoyment? The dictionary says that a problem is 'a question proposed for solution; a matter stated for examination or proof; hence a matter difficult of solution or settlement.' But it doesn't treat the 'problem' as a question of trouble or tribulation—a sense in which it is frequently regarded. Some people thrive, mentally, on 'problems' which, to others, are simply tiresome. The breeder who can bring to his aid a real enjoyment for the study and mental activity necessary in successfully solving his 'problems' will find their solution very much easier, and will come to regard them not as trials or difficulties, but more as opportunities for the exercise of his mental equipment. There is more fun to be got out of the achievement itself, very often, than the profits of the achievement."

When you come to think it out, those ideas seem to be based on sound farm philosophy.

Progress in the Pig Industry.

Pig raising is becoming, under the influence of war time economic conditions, more of a specialised industry rather than remaining a sideline to dairying and other kinds of farming. Judging by the increase of interest in the industry, the pig will soon occupy a more important place in Australian rural enterprise than it has ever held before.

The standard of breeding, too, is decidedly on the up grade and breeders in many districts are concentrating with the utmost keenness on the preparation of animals for this year's district shows.

This show business is no pastime, but all the hard work and care associated with it are well worth while, for it gives the breeder an opportunity to "show the world" in the most direct and practical way what he is doing—in other words, to display his ideas of what a pig should be as exhibited in the show pen. A good show pig tells a story of sound judgment and competent care more convincingly than all the talk on the top rail.

A breeder should welcome every opportunity of showing his stock. If they are top-notchers they are bound to create interest among prospective buyers. If they do not measure quite up to the winning standard, the breeder gets the best of lessons by comparison and so improves on his exhibits for the next district show.

Producer Gas Units.

Interest in the possibilities of producer gas is growing remarkably.

The Government is taking a keen interest in its possibilities and has now formed an investigational and advisory committee to examine the engineering and economic espects of charcoal gas production. Consequently, the best possible advice on developments in gas production will be available to farmers and everyone else who is interested in cheaper fuel, especially as a war time economy.

Already considerable progress has been made in experimental work in the use of producer gas and the production of charcoal. The Forestry Sub-Department is now busy on a plan involving the using of waste timber from Crown lands near Beerwah in its conversion into charcoal, and the replanting of the area with more useful trees. Money has been made available for the purchase of producer gas equipment for use under service conditions and for the careful checking of its performance.

Sweet Corn for Planting—A New Industry in the South.

Sweet corn as a new industry is making considerable progress in the Hawkesbury River District in New South Wales. Yields up to 4 tons to the acre are expected under irrigation. During the past two years attempts have been made to establish a corn-canning industry, and although the seasons have been the worst for ten years in the areas of supply, results have been very gratifying.

Increased yields are anticipated from late sowings which have been irrigated. Only the golden coloured varieties of sweet corn are favoured for canning. There are many other districts in the South where the corn will grow well, but nearness to a cannery is essential, as the corn must be processed as soon as possible after it is pulled.

It would be interesting to find out if there is any future for such an industry in Queensland, for new industries are always welcome if it is possible to establish them on an economic basis.

Where the Branding Iron Should be Placed.

More attention is now being given to the proper branding of cattle, and that means that we are well on the way towards preventing the enormous loss—said to run into hundreds of thousands of pounds a year—caused by faulty branding, branding on the rump and other valuable parts of the hide, and the use of unnecessarily large brands.

At a time like this when we are out to eliminate every form of unnecessary waste, it goes without saying that the benefit of correct branding of cattle will not lack appreciation by the stockowner. Correct branding cuts out a big percentage of waste leather in the tanned hide and increases the value of Australian hides and leather, which are among our exports which are growing rapidly in importance.

In New Zealand, the Argentine, and the United States, branding, if not completely abolished, is limited to sections of the hide less valuable than the rump.

Farm Notes

SEPTEMBER.

With the coming of warmer weather, weeds of all kinds will be making their appearance on cultivated land and among row crops, but in the latter case they can be effectively dealt with by inter-row cultivation, and, where necessary, by the use of the hoe.

