ANNUAL RATES OF SUBSCRIPTION.

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Event and Comment.

A King Speaks to His People.

"THIS is London—London calling to the Empire at home and overseas!" That call went out to the Empire on Sunday, 1st March, and was heard distinctly in all parts of Queensland. It was preliminary to an address by His Majesty King Edward VIII. to his people in all parts of the British Empire. The King's speech was profoundly impressive, and was such that every one who heard it had a right to feel that it was directed to him personally.

His Majesty the King said—

> It has been an ancient tradition of the British monarchy that the new sovereign should send a written message to his peoples. Science has made it possible for me to make that written message more personal and to speak to you all over the radio. This, however, is no innovation, for my father has for the last few years spoken to his peoples at Christmas time. A little more than two months ago he broadcast his last Christmas message. To many of you the sound of his voice must still seem to be ringing in your ears. He was speaking then at the close of a long and wonderful reign, which covered a period of twenty-five years, during which unprecedented changes have taken place and great anxieties and problems have been shared by all.

Throughout his reign he set a high example of constant devotion to duty, and he was ever concerned for the welfare of his subjects and of all those under his protection. In times of adversity his calm confidence was an inspiration to all his people, and he shared in their joys as well as in their sorrows.

I know how, in the Dominions, in India, in the Colonies, and the dependencies the bond of loyalty to the Crown—that symbol of the unity of many lands and populations—has been strengthened by a tie of personal devotion to my father. I feel that his death is not only an overwhelming grief to my mother and to us, his children, but that it is at the same time also a personal loss to you all. To the princes and the peoples of India I tender my greeting as King-Emperor. The manifestations of your sorrow and of your loyalty at this time have been a source of deep gratification to me. Associations in peace and in war between the British and Indian peoples have been long and honourable, and the example set by Queen Victoria, King Edward the Seventh, and King George the Fifth lays on me, as their successor, a solemn trust to maintain and strengthen these associations.

Queen Mary, my family, and myself have been greatly helped by the world-wide tributes of genuine sorrow which we have received from every side. Vast crowds assembled reverently at the funeral. Homage to the late King's memory and written words of sympathy by thousands of people, not only those resident within the British Empire, but in many foreign countries as well, are things that we will never forget. It is wonderful for us to know how universally my father's great qualities have been appreciated and valued. It is no mere form of speech to say that he reigned in the hearts of his people. And it was his happiness to know before he died that his long years of unstinted service were rewarded by a devotion and an affection so perfectly expressed in the Jubilee demonstrations of last year.

It falls upon me to succeed him and to carry on his work. I am better known to most of you as the Prince of Wales, as the man who, during the war and since, has had an opportunity of getting to know the people of nearly every country of the world under all conditions and circumstances. And although I now speak to you as the King I am still that same man who has that experience and whose constant effort it will be to continue to promote the wellbeing of his fellow men. May the future bring peace and understanding throughout the world, prosperity and happiness to the British people, and may we be worthy of the heritage which is ours.

A Great Act of Statesmanship.

IN the course of a broadcast address from Brisbane, His Excellency the Governor, Sir Leslie Wilson, called attention to the many manifestations of genuine grief and sympathy which had come to him from the people of Queensland when the death of King George V. was announced. His Excellency said—

It seems such a short period since the people of Queensland have been listening to his late Majesty King George.

Few, if any, of those who heard or read his words would ever forget them. In his broadcast on Christmas Day, 1934, the late King referred to the Empire as bound to him and to its units by the spirit of one great family, and had said that, if he might be regarded as in some true sense the head of that great and widespread family, it would be a full reward for the sometimes long and anxious labours of his reign, which was then well nigh of twenty-five years' duration. A year later, on a similar occasion, the late King had said that it was the personal link between himself and his people which he valued more than he could say.

We in Queensland could really say that we were a distant outpost of the Empire, and no one knew better than himself how widely and sincerely King George's death had been felt here. He had received evidences of sincere feeling from all classes of the community. He somehow felt then, and still felt, that the grief so widely expressed was really a personal grief, and the reason was to a great extent due to the fact that every one had been brought closer to the late King as a man by that great achievement of science, radio. Now his son, King Edward VIII., was going to speak in his place. It would not be an easy task, said Sir Leslie, and he was sure the people of Queensland would appreciate the great act of statesmanship.

The Guarantee of Peace.

BROADCASTING from London on 1st March, the Premier of Queensland, Hon. W. Forgan Smith, made a strong plea for universal peace. He said:—

The King came to the throne in one of the most difficult economic periods, when men starved in a world of plenty. An atmosphere of suspicion between nations complicated matters, but it could be said that the British Commonwealth of Nations was strong enough to guarantee peace, and the gaining of universal peace was our job and responsibility.

The world faced the problem of using the increase in productivity so that poverty would not exist, and one of the factors which led to war would be removed.

British industry was still in the ascendancy, and there was a strong public feeling for a reciprocity of trade between the Dominions and Britain.

The Premier stated that the retail price of sugar in Europe was so much above the normal that they could produce more than sufficient to meet the demand. This was applicable also in other commodities. If the price level of commodities could be brought down to a reasonable level there would be a shortage, not a surplus, in world production.

Restricted production was the greatest tragedy, and it was on a solution of this problem that hopes of the future and happiness during the new King's reign depended.

Irish Blight of Potatoes.

SPRAYING EXPERIMENTS AT BEENLEIGH.

By R. B. MORWOOD, M.Sc., Plant Pathologist.

THE potato crops of the coastal river flats and to a lesser extent the more inland districts of Queensland are liable to attacks of Irish blight. The disease may be prevented by an adequate spraying programme, but a considerable proportion of growers neglect this precaution. Following heavy losses in unsprayed crops in the Beenleigh district a series of spray demonstrations and experiments have been carried out in this area.

As a result it can be confidently recommended that potato crops should be sprayed with Bordeaux mixture prepared from 4 lb. of bluestone and 4 lb. of quick lime or of hydrated lime to 40 gallons of water. The first spray should be applied prior to hilling, and in a normal season this should be followed by two more applications at intervals of a fortnight. When blight is present, or in seasons favourable to its development, four or five sprays should be given at intervals of ten days.

The first experiment was started in April, 1934, under somewhat unfavourable conditions, as it was rather late in the season, and the stand and early growth of the crop had suffered from excessive rains following planting. Irish blight could be found in the plot prior to the commencement of spraying; however, two applications of Bordeaux mixture were made at intervals of ten days. While this was insufficient for complete control of the disease the difference between sprayed and unsprayed plots was striking. The tops in the sprayed plots were quite green and vigorous when those in the unsprayed sections were brown and leafless. Weighing the tubers confirmed the improvement shown in the tops. The yield of marketable potatoes from the sprayed plots was a 50 per cent. improvement on the checks.