Where crops are sown on thoroughly fallowed land, the greater freedom from weed infestation is at once apparent when compared with adjacent paddocks which have merely received a hurried preparation, so that sowing clean seed on clean land may be amply rewarded in the resultant clean crops and higher returns.

Potatoes planted during July and August should now be making growth, and should be sprayed with Bordeaux mixture as a preventive of blight, particularly if cool, moist weather is experienced. Bordeaux and Burgundy mixtures are not regarded as a cure for blight, but the spray forms a satisfactory protective covering, which, if applied at intervals during growth, will effectively prevent the disease. Where land has received adequate preparation, forming a satisfactory seed-bed, and has a sufficiency of subsurface moisture to induce germination, early sowings of maize, sorghum, sudan grass, millets, cowpeas, and pumpkins and the planting of sweet potato cuttings may be proceeded with, the farmer's chief concern being to provide a sufficiency of summer-growing fodder and grain crops both for current needs and for storage as seasonal reserves.

The spring maize crop is usually considered as uncertain for grain production, as the warm, moist conditions required during the tasselling period do not always occur, but as excellent crops are sometimes obtained the risk is well worth while, especially as the fodder provided can always be put to good use in the event of a failure for grain.

Early-maturing Yellow Dent varieties—such as Funk's 90-Day—will be found the best for early sowing, as they have the capacity of making the best use of available moisture.

Market prices also are a consideration, for although early sown maize is usually intended for farm use, any surplus can be disposed of at higher prices than may be obtainable for the main crop at a later date.

Sweet potato cuttings will now be obtainable, and attention is directed to this valuable crop, which will thrive over a much greater range of climatic and soil conditions than the English potato. There is scarcely a farm throughout the State which would not benefit from a patch of sweet potatoes, for either culinary use or stock-feeding. They are not always profitable as a market consideration, but improvement in this direction is possible if well-graded tubers of suitable cooking varieties only are offered.

PLAYING POLO WITH A HOE.

In the Forbes district (New South Wales), where polo is the most popular game with the "young bloods," the local sports exercise their polo ponies in a game of burr cutting, using a long-handled hoe as a stick and undercutting the objectionable growths neatly instead of hitting a ball. It seems a peculiar way of weeding, but where the burrs are scattered, the young polo players at least make an interesting job out of what ordinarily is an arduous task, and, at the same time, judging by the scores put up, keep their eye in very effectively for the district polo matches.

Seriously, however, the scheme has much to commend it, as a horseman can see the weeds much more easily than a man on the ground, and there is never any need to dismount to cut the burrs out, as the job can be done easier with one swish of a sharp, narrow-bladed hoe.

Orchard Notes

SEPTEMBER.

THE COASTAL DISTRICTS.

IN the North Coast and Gayndah districts most of the citrus crops have been harvested, with, perhaps, the exception of Valencia Lates. Orchard work this month includes pruning, cultivation, fertilizing, and spraying. Some trees may be showing signs of impaired vigour, and these will require a severe pruning, both in thinning and shortening back, removing superfluous growths and diseased and weakly woods. Healthy and vigorous orange trees will require little attention beyond the removal of crowded lateral growths.

Mandarins will need special treatment, particularly Glen Retreats and Scarlets. These varieties usually produce a profusion of branches, and as the trees mature the growths harden and the fruit-bearing shoots make short, weakly growths, which usually result in an over-production of small fruits and a weakening of the trees. This is noticeable particularly in the case of the former variety, for which the annual pruning should consist of a heavy thinning and shortening back. Mature mandarin trees require attention towards assisting them to produce new and vigorous fruit-bearing growths.

Unprofitable trees should receive attention and be prepared for top-working. They may be headed back to three or four main arms radiating from the stem and whitewashed to prevent bark scald. Such trees may be grafted or later budded when suitable growths have matured.

Before working up the soil, fertilizing should receive attention. The spring application should carry a high percentage of nitrogen.

In the warmer districts, which are free from frosts, plantings of young trees may be made. Serious consideration should be given only to the selection of commercial varieties and, having due regard for local conditions, selections may be made from the following varieties:—Washington, Navel, Joppa, Siletta, Valencia Late, Beauty of Glen Retreat, Emperor, Scarlet, Solid Scarlet, Marsh Seedless or Thompson grapefruit, and Villa Franca, Lisbon, and Genoa lemons.

Where melanose and black spot are present in orchards, preparations for control measures should be made and Bordeaux sprays applied at the correct times.

Most citrus trees would benefit considerably by the application of a strong lime-sulphur wash, 1-18.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

BLACK aphis should be attacked wherever it makes its appearance by spraying with a tobacco wash, such as black-leaf forty. If these very destructive insects are kept well under control, the young growth of flowers, leaves, wood, and fruit will have a chance to develop.

The working-over of undesirable varieties of fruit trees may be continued. The pruning of grape vines should be done during this month, delaying the work as long as it is safe to do so, as the later the vines are pruned the less chance there is of their young growth being killed by late frosts. Keep the orchards well worked and free from weeds of all kinds, as the latter not only deplete the soil of moisture, but also act as a harbourage for many serious pests, such as the Rutherglen bug.

New vineyards may be set out, and, in order to destroy any fungus spores that may be attached to the cuttings, it is a good plan to dip them in Bordeaux mixture before planting. The land for vines should be well and deeply worked, and the cutting should be planted with one eye only out of the ground and one eye at or near the surface of the ground.

In the warmer localities suitable for the growth of citrus fruits, the land should be kept well cultivated, and if the trees need irrigating they should be given a good soaking, to be followed by cultivation as soon as the land will carry a horse without packing.

Fruit fly should be systematically fought, as it will probably make its appearance in late citrus fruits and loquats; and if this swarm of flies is destroyed, there will be every chance of the early crops of plums, peaches, and apricots escaping without much loss.

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.

CLOTHES AND SHOES FOR THE OLDER CHILD.

(Continued.)

LAST month we talked about children's clothing generally and gave an outline of suitable clothing for little girls. This month we are going to complete our suggestions in regard to clothing and also give some good advice about a much-neglected subject—care of the feet.

Knickers for Little Boys.

Material.—In cold weather, little boys may need knickers made from warmer materials than those we use for girls, as they have no covering skirt. Woollen materials that are warm, light, porous, and easily washed and brushed are recommended. If linings are used they should be of light weight cotton material, not heavy calico. Unlined knickers worn with underpants made of cellular cotton are practical and hygienic. Backs of knickers should be cut longer and slightly wider than fronts to allow ample room for bending and sitting, and there must be plenty of length from waist to fork. The seams of boys' knickers should be strongly machine sown. Knickers should be worn outside a shirt waist and attached to it by buttons, or they may hang from wide braces of their own material crossed at the back to prevent slipping on the shoulders.

Rompers and crawlers are very useful. They should be made very loose so as not to hinder the child's play, and it is a good plan to make them of gay material so as to develop the child's growing sense of pattern and colour. They should, of course, be washable.

Young children may be allowed to play in gardens and on the beach in sun suits when the weather is warm. Artificial silk or cellular cottons are the best materials for sun suits, which should take the form of tiny shorts with criss-cross shoulder straps. Care must be taken in our hot Queensland summer that the skin is exposed to the sun very gradually and to begin with at a time when burning is not likely to occur, say, in the early morning. The aim should be to secure a tanned

effect. And while on this subject it may be opportune to condemn the practice which is followed by some mothers of dressing tiny boys in long trousers and heavy double-breasted coats. Apart from the fact that these garments completely destroy the attractive naturalness of the unfortunate child, they inevitably limit the child's movements and prevent the health-giving rays of the sun from getting to his legs and arms and helping to make them strong and straight.

Footwear and Care of the Feet.