Following this initial successful demonstration the experiment in the next crop was enlarged to include a number of materials other than the standard 4-4-40 Bordeaux mixture. This crop was only very mildly affected with blight. The disease was considerably more pronounced in several of the unsprayed plots than in those sprayed, but with the advent of dry seasonal conditions it passed over without leaving any marked reduction of yield.

On the next crop—that of autumn 1935—experiments were carried out on two potato crops at Beenleigh. The first of these, on the property of Mr. B. Spann, was designed to compare the various spray materials, including home-made and ready-mixed Bordeaux, miscellaneous copper fungicides, and two sulphur mixtures and to compare the sprays with copper dusts. The second, on the property of Mr. C. W. Luback, was divided into two portions, one designed to compare different strengths of Bordeaux and the use of English and Australian bluestone, the other to compare different spray schedules using Bordeaux mixture of 4-4-40 strength.

EXPERIMENT I.—VARIOUS FUNGICIDES.

The area selected on Mr. B. Spann's farm was of Factor potatoes with a good stand. The crop was fertilized and well worked, and put on a remarkable growth of tops. Diseases other than Irish blight did

not interfere to a great extent. Although there was reason to believe that the seed was considerably infected with virus diseases, they did not appear till the crop was well developed, and made little difference to the yield. This result was attributed to high-temperature masking. Blackleg caused the total loss of plants in two small patches. Allowance was made for the estimated crop from plants killed by this disease.

The potatoes were planted about the middle of February, and the first application of sprays and dusts was made on the 19th-20th March, when the plants were beginning to flower, followed by two more applications at fortnightly intervals. All dusting was done while the dew was still on the plants. A fourth application was planned but abandoned owing to the tangled nature of the tops and the absence of blight infection at the time.

The sprays and dust are listed in Table I., which also gives the results of the experiments. Bordeaux mixture was made up by the 4-4-40 formula, using quick lime, and the other copper sprays were made to the same copper content with the exception of ammoniacal copper carbonate, bouisol, and one-half strength colloidal copper. The ammoniacal copper carbonate was made to the formula 5 oz. of copper carbonate and three pints of ammonia to 40 gallons of water. For bouisol the figures were 5 lb. to 100 gallons. Of the sulphur sprays lime sulphur was made up to ·5 per cent. polysulphide sulphur, equivalent to 1 : 26 with the particular brand used, and colloidal sulphur was used at a strength of 5 lb. per 100 gallons. Severe spray injury was caused by the ammoniacal copper carbonate. All other plots were free from this defect.

The layout of the plots involved four replications of each of the twenty treatments. Individual plots were 20 feet 5 inches long and three rows wide (1/240 acre). The arrangement was random, excepting that each treatment occurred once in each row and also occurred once in each of the four blocks of twenty plots obtained by dividing the area at right angles to the rows.

Blight did not appear till a fortnight after the third spray was applied, when the crop was nearly mature. It was first observed on the 1st May, and by the time the plots were dug (20th May) the tops in the unsprayed plots were dead and dry from the effects of the disease. The best sprayed plots were at that time quite green. The tubers were generally healthy, only an occasional one exposed to the surface being affected.

Notes were made on the plots just prior to harvest, when all the copper containing sprays and dusts with the exception of ammoniacal copper carbonate were considerably less diseased than the unsprayed. The lime-sulphur and colloidal sulphur plots were no better than the controls. Among the copper sprays six appeared to be outstanding. These were home-made Bordeaux mixture, Burgundy mixture, home-made colloidal copper, and three ready-mixed proprietary Bordeaux mixtures. The dusted plots showed a little more disease than did the best sprayed plots.

Owing to the lateness of the attack of blight, the yields did not show such marked differences between treatments as did the appearance of the tops. The figures for the yield of marketable tubers from each plot are given in Table I.

TABLE I.

—	Yield in pounds per plot.				Average Yield, tons per acre.
Bordeaux mixture	50	54	60	62	6·1
Burgundy mixture	58	49	60	62	6·1
Ammoniacal copper carbonate	31	33	22	32	3·2
Lime Sulphur	47	50	47	47	5·1
Home-made colloidal copper	54	51	44	57	5·5
Half-strength colloidal copper	50	47	39	70	5·5
Bouisol	47	51	65	65	6·1
Colloidal sulphur	30	50	63	43	5·0
Proprietary Bordeaux No. 1	68	61	48	74	6·7
Proprietary Bordeaux No. 2	51	54	66	76	6·6
Proprietary Bordeaux No. 3	50	53	48	75	6·1
Proprietary Bordeaux No. 4	59	50	71	68	6·6
Proprietary Bordeaux No. 5	53	40	63	50	5·5
Verderame	51	58	48	65	5·9
Copper carbonate	61	71	40	64	6·3
Copper dust No. 1	58	51	68	71	6·6
Copper dust No. 2	46	53	54	58	5·6
Copper dust No. 3	65	60	56	67	6·6
Copper dust No. 4	51	55	59	55	5·9
Unsprayed	49	35	43	60	5·0
			Mean		5·8
			Standard error		6·9%
			Significant difference		1·2

Statistical analysis indicated that though there were some markedly significant differences, there were not clear-cut significant differences in the yields of individual effective and non-effective treatments. The experiment was then analysed on the basis of the groups of plots shown in Table II.

TABLE II.

Group.	No. of plots.	Average yield in tons per acre.	Diff. from no copper.	Diff. S.E.
Copper sprays (no spray injury)	48	6·1	+1·1	4·0
Copper sprays (spray burn marked)	4	3·2	−1·8	4·0
Copper dusts	16	6·2	+1·2	3·8
No copper	12	5·0	..	..

From this it can be definitely stated that the plots receiving copper sprays outyielded those not receiving these sprays. Similarly the dusted plots outyielded the "no copper" plots. The difference between dusts and effective sprays was insignificant.

Discussion.

The experiment demonstrated that Irish blight can be controlled by the application of sprays. The improvement in yield of marketable tubers was over 1 ton per acre, a result in the case of the home-made Bordeaux mixture obtained by the use of 18s. worth of spray materials. The ready-mixed Bordeaux mixtures were effective, but it is to be noted that they were used at an equivalent strength to 4-4-40 Bordeaux. This necessitated the use of 1 lb. of the mixture containing the equivalent of 50 per cent. copper sulphate to 5 gallons of water. Dusting proved as good as spraying under the conditions prevailing, but observations indicated that dusts should be applied more often than sprays. Neither the ready-mixed Bordeaux nor dusts are as economical as home-made Bordeaux mixture, which must, therefore, be recommended for use on potatoes.

EXPERIMENT II.—STRENGTH OF BORDEAUX MIXTURE.