Next time you sit on the beach watching the crowds go down to bathe, I suggest that you might learn a valuable lesson by watching, not the pattern and colour of the swim suits, but the shape of the feet of the people who pass you by. What a sorry sight most of them are, especially the women's feet, with their distorted and misshapen joints telling the story of unnecessary suffering caused by the neglect or ignorance of the parents or others who cared for these people in their childhood. The feet are the most complicated structure in the human body. They are built up of twenty-six bones, which form a series of arches with weight-bearing points, and they have to support, not only the weight of the body, but whatever load may be added to it. It is fairly safe to say that although some foot deformities are the result of illness, improper feeding, or too rapid increase in weight, the great majority are caused by ill-fitting shoes. Now that we have faced this position, let us see what you, who are now the parents of young children, can do to care for their feet, so that they can walk with ease and grace and have feet that are as attractive in shape when they grow up as they are now. Consider the case of a baby of twelve months of age. He has probably worn until now soft shoes and socks that permitted the natural development of the feet, and we are now going to buy the first pair of toddling shoes—something to wear while he is learning to walk, although he will accomplish this better with bare feet on the veranda or smooth lawn. The average year-old baby will need size 3 or 4 in shoes, and they should have a pliable leather sole. Welted shoes are the best when baby is older and walking well, but are rather cumbersome for first shoes. When fitting the shoes on allow baby to stand in them and see that there is about a quarter of an inch to spare beyond the limit of the great toe. This is very necessary because of the very rapid growth of the little feet. Do not buy more than one pair of shoes, as baby will grow out of them in a few months.

At the age of sixteen to eighteen months baby will probably have outgrown his first pair of shoes, and now you can buy welted soles, provided they are pliable as well as firm. Again take the precaution to allow him to stand up in his shoes and see that there is growing room, and never allow him to wear them once the great toe is jammed hard into the toe of the shoe. It is better that a child should go bare foot than that he should be made to go about in shoes too short for him just because they are not worn out. As little boy or girl grows older, always keep watch on the following points when buying shoes:—

(1) That the shoes shall be made to fit the foot and not the foot to fit the shoe.
(2) The heels shall be broad and from ½ to 1 inch high.
(3) Toes should be square, or at least well rounded.
(4) Welted soles—never pump soles, except for party wear.

Teach children little exercises for strengthening the feet, and teach them to be proud of keeping them in good shape, and so protect the rising generation from the "physical vice of deformed feet."

You may obtain information on all matters concerning infant and child welfare 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.

JAM AND CHUTNEY.

If summer fruits are best for bottling and preserving, winter fruits are excellent for jams and chutneys. Oranges and apples can be utilised in dozens of ways, and here are some suggestions:—

Mixed Marmalade.

This is a special recipe and is well worth trying. Wash well 2 grapefruit, 4 sour apples, 4 lemons, 4 nice navel oranges. Peel very thinly and shred very

finely. Place in preserving pan. Squeeze juice from fruit and add to shredded rinds. Peel and core the apples and place the cores and skins with the piths cut up small into a piece of muslin and tie up loosely. Chop the apples and add them to the juice, &c. Add 8 pints water and boil all together until shreds are tender and the contents reduced quite a lot. Remove muslin and press moisture out, leaving the muslin bag as dry as possible. Now add 6 lb. warm sugar, bring to boiling point, and boil quickly for about 20 minutes, or until it jells when tried on a cold plate. Sometimes this mixture will jell after 10 minutes of quick boiling. Seal in the usual way.

Apple Chutney.

Peel 6 lb. sour apples and put them through a mincer with 6 medium-sized onions. Put in a saucepan with the grated rinds and juice of 4 lemons, 2 lb. seeded raisins, 3 lb. brown sugar, 3 finely-chopped cloves of garlic, 2 dessertspoons ground ginger, 2 tablespoons mustard seed, 1 teaspoon celery seed, pepper, salt, and 2 quarts malt vinegar. Bring to boil and simmer until tender, stirring well during the boiling, as it burns easily on account of being thick. Allow mixture to become quite cold before bottling. Seal with paraffin wax.

Pear Conserve.

Take 12 lb. pears (quartered), 9 lb. sugar, 3 pints of water, 1 tablespoonful of cloves, 1 teaspoonful citric acid. Boil sugar and water together for a quarter of an hour, add fruit, and boil till it turns red (four or five hours). The cloves must be tied in muslin and boiled with the pears. Add acid about twenty minutes before it is done. Will keep for years.

Apple Marmalade.

Take 4 lb. of apples, pare, core, and slice, and place in a pan with just sufficient water to barely cover them. Boil to a pulp and rub through a sieve. Allow 1 lb. of sugar to every pound of pulp, add a little cinnamon, and boil once more for about half an hour, stirring constantly. Put into jars and cover down as quickly as possible.

Orange and Lemon Marmalade.

Take 6 oranges and 6 lemons, cut up very fine, using all but the pips. To every cup of pulp add 3 cups of water and soak all night. Next day boil for a quarter of an hour and leave to soak another night; then add 3 parts of a cup of sugar to 1 cup of pulp, and boil till the right consistency.

Pear Marmalade.

Choose as many ripe, mellow pears as you desire to use. Weigh, pare, halve, and core, and put into a preserving pan. Cover with water and simmer gently till they are tender. Lift them out of the water and boil the liquid for an hour with the skins and cores of the pears. Strain the liquid, and make a syrup by boiling 1½ lb. sugar for every 2 lb. of fruit. Let this syrup boil till it will stiffen.

Apple and Marrow Chutney.

Peel, slice, and cut marrow into small pieces, and weigh 3 lb. Put into a large basin in layers, sprinkling each layer with a little salt. Allow to stand overnight, then the next day pour off the water. Peel and chop 3 lb. apples and place them in a saucepan with the prepared marrow, 1 lb. chopped onions, 1½ lb. brown sugar, 3½ pints malt vinegar, 1 lb. sultanas, ½ oz. salt. Place 2 cloves garlic, ½ oz. mustard seed, 1 oz. whole ginger, 1 oz. peppercorns, ¼ oz. pimento, and a few cloves, if liked, in a muslin bag and tie loosely. Bring to boiling point and simmer gently until tender and rather thick. Remove bag, and bottle.

Grapefruit and Apple Jelly.

Wash 2 grapefruit and 2 lemons, also 1 lb. sour apples. Peel the grapefruit and lemons very thinly and shred finely. Peel and core apples and cut into slices. Squeeze the juice from the fruit and place in a boiling pan with the sliced apples. Tie the apple skins in a piece of muslin with the pith and pips. Add 2 quarts of water and bring to boiling point. Simmer for 1½ hours, taking care the apples are well mashed. By this time the contents of pan should be reduced quite well. Strain through a clean tea towel and allow to drip without squeezing. When liquid is all drained from the towel, replace pulp back in saucepan, cover with cold water, and boil gently for another hour. Strain through the towel again, and when all juice is extracted mix the two together. Now weigh syrup and place in large pan; add equal weight of warm sugar, bring to boiling point, and boil quickly for about 20 minutes, or until it jells when tested on a cold plate. Pour into warmed jars and seal immediately with liquid paraffin wax.

Apple and Pear Chutney.

Peel apples and weigh 4 lb., also 2 lb. pears, after peeling. Put them through the mincer with 1 lb. onions, 2 lb. seeded raisins, 2 cloves garlic, ½ lb. preserved ginger, and 1 red and 1 green capsicum. Put all this in a saucepan and add 2 lb. dark-brown sugar, 4 oz. salt, 1 tablespoon mixed spice, ¼ oz. ground chillies, 1 pint vinegar. Cook very slowly, stirring constantly, as this chutney burns very easily. Cook for one hour, adding a little more vinegar if too thick. Bottle and seal when quite cold.

Apple and Ginger Marmalade.