This experiment was laid out on the property of Mr C. W. Luback. The crop which showed magnificent growth in the early stages was a fortnight later than that used for the previous experiment, and blight appeared somewhat earlier. The first spray application was made on 3rd April, when a trace of blight was showing. The plots were only visited at fortnightly intervals, when they were sprayed, a total of three applications of spray being made. This interval proved too long, and during a severe visitation of blight the plots were severely affected in spite of the spray, and only remained green for two to three weeks after the surrounding unsprayed crop had succumbed.

The experiment was designed to compare three different strengths of Bordeaux mixture and two types of bluestone. Under the severe conditions prevailing any differences in effectiveness should have been reflected in the yield figures. These, however, show no significant differences. The 2-2-40 Bordeaux mixture appeared to be practically as good as the strongest used (6-4-40), and the conclusion must be reached that thoroughness of application is more important than actual strength of mixture. However, on the experience of this single trial, one would hesitate to recommend the slight economy of reduction of the strength of the mixture from the standard 4-4-40.

The yield figures obtained in this experiment are given in Table III.

TABLE III.

Treatment.	Yield in pounds per plot.			Average Yield in tons per acre.
Bordeaux (Australian Bluestone)—				
2-2-40	47	41	48	3·02
4-4-40	51	44	44	3·09
6-4-40	46	43	50	3·09
Bordeaux (English Bluestone)—				
2-2-40	51	41	42	2·98
4-4-40	54	45	47	3·24
6-4-40	49	41	52	3·38

EXPERIMENT III.—TIME OF APPLICATION.

The tests of the number of applications of Bordeaux mixture and the time they should be applied were carried out alongside Experiment II. and under the same conditions. Six schedules were planned, one to receive no spray, one to receive four applications of 4-4-40 Bordeaux mixture, starting at the time of hilling and continuing at intervals of a fortnight, and the other four schedules each omitting one of these applications. Unfortunately, as for the previous experiment, the period chosen, namely, a fortnight, was too long, and the plots did not survive to receive the fourth application. The yields from the plots are given in Table IV.

TABLE IV.

Treatment.	Yield in pounds per plot.			Average yield in tons per acre.	
No spray	24	28	26	1·73	
2nd and 3rd spray..	52	39	41	2·93	
1st and 3rd spray	36	34	43	2·51	
1st and 2nd spray	38	29	45	2·49	
1st, 2nd, and 3rd spray	51	57	45	3·40	3·44
1st, 2nd, and 3rd spray	52	50	55	3·49	

S.E. 5·5%.
Signif. diff. between means of 3 = ·44 tons per acre.
Signif. diff. (Mean of 6 — mean of 3) = ·38 tons per acre.

Three sprays are significantly better than any pair of sprays. All of the spray schedules are significantly better than no spray.

While the spray applied at long intervals did not completely control the disease under the severe conditions operating, yet it made the difference between a very poor crop and a fair one. The application of three sprays nearly doubled the yield, making a difference of over a ton and a-half per acre. Had the four or five applications been made at intervals of a week or ten days there is little doubt that an excellent yield would have been obtained in spite of the very favourable conditions for the disease.

Summary of Results.

Bordeaux mixture sprays will control Irish blight of the potato. Other copper sprays, including proprietary ready-mixed Bordeaux powders and copper dusts, are effective if used correctly. Sulphur sprays do not control the disease.

In three out of four experiments the yield of sprayed potatoes exceeded that of unsprayed by 1 ton per acre or more.

Acknowledgment.

Acknowledgment is made of the assistance rendered and facilities provided by Messrs B. Spann and C. W. Luback, on whose properties the experiments were conducted.

PLATE 70.

The Herbert River at Macknade, North Queensland.

[Photo. by courtesy of "The Telegraph."

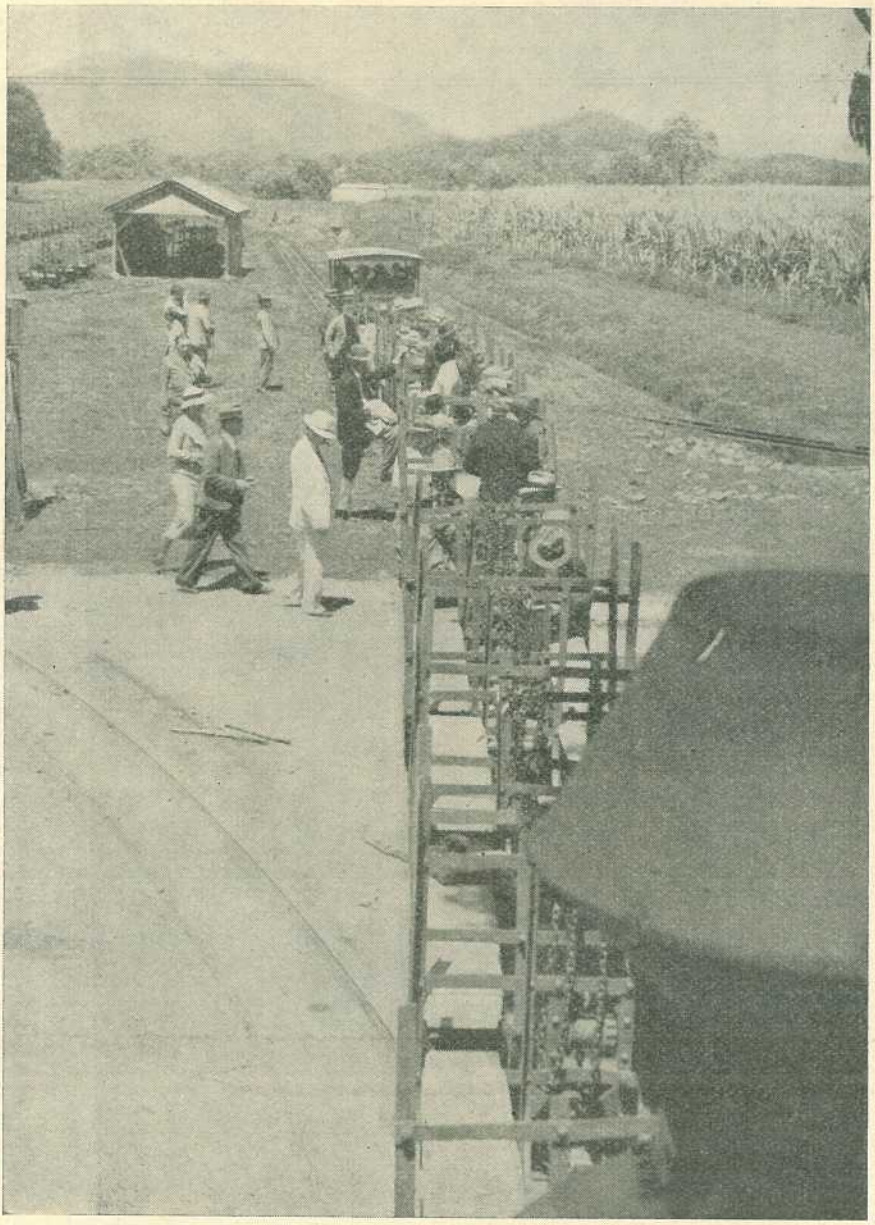


PLATE 71.

Tram Tour through Cairns Cane Lands, Hambledon, North Queensland.

[*Photo. by courtesy of "The Telegraph."*

Leaf Miner and Stem Borer of Tobacco in North Queensland.

By D. O. ATHERTON, B.Sc.Agr., Assistant Entomologist.

(*Continued from January*, 1936.)

LEAF MINER AND STEM BORER COMPARED.

ALTHOUGH one species is known as the leaf miner and the other as the stem borer there is often a certain amount of leaf mining associated with stem borer activities, and often some stem injury associated with the leaf miner. Thus, the colloquial names are only calculated to emphasise the commoner method of attack by the species indicated, and not to specify the only way in which the host is damaged. The two are often found closely associated as pests of tobacco, and in the past some confusion has arisen as to whether more than one species was present (Taylor, 1917, and Edwards, 1929).

This confusion in the records, together with the close association of the species in the crop, gave rise to some speculation as to the possible occurrence of inter-specific breeding. Accordingly several experiments designed to throw some light on the matter were conducted in the laboratory. For the attempted crossing of the species one or more males of one species were segregated with a corresponding number of virgin females of the other species. The containers used for segregation consisted of large glass test tubes 8 inches in length and 1½ inches in diameter. The containers were closed by a piece of muslin stretched over the open end, and each tube contained a piece of cotton wool moistened with a sugar and water syrup.

Eggs were laid by the females of both species, leaf miners laying within from 9 to 66 days after emergence and stem borers from four to forty-seven days after emergence. The number of eggs in all cases was less than usual for the mated moths of the species, the average for the leaf miners being twenty-five and for the stem borers seventy-five. All the eggs were infertile, and the resemblance in these particulars to isolated unmated females of either species will be apparent. No attempted mating was observed between males and females of the different species and from these observations there is no reason for supposing that crossing of the two species takes place in the field.

Leaf miner adults are similar to stem borers in many respects, though they differ in others equally striking. Both are about the same size, and agree in general conformation, though the distinctive colour of the wing and body scales facilitates specific recognition of undamaged specimens. Such moths in a collection containing both sexes of both species are readily classified into two groups, the grey colour of the leaf miners presenting a marked contrast to the coppery red-brown of the stem borers. Even when the moths in such a collection have lost most of their scales the male leaf miners are readily recognised by the "kilt" of hairs near the tip of the abdomen. Females of that species, and both sexes of the stem borer are, however, indistinguishable one from another once the wing scales have been lost.

The corresponding immature stages of the two species bear a superficial resemblance to one another, though more detailed observations reveal certain differences. A close examination of the eggs by the aid of a high-power lens shows that those of the stem borer are not quite so robust as those of the leaf miner. Eggs of the former are 479 $\pm$ 23μ long by 315 $\pm$ 13μ in diameter, and those of the latter 481 $\pm$ 33μ by 349 $\pm$ 16μ. Leaf miner eggs are broader in proportion to their length than those of the stem borer, and while they are oval in outline stem borer eggs are shaped more like a short cylinder with hemispheral ends. The reticulate markings on the chorion occur more constantly and generally in the stem borer. In the stem borer the colour is often a creamy yellow, but in the leaf miner it is generally pearly white or only slightly creamy.

Newly hatched larvæ of both species are similar in size and general conformation, but the head capsule and prothoracic plate of the stem borer may be lighter in colour than these parts in the leaf miner. These differences in colour become more pronounced as the larvæ approach maturity. The head of the stem borer larva varies from dark to light brown, but that of the other species is nearly always very dark brown or almost black. The prothoracic plate of the stem borer may be distinctly marked and brown in colour, or it may be indistinctly delineated and only slightly different in colour from the rest of the body. The prothoracic plate of the leaf miner is always distinctly marked. Leaf miners may be light creamy yellow, but they usually have a dirty grey or pinkish tinge, and the latter may be so pronounced as to give an almost purplish appearance. Mature larvæ of the stem borer show very little colour variation, being invariably whitish or creamy yellow. Leaf miner larvæ are often longer in the body than stem borers, even when both are full grown, but the latter are usually more robust in build.

There are only four larval instars in the leaf miner life cycle, but five in that of the stem borer. The latter insect seems to vary more widely from Dyar's constant than does the former. Temperature studies in relation to life history show that the effective day-degree requirements for the egg stage and for the pupal stage are similar in both species. For the completion of the larval stage, however, the stem borer requires that twice the number of effective day-degrees be experienced as are necessary for the leaf miner. The average requirements in effective day-degrees are here repeated for the various stages.

TABLE 9.

TEMPERATURE AND DEVELOPMENT.

Pest.	Effective Day—Degrees.			
	Egg.	Larva.	Pupa.	Total.
Leaf miner	118 $\pm$ 11	351 $\pm$ 33	221 $\pm$ 20	690 $\pm$ 36
Stem borer	117 $\pm$ 9	703 $\pm$ 81	230 $\pm$ 36	1050 $\pm$ 95

The similarity of the figures for the egg stage and for the pupal stage of the two pests contrasts strikingly with the disparity of the two figures for the larval stage. The latter point is significant, as it means that under identical temperature conditions the leaf miner larva develops in half the time required for the completion of this stage in the stem borer.

Pupation by the stem borer invariably occurs within the host plant, and consequently the pupa is protected from outside agencies until the moth emerges. The leaf miner, on the other hand, pupates outside the plant, usually on the ground or in the debris at the base of the plant, but sometimes on the outside of the stem.

Eggs of both species have been found on seedlings and small plants, and there is little doubt that they are also laid by both species on larger plants in the field. Both species oviposit on either leaf surface, on the stems, and, at least in seed-beds and in the laboratory, on the soil. The leaf miner very definitely prefers the soil for oviposition, but the stem borer just as strongly favours the plants.

The newly emerged larvæ of both species often wander about on the plant for some time before entering a leaf, and both reject the epidermis when eating their way into the mesophyll. While the leaf miner habitually mines large blotches in the leaves the stem borer never excavates leaf mines of any size. The typical leaf mining of one species may be readily distinguished from that of the other. The leaf miner may desert one leaf and attack another, but the stem borer apparently invariably remains inside the plant once it has entered, though in the laboratory immature larvæ were successfully transferred from one leaf to another. Stem injury by the leaf miner in older plants is always confined to the cortex immediately under the epidermis, but the stem borer habitually penetrates through the vascular cylinder into the pith.