Wash 6 lb. sour apples well and cut into thin slices without peeling. Place in a large pan with 3 pints of water and the juice of 2 lemons. Boil until tender and well mashed. Strain through a clean towel and allow liquid to drip out without squeezing. When liquid is all dripped out, add another pint water to pulp and boil for another hour. Strain this through the towel, then mix the two syrups together. Weigh syrup and add equal weight of warm sugar. Add 2 lb. preserved ginger cut into small pieces. Boil quickly for 10 minutes, then bottle in the usual way.

FOR LUNCH.

Corned Beef Stew.

Melt 2 level tablespoons butter or margarine in a saucepan, add 2 finely-chopped large onions and fry until light-brown. Add 2 cups diced beef, 6 peeled and halved tomatoes, 2 cups cooked haricot beans. Bring very slowly to boiling point, season with pepper and salt, and simmer very gently for 10 minutes. Make a border of mashed potato and fill centre with stew. Sprinkle with chopped parsley.

Cornmeal Pikelets.

Sift ½ cup self-raising flour, ½ cup cornmeal, pinch salt, and 2 tablespoons sugar into a basin; beat 1 egg well, add a little more than ½ cup milk. Pour into centre of flour and mix well together. Dissolve ½ level teaspoon bicarbonate soda in about 1 tablespoon boiling water, add to batter with 1 dessertspoon melted butter. Beat well and bake in spoonfuls on a hot, greased girdle. Serve with honey or maple syrup.

Orange and Walnut Tart.

Beat the yolks of 3 eggs until very light; gradually add 1 level cup sugar and beat until very thick and almost white. Add 1 cup finely-chopped walnuts, ¼ cup sao biscuit crumbs (very fine), 2 tablespoons rice bubbles, grated rind of 2 oranges, ½ cup orange juice, and a pinch salt. Whip the whites to a very stiff froth and fold into the mixture. Bake in 2 well-greased and lightly-floured sandwich tins for about ½ hour. When cold, join together with an orange filling, made with ½ cup each orange juice, water, and sugar, and 1 tablespoon lemon juice. Bring to boiling point and add 1 level tablespoon cornflour diluted with a little cold water or orange juice. Stir until mixture is clear, then remove from fire and add 1 dessertspoon butter by degrees. Cool and use as directed. The tart may be spread with raspberry jam instead of filling. Sprinkle thickly with icing sugar.

Celery Fritters and Bacon.

Scrape celery well and cut into 3-inch pieces. Cook gently in salted water until tender; drain well, then dip in a good frying batter flavoured with curry-powder. Fry in boiling fat until a golden brown, drain, and serve with crisp bacon.

Medley Stew.

Fry 2 large minced onions in bacon fat until brown, add ½ lb. minced steak, free from fat, and stir all the time while cooking so as to keep particles of meat separate. Add 2 cups cooked spaghetti and 4 sliced and cooked tomatoes. Melt ¾ cup grated cheese in 1 medium-size tin tomato soup, add 1 tablespoon any good relish and a little clove of garlic (optional). Add soup, &c., to meat, stir until well blended, adding more salt and pepper if necessary. Serve piping hot with fingers of toast or fried bread.

Strawberry Shortcake.