Both species may cause serious losses in seed-beds. The presence of the leaf miner is always obvious, but the presence of the stem borer may not be apparent until after the plant has been set out in the field and the typical gall develops. Either species may destroy all the seedlings in affected beds, but as a rule numbers of the plants escape serious attack. In the field, also, total destruction of the crop may result from severe attacks by the leaf miner or both species acting simultaneously, but such spectacular losses are not general. Stem borer alone is seldom responsible for the destruction of a whole crop. With either pest the critical stage in the field occurs during the period of suspended growth immediately after transplanting, and if the crop survives this interval disastrous losses seldom occur.

The species respond quite differently to the stimulus of light in the laboratory, for while handling moths during the life history studies it was found that both sexes of the leaf miner were positively phototropic, whereas most stem borers gave a negative response to this stimulus.

The leaf miner generally lives longer than the stem borer when maintained in similar surroundings under identical conditions of temperature and humidity. In one comprehensive series under observation in the laboratory leaf miner moths lived up to sixty days, the average being thirty-eight days, while stem borers lived only twenty-one days at the most, the average being eighteen days.

The stem borer is more fecund than the leaf miner, the average oviposition of mated females in one series being 238 and 65, respectively. Parthenogenesis has been recorded in the leaf miner previously (Pickard, 1913), but was not observed in North Queensland, though there were indications of its occurrence in the stem borer.

NATURAL ENEMIES.

The early studies of the bionomics of these pests indicated that the use of artificial control measures might prove economically unsound or quite impracticable. It was therefore considered advisable that the status of insect enemies be investigated. The importance of these beneficial species, particularly those that are parasitic, is apparently quite different in the two pests under discussion, and the following notes abstracted from "The Review of Applied Entomology" indicate the position.

Only one insect enemy, namely, an egg parasite, has been recorded elsewhere for the stem borer, whereas two egg parasites, numerous larval and pupal parasites, and several larval predators, have been recorded for the leaf miner.

The egg parasite of the stem borer is *Chelonus bussyi* Vier. (Keuchenius, 1915, and Fulmek, 1923).

The species regarded as probable egg parasites of the leaf miner are *Polynema striaticorne* Gir. and *Phanurus* sp. (Underhill, 1926). Those definitely recorded as larval or pupal parasites of the same pest are *Chelonus* sp. (Edwards, 1929), *C. blackburni* Cam. (Fullaway, 1914, and Morgan and Crumb, 1914), *C. phthorimaeae* Gahan (Poos and Peters, 1927, and Graf, 1917), *C. shoshoneanorum* Vier. (Graf, 1917), *Chelonella curvimaculata* Cam. (Wilkinson, 1932), *Campoplex* (*Omorgus*) *phthorimaeae* Cush. (Poos and Peters, 1927, Underhill, 1026, Graf, 1917, Schlupp, 1917, and Cushman, 1915), *C. ferrugineipes* Ashm. (Poos and Peters, 1927, and Underhill, 1926), *Microbracon gelechiae* Ashm. (*Habrobracon johanseni* Vier.) (Poos and Peters, 1927, Underhill, 1926, Wilkinson, 1926, Trouvelot, 1922 and 1924, Sagot-Lesage, 1923, Newman, 1922, and Graf, 1917). *Limnerium blackburni* (Fullaway, 1914), *L. polynesiale* Cam. (Morgan and Crumb, 1914), *Bassus gibbosus* Say (Poos and Peters, 1927, Underhill, 1926, and Graf, 1917), *Apanteles* sp. (Graf, 1917), *A. scutellaris* Mues. (Muesback, 1920), *A. carpatus* Say (Underhill, 1926), *Microgaster* sp. (Graf, 1917), *M. phthorimaeae* Mues. (Muesback, 1922), *Zagrammosoma flavolineatum* Cwfd. (Graf, 1917), *Nepeira benevola* var. *fuscifemora* Cush. (Graf, 1917), *Ephialtes aequalis* Prov. (Underhill, 1926), *Hormius pallidipes* Ashm., *Orgillus mellipes* Say, *Meteorus vulgaris* Cress., *Cardiochiles explorator* Say and *Angitia* sp. (Poos and Peters, 1927), *Eulimneria stellenboschensis* Cam. (Edwards, 1929, and Wilkinson, 1929), *Habrocytus cerealellae* Ashm. (Flanders, 1930), *Pimpla* (*Itoplectis*) *conquisitor* Say (Underhill, 1926), *Dibrachys clisiocampae* Fitch. (Graf, 1917), *Sympiesis stigmatipennis* Gir. (Poos and Peters, 1927, and Graf, 1917), and *Pediculoides ventricosus* Newp. (Trouvelot, 1924 and Ghesquiere, 1923). Other species recorded as doubtful parasites are *Anaphes* spp. and *Zele melleus* Cress. (Underhill, 1926) and unidentified hymenopterous parasites are also recorded (Jack, 1929, Edwards, 1929, and Spencer and Strong, 1925).

The predators on leaf miner larvæ include the hemiptera *Podisus maculiventris* Say (*spinosus* Dall.) and *Lyctocoris campestris* F., and the ants *Formica fusca subsericea* Say, *Lasius niger americanus* Emery (Underhill, 1926), and *Pheidole pallidula* (Trouvelot, 1924), and two Syrphid flies *Syrphus novae-zealandiae* and *Melanostoma fasciatum* (Miller, 1918).

Only four of the species mentioned appear to be of any real importance in the control of *P. operculella.* The most valuable of these is probably *Microbracon gelechiae* Ashm. (*Habrobracon johanseni* Vier.). This species was introduced from America into France (Trouvelot, 1921), where it has reduced the percentage of infested potatoes (Sagot-Lesage, 1923). "This species develops rapidly (in twelve days during the summer), while the period of oviposition is extensive (thirty days in summer), one female laying an average of 200 eggs; and its destructive action on *P. operculella* is considerable, the larvæ being used by the Braconid both for food and for oviposition purposes." (Trouvelot, 1924.)

In some localities in South Africa as many as 50 per cent. of the larvæ in the leaves of potatoes were found to be parasitised by *Campoplex* (*Omorgus*) *phthorimaeae* Cush. (Schlupp, 1917), while another species of this genus, *C. ferrugineipes,* may be the most important parasite of *P. operculella* in the United States during certain parts of the season (Poos and Peters, 1927, and Underhill, 1926).

The fourth important species, *Eulimneria stellenboschensis* may parasitise as many as 46 per cent. of the larvæ in some localities (Edwards, 1929).

Some of the other species of larval parasites may be of value at times in certain localities.

No parasite of either leaf miner or stem borer has been recorded specifically in Australia, though unidentified parasites and diseases of leaf miner pupæ have been noted in Victoria (French, 1913). An attempt to introduce *Microbracon gelechiae* into Western Australia from California was unsuccessful, as the wasps died in transit (Newman, 1922).

During the course of the present studies some very interesting information respecting the status of natural enemies in North Queensland has been obtained. Natural enemies of both species have been observed, but the status of larval parasites is apparently very different from that obtaining in other countries. In North Queensland, although large numbers of leaf miner moths have been bred from field material, only one larval parasite has yet been discovered. Larvæ of the stem borer appear to be free of all parasites in other countries, yet in North Queensland three species of Braconid wasps have been bred from the larvæ of this pest. The commonest thereof is the species which parasitises the leaf miner. None have as yet been specifically identified, but one or another, if not all three, occur in several widely separated districts, including Bowen, Hervey's Range, Mareeba and Mount Garnet. The predatory mite *Pediculoides ventricosus,* has been found breeding on immature stages of the stem borer, particularly in the Bowen district, but is of negligible importance as a natural control.

Several predators operate on the leaf miner in the Mareeba and surrounding districts. These include Sphecoid wasps, the larva of a Staphlinid beetle, a Pentatomid bug, and the Reduviid *Pristhesancus papuensis* Stål.

ARTIFICIAL CONTROL.

Before considering artificial control measures in detail it is advisable to recapitulate some of the information already recorded.

Flight in both species is more or less restricted to certain times of the day. The first flight occurs soon after sunrise, and continues for nearly two hours, while a second flight begins at dusk and continues for three or four hours. During the intervening hours of daylight the moths are inactive. Adult females sometimes laid fertile eggs before feeding in the laboratory, but usually feeding preceded oviposition. Leaf miner moths are positively phototropic, but stem borer moths are not.

Both species can breed in the stems of mature plants, the leaf miner outside and the stem borer inside the vascular cylinder. As long as the stalk retains its green colour the leaf miner is able to continue breeding, but the stem borer has an even better chance of survival, and live pupæ of this pest have been taken in stems kept in the laboratory for five weeks after the plants had been uprooted in the field. The larvæ of the stem borer, after entering the plant, remain under cover until they emerge as adults. Leaf miner larvæ are inaccessible as long as they occupy mines, but they sometimes leave one leaf and enter another, thrusting aside and rejecting the epidermis when doing so.

The egg stage of both species occupies not longer than four or five days in summer. The eggs of the stem borer are laid on the plant and those of the leaf miner on the soil or plant.

Control of Adults.

The flight habits of the pests led to the investigation of a seed-bed modification aimed at their exclusion from the young plants. A second line of investigation was suggested by the fact that the adults often feed in the laboratory before oviposition begins, and it is therefore likely that they do so in the field also, consequently there was the possibility that gravid moths might be trapped by fluid baits in the field.

Furthermore, although stem borers are not attracted to lights, leaf miner moths are, and the possibility of their control by light trapping during the ovipositional flight was accordingly also thought worthy of investigation.

Seed-bed Modification.

Moths were excluded by careful attention to the borders of seed-beds and the provision of end flaps on the usual storm covers, and it was demonstrated that if the moth-proof covers were not removed between the hours of 5 p.m. and 9 a.m. seed-beds remained free of infestation.

This technique has one serious defect in that it favours the development of blue mould. Thus it is unlikely to be employed extensively during a moist season in which the disease is prevalent.

Fluid Baits.

These have been used with some success for the control of other small moths, but the available literature lacks any discussion of this method for the control of *Phthorimaea* spp. Therefore, when formulating fluid baits for use against leaf miner and stem borer the requirements for various other species were considered. Among these were the oriental peach moth, *Cydia* (*Laspeyresia*) *molesta* Busk. and the codling moth, *Cydia pomonella* L. (Fowler, 1927, Yothers, 1927, &c., and Petersen, 1925, &c.).

Experiments with two series of fluid bait pails were initiated during the autumn of 1933. Series A comprised pails of a molasses and water syrup, and series B pails of honey and water syrups. The molasses was diluted with water to make a 10 per cent. syrup, and either sodium arsenite or sodium benzoate was added to certain of the pails to prevent the development of yeasts and moulds. The honey was diluted with water to two different strengths of syrup, one containing 10 per cent. honey and the other 20 per cent. honey. Preservatives similar to those in series A were used and added to some of the honey pails. Further details of the fluid baits used in each pail will be found in Table 10.

TABLE 10.

Fluid Baits for Control of the Leaf Miner and the Stem Borer (½-gallon of Fluid per Pail).

Pails.	Syrup.	Preservative Added.	Total Catch.
A1 ..	10 per cent. molasses in water..	..	9
A2 ..	ditto	..	22
A3 ..	ditto	Wire cover with ½-in. mesh ..	24
A4 ..	ditto	ditto	15
A5 ..	ditto	Sodium arsenite ½ oz. per gall.	20
A6 ..	ditto	ditto ½ oz. per gall.	4
A7 ..	ditto	ditto 1 oz. per gall.	3
A8 ..	ditto	ditto 1 oz. per gall.	19
A9 ..	ditto	Sodium benzoate—½ oz. per gall	31
A10 ..	ditto	ditto ½ oz. per gall.	32
A11 ..	ditto	ditto 1 oz. per gall.	20
A12 ..	ditto	ditto 1 oz. per gall.	16
B1 ..	10 per cent. honey in water ..	..	41
B2 ..	ditto	Wire cover with ½-in. mesh ..	15
B3 ..	ditto	Sodium arsenite—½-oz. per gall.	4
B4 ..	ditto	ditto 1 oz. per gall.	0
B5 ..	ditto	Sodium benzoate—½ oz. per gall.	8
B6 ..	ditto	ditto 1 oz. per gall.	25
B7 ..	20 per cent. honey in water ..	..	6
B8 ..	ditto	Wire cover with ½-in. mesh ..	10
B9 ..	ditto	Sodium arsenite—½ oz. per gall.	7
B10 ..	ditto	ditto 1 oz. per gall.	8
B11 ..	ditto	Sodium benzoate—½ oz. per gall.	19
B12 ..	ditto	ditto 1 oz. per gall.	20

Containers for the fluid baits consisted of half kerosene tins, and thus had a capacity of 2 gallons and an evaporating surface of approximately 80 square inches. These containers are referred to as bait pails. The pails were coated inside with paraffin wax to prevent corrosion and subsequent interference with the composition of the baits. Each tin was marked to show the space occupied by half a gallon of fluid and thus facilitate the addition of water lost by evaporation. Twenty-four pails were used, there being twelve in each series. In view of the

possibility of large moths interfering with the records of such small species as the Phthorimaeas certain of the pails were covered with wire-netting of half-inch mesh to exclude the former.

The trial of these fluid baits was conducted near the Barron River on a farm heavily infested by leaf miner. Two acres of late-planted seedlings had been destroyed by that pest prior to the inception of the experiment, and the field used contained about 4 or 5 acres of maturing tobacco adjacent to these 2 acres. Leaf miner moths were very numerous during the trial and stem borer moths were also present, though not so plentiful as the other species.

The pails were placed 1 chain apart each way, and the catch counted every morning from 1st to 14th May. Observations were then discontinued, as none of the fluids showed any promise of developing sufficient attractiveness to warrant the collection of further data. The weather was fine for the trial, and although several slight falls of rain were recorded the total was less than 1 inch. It was intended to separate all the locally important pests of tobacco when recording the moths collected from the pails, but the results were so disappointing that the details are scarcely worth recording.

During the period of observation the following numbers of moths of the pests indicated comprised the whole catch of economic species:— Corn ear worm, *Heliothis obsoleta* F., 2; green loopers, *Plusia argentifera* Guen. and *P. chalcites* Esper., nil; cluster caterpillar, *Prodenia litura* F., 1; leaf miner, 378; and stem borer, 11. Of the leaf miners 215, or 57 per cent., were taken in the pails containing molasses baits, and 163, or 43 per cent., in the honey baits. The total catch of leaf miners for each day is presented in Table 11, and the total leaf miners trapped in each pail is given in Table 10. The total catch of leaf miners represents an average of little more than one moth daily in each pail, the average in the best individual pail being just under three moths daily. As these pails were in a very heavily infested field where the moths were numerous, satisfactory control by fluid baits seems quite unlikely.

TABLE 11.

FLUID BAITS FOR CONTROL OF THE LEAF MINER AND THE STEM BORER.

Type of Fluid Bait.	Day of Catch (May, 1933).														Average per Pail (in 14 Days).
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Water and molasses— 10 per cent. (12 pails)	9	5	16	14	14	6	17	34	8	15	11	29	9	28	17·92
Water and honey— 10 per cent. (6 pails)..	3	5	10	8	12	2	11	10	10	3	5	6	3	5	15·50
Water and honey— 20 per cent. (6 pails)..	4	4	5	2	6	4	6	5	5	8	5	5	4	7	11·66
All pails	16	14	31	24	32	12	34	49	23	26	21	40	16	40	15·75

However, before condemning the fluid baits altogether, two were given an additional trial. These were, respectively, the best baits from each of the two series and pails of both were placed on the ground in a small patch of potatoes. Leaf miner adults were so numerous in this area that hundreds were disturbed on agitating the foliage of a few plants. The pails were left in position for ten days, and the total leaf miner catch in this period was fourteen in one pail and sixteen in the other.

These trials are sufficiently convincing to show that none of the mixtures used can be considered useful for the control of leaf miner or stem borer. Their failure in a densely populated area leaves little room for hope that any of them could prove commercially successful, even with further modification.

Light Traps.

That the leaf miner moth is attracted to lights has been well known for many years. Over forty years ago control recommendations based on the use of light traps were advanced (Kirk, 1894) and since then similar measures have frequently been advocated (Van der Goot, 1924, and others). Unfortunately, none of these authors record the numbers of moths trapped, neither do they publish estimates of the reduction in moth population nor of the expense involved. The collection of data on these and other aspects of the question was therefore considered advisable.

Experiments with light traps were pursued concurrently with the trials outlined in the preceding section, acetylene lamps being used as the source of light. These lamps are inexpensive, easily transported, give a bright light, and the required calcium carbide is easily procured. The particular type of lamp used burned from four to six hours on the one charging, and the flame was about 15 inches above the base. As the evening flight of the moths ceases at about 10 p.m. the lights were burned only from dusk, or 6.30 p.m., for roughly four hours. It was found that the lamps employed in the investigation needed about ½ lb. of calcium carbide per night for the four hours. Thus, four lamps were operated every night for a week at a cost of about 5s. for carbide.

The following four types of traps were tested:—(*a*) A tray of water 3 feet square placed on the ground with the lamp standing in the centre. (*b*) Similar to the former, but, in addition, the water in the tray was covered with a kerosene film. (*c*) Two concentric cylinders of ½-inch mesh wire-netting 3 feet long and 1½ and 2½ feet in diameter, respectively. The cylinders were smeared with tanglefoot and placed on the ground with their axes coincident and vertical. The light was then placed in the centre. (*d*) A single cylinder of cellophane covered wire-netting, the cellophane being smeared with tanglefoot. The cylinder was 3 feet long and 1 foot in diameter, with the light again centrally placed.

Unfortunately the kerosene evaporated from the surface of the water in trap (*b*) soon after the first day, and thus the final results from this trap are comparable with those from trap (*a*).

TABLE 12.

Light Traps for Control of the Leaf Miner.

(Average daily catch per single light).

Light Modification.	Leaf Miner.		Stem Borer.		Both Species.
	♀♀	♂♂	♀♀	♂♂	
a	50	115	3	1	169
b	54	175	3	1	233
c	16	35	..	..	51
d	24	54	..	..	78
Average	36	95	1·5	0·5	133

The lights were all placed in a plot of tobacco which had been planted late and thereafter practically destroyed by the leaf miner. The adults of this pest were numerous and easily disturbed during the day, and stem borer moths were also present. Traps (*a*) and (*b*) were operated over a longer period than were (*c*) and (*d*). The average nightly catch for each type is presented in Table 12, both sexes and species being differentiated. The greatest number of moths caught by any one trap on any one night was 361 at (*b*) on the third night after it was placed out. Of these only 79, or barely 22 per cent., were female leaf miners, 276, or about 76 per cent., being male leaf miners. Only about 2 per cent. were stem borers, but they were all females. A duplicate of trap (*a*) was operated in the small heavily-infested patch of potatoes mentioned in discussing fluid baits. A conservative estimate of the adult population in this area would be many thousands per square chain, yet the average leaf miner catch per night was only 124, nearly 70 per cent. of these being males.

The area on which the four types of trap were compared was bounded on the north by virgin country for several hundred yards. It was decided to use this area to ascertain whether the moths could be attracted to lights over any considerable distance from the infested field. The type (*a*) trap was used and placed on successive nights at distances of 60, 40, and 20 yards, respectively, from the fence of the infested field. No stem borers were taken at any of these points, but the leaf miners recorded were as follows:—At 60 yards 2 females and 1 male, at 40 yards 3 females and 1 male, and at 20 yards 5 females and 1 male.

Several interesting conclusions emerge from these trials. Leaf miner and stem borer moths are not effectively attracted to lights from infested fields over distances greater than a chain. Adult leaf miner moths can be destroyed by light traps, but the small numbers taken in a huge population indicate that light traps cannot be expected to give economic control. In view of the negatively phototropic response shown by the stem borer moths as described in the life history notes, it is not surprising that very few individuals of this species were taken at the lights.

[TO BE CONTINUED.]

MILKING AS AN ART.