Sift together 2 level cups flour, 4 level teaspoons baking powder, ½ level teaspoon salt, add 1 tablespoon castor sugar, rub in ⅓ cup butter with fingertips, then gradually add 1 egg, well beaten, mixed together with ⅓ cup milk. Toss mixture on to floured board and divide into two parts. Pat out to fit the size of a sandwich tin, brush over with melted butter, then place the other half on top. Bake in hot oven for about 15 minutes. When cooked, split with knife. Fill with strawberries, crushed a little, add sugar to taste and whipped cream. Place on the other half. Decorate with whipped cream and a few whole strawberries.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1940 AND 1939, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	June.	No. of years' records.	June, 1940.	June, 1939.		June.	No. of years' records.	June, 1940.	June, 1939.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	1·70	39	3·72	3·63	Gatton College ..	1·77	41	1·09	1·81
Cairns	2·88	58	3·08	5·13	Gayndah	1·85	69	0·15	5·25
Cardwell	2·04	68	3·59	2·78	Gympie	2·63	70	1·13	2·42
Cooktown ..	2·02	64	1·17	4·05	Kilkivan	2·10	61	1·17	3·10
Herberton ..	1·18	54	1·75	3·54	Maryborough ..	2·99	69	0·65	3·50
Ingham	2·43	48	2·77	2·60	Nambour	3·71	44	3·24	4·13
Innisfail	7·20	59	15·74	5·43	Nanango	1·97	58	2·09	3·32
Mossman Mill ..	2·50	27	3·26	4·48	Rockhampton ..	2·56	69	..	2·67
Townsville ..	1·55	23	0·49	1·76	Woodford ..	2·82	53	1·87	2·57
Central Coast.					*Central Highlands.*				
Ayr	1·45	53	0·45	0·97	Clermont ..	1·68	69	0·07	1·28
Bowen	1·63	69	0·24	1·70	Gindie	1·43	41	..	0·87
Charters Towers ..	1·34	58	0·55	2·89	Springsure ..	1·75	71	0·05	0·59
Mackay P.O. ..	2·74	69	0·75	3·55	*Darling Downs.*				
Mackay Sugar Experiment Station	2·46	43	0·88	2·83	Dalby	1·67	70	0·91	3·18
Proserpine ..	3·30	37	1·71	2·89	Emu Vale ..	1·49	44	0·41	2·76
St. Lawrence ..	2·47	69	0·14	2·34	Hermitage ..	1·67	33	..	..
South Coast.					Jimbour	1·62	52	1·24	2·39
Biggenden ..	2·24	41	0·19	3·64	Miles	1·74	55	..	2·11
Bundaberg ..	2·86	57	0·25	3·64	Stanthorpe ..	1·88	67	1·03	2·33
Brisbane	2·66	88	1·07	2·44	Toowoomba ..	2·35	68	2·11	3·34
Caboolture ..	2·61	53	2·58	2·21	Warwick	1·73	75	0·64	3·09
Childers	2·45	45	0·55	3·53	*Maranoa.*				
Crohamhurst ..	4·38	47	2·87	4·02	Bungeworgorai ..	1·20	26	..	0·50
Esk	2·16	53	1·84	2·06	Roma	1·53	66	0·13	0·81

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—JUNE, 1940.

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	30·01	78	68	81	15, 19	61	10	117	16
Herberton	..	68	55	73	16, 20	36	9	175	18
Rockhampton	30·19	77	56	81	21	43	10	..	..
Brisbane	30·25	71	51	77	21	43	23	107	6
Darling Downs.									
Dalby	30·28	70	41	78	16	25	23	91	3
Stanthorpe	..	63	33	70	17, 18	18	22	103	5
Toowoomba	..	64	46	70	19	33	8	211	7
Mid-Interior.									
Georgetown	30·06	83	58	88	20	34	10	5	1
Longreach	30·19	77	46	82	15, 16, 18–20	30	9	26	2
Mitchell	30·27	70	36	79	15	23	23, 24	8	1
Western.									
Burketown	30·08	84	61	89	19, 20	45	10	..	..
Boulia	..	78	48	85	15	37	9	..	..
Thargomindah ..	30·24	70	42	83	15	31	24	..	..