Milking might be defined as an art, inasmuch as some persons are more fitted temperamentally for the work. A person who is rough in his manner and irritable in temper can never establish the sympathy between the cow and the milker that is necessary for good results. The milk yield is adversely affected by rough treatment, and the capacity of production over the lactation period is reduced accordingly. Good herdmasters are very careful in the selection of milkers, and will not employ persons who are manifestly bad-tempered or even who profess a dislike for the work. The secretion of milk entails the expenditure of a large amount of nervous energy on the part of the cow. Noise or disturbance, ill handling of cows, roughness in the work, and even spasmodic or intermittent application all tend to check the flow of milk. In the course of a few days decline in production is evident. The system of recording the weight of milk at each milking is an excellent one, and well worth the amount of time the recording occupies. A careful herdmaster will be quick to note any decline in production, and will want to find the reason for it.

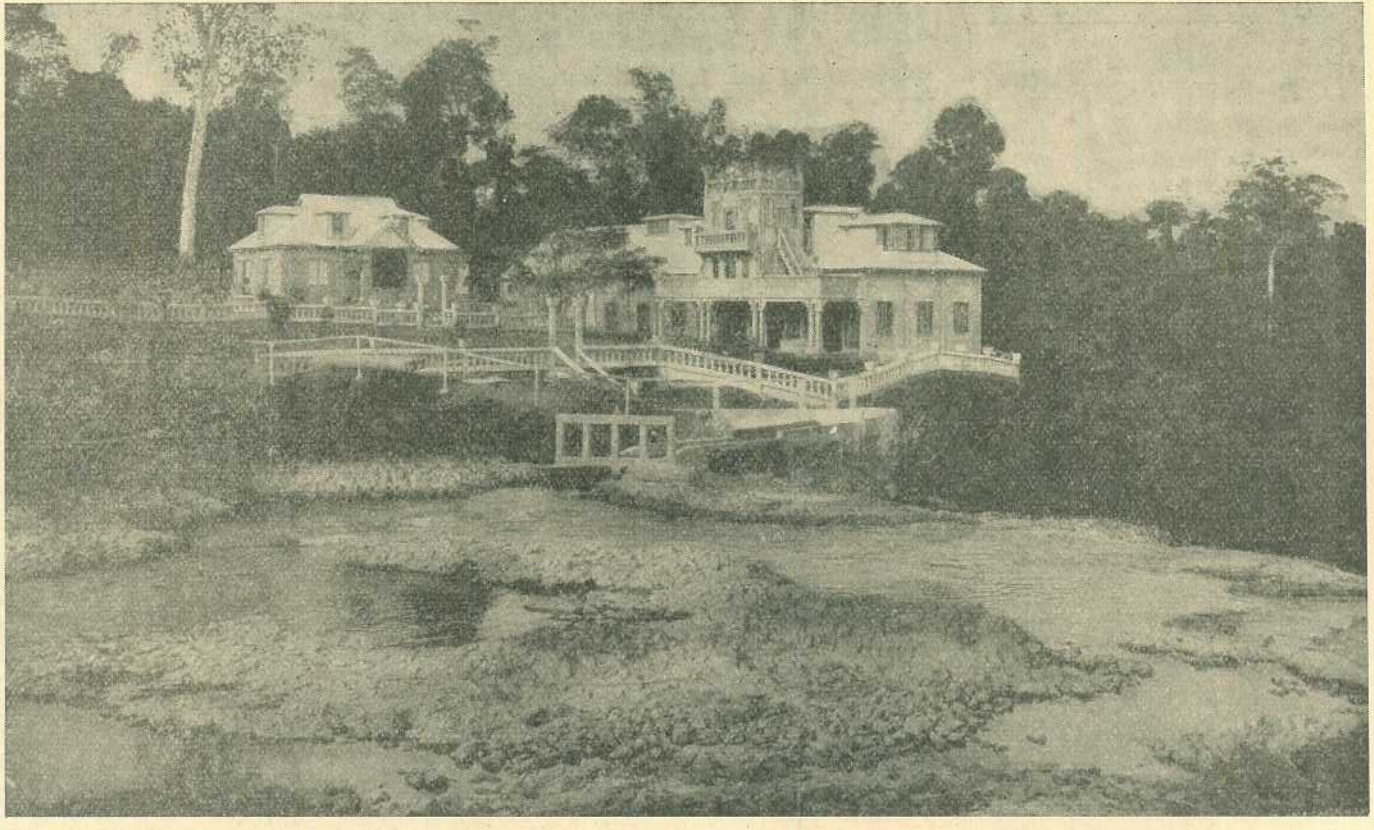


Plate 72.
Paronella Park from top of Mena Creek Falls, Innisfail, North Queensland.

Ergotism in Dairy Cattle.

By J. C. J. MAUNDER, B.V.Sc. (Dairy Branch).

In view of a sickness, somewhat resembling staggers, which may result in dairy cattle after feeding on paspalum the seeds of which are affected by Ergot fungus, the Minister for Agriculture, Mr. Frank W. Bulcock, has made available the following notes, prepared by Mr. Maunder, of the Veterinary Staff of the Dairy Branch.

This disease in paspalum, which is widespread, is recognised easily by the jelly-like substance which adheres to the seed spray and becomes very sticky as it develops.

Dairymen are advised to study these notes carefully and apply the treatment described as soon as the first symptoms appear in their herd, as the treatment is more effective in the early stages.

THE ingestion of paspalum, affected with the fungus Ergot, is injurious to the health of dairy cattle, and the following brief notes on the condition will enable stockowners to recognise the disease in its early stage, and to adopt effective curative treatment.

The active principles of Ergot act on the nervous system and produce characteristic symptoms and lesions.

It will be noticed that milk production suddenly drops, the affected cow loses condition rapidly, and though it will move about and graze to a certain extent, its movements are those of a sick beast, reluctant to move. There is some disturbance of the digestive system, usually impaction, though sometimes scouring may be present. No marked fever is manifested, temperature, pulse and respiration remaining about normal.

Typical lesions are noted on the muzzle and the teats, where it will be noticed that the skin becomes reddened and sensitive, sore teats and irritation at milking being particularly noticeable. As the condition progresses, the skin of the teats and muzzle may crack and eventually peel off, leaving a raw exposed surface.

A bi-lateral nasal mucous discharge is usually present, and may be combined with excess lachrymation and/or mucous discharge from one or both eyes.

Locomotion may sometimes be disturbed manifested by a staggering gait behind or stiff in front. Muscular twitchings or shivering may sometimes be observed.

Treatment.

Treatment must be applied in early stages if loss of milk production is to be avoided.

The first warning may be simply a drop in milk, sore teats with no other disturbance, or any one of the set of symptoms described.

Drench at once as follows:—Epsom salts 1 lb., ginger 1½ oz. Dissolved in water and given as a drench.

Should response be poor, a tonic mixture or tonic powders could be supplied, but it would appear that these are seldom necessary.

Tonic Powder.—

Ferri Sulph. Exsic.	2 drachms
P. Nux Vom.	1 drachm
Mag. Sulph.	2 oz.
P. Gentian	2 drachms

Give one powder night and morning in treacle. Six powders should suffice.

Vaseline or any ointment should be applied to the sore teats