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	August, 1940.		September, 1940.		Aug., 1940.	Sept., 1940.
	Rises.	Sets.	Rises.	Sets.	MOONRISE. Rises.	Rises.
					a.m.	a.m.
1	6·33	5·24	6·6	5·38	3·48	4·58
2	6·33	5·25	6·5	5·39	4·41	5·45
3	6·33	5·25	6 4	5·39	5·33	6·29
4	6·32	5·25	6·3	5·39	6·22	7·14
5	6·31	5 25	6·2	5·40	7·9	8·0
6	6·30	5·26	6·0	5·40	7·54	8·46
7	6·30	5·26	5 59	5·41	8·38	9·34
8	6·29	5·26	5·58	5·41	9 21	10·24
9	6·28	5·26	5·57	5·42	10·5	11·16
					p.m.	
10	6·27	5·27	5.56	5·43	10·50	12·9
11	6·27	5 28	5·55	5·43	11·37	1·3
					p.m.	
12	6·26	5·29	5·53	5·44	12·27	1·57
13	6·24	5·29	5·52	5·44	1·19	2·51
14	6·23	5·30	5·51	5·45	2·13	3·45
15	6·23	5·30	5·50	5·45	3·8	4·36
16	6·22	5·31	5·49	5·46	4·2	5·27
17	6·21	5·32	5·47	5·46	4·56	6·18
18	6·20	5·32	5·46	5·46	5·49	7·9
19	6·19	5·32	5·45	5·46	6·41	8·0
20	6·18	5·33	5·44	5·47	7·33	8·51
21	6·17	5·33	5·43	5·48	8·23	9·43
22	6·17	5·34	5·41	5·48	9·14	10·34
23	6·16	5·34	5·40	5·49	10·5	11·26
24	6·15	5·34	5·39	5·50	10·57	..
						a.m.
25	6·14	5·34	5·38	5·50	11·49	12,18
26	6·13	5·35	5·37	5·51	..	1·8
					a.m.	
27	6·12	5·36	5·36	5·51	12 42	1·57
28	6·11	5·37	5·35	5·51	1·35	2·45
29	6·10	5·37	5·34	5·52	2·28	3·31
30	6·8	5·37	5·33	5·22	3·19	4·17
31	6·7	5·38			4·9	

Phases of the Moon, Occultations, &c.

4th Aug.	●	New Moon	6	9 a.m.
10th ,,	☽	First Quarter	10	0 p.m.
18th ,,	○	Full Moon	9	2 a.m.
25th ,,	☾	Last Quarter	1	33 p.m.

Perigee, 6th August, at 1.0 p.m.
Apogee, 22nd August, at 8.0 a.m.

The most brilliant of "stars," Venus—for so many months the Evening Star—passed between the earth and the sun toward the end of June. In July, Venus was hailed by all who were abroad before dawn as the Morning Star, rapidly becoming brighter and higher in the eastern sky. On clear dark mornings in early August Venus will shine almost like an electric torch. Later her brilliancy will decrease as she draws away from the sun. About the middle of the month, however, she will still be bright enough to be seen in broad daylight. On 16th August the planet will be 19 degrees west of the sun.

Quite a number of meteors may be seen shooting from the north-east before dawn this month. They come in more or less abundance every year and are known as the Perseids. From 10th to 12th August they are often particularly active. It is fairly well established that they are fragments of debris left behind by Tuttle's comet, which approaches the sun every thirteen and a-half years.

It is said, "God's mills grind slow but sure." The slow but inexorable motions of His millstones, which have turned but once in 257 years, may be watched during this and the next few months, when Jupiter and Saturn will approach and pass each other no less than three times. The planets will also be in "Opposition" (opposite the sun) on the same day, 3rd November. A triple conjunction of Jupiter and Saturn is exceedingly rare, measuring by human standards, for the last time it occurred was in 1683. Jupiter moves faster than Saturn, so that on 7th August he will be quite near the ringed planet, but on 15th August he will pass a little north of Saturn. On 27th August Jupiter begins to move back along his path; Saturn does likewise on 4th September. This will cause another conjunction on 12th October. Jupiter continues his retrograde motion until 31st December, and Saturn until 10th January. On 20th February, 1941, the third conjunction occurs. These evolutions will keep the two planets together for no less than eight months.

2nd Sept.	●	New Moon	2	15 p.m.
9th ,,	☽	First Quarter	5	32 a.m.
17th ,,	○	Full Moon	12	41 a.m.
25th ,,	☾	Last Quarter	3	47 a.m.

Apogee, 3rd September, at 4.0 p.m.
Perigee, 18th September, at 6.0 p.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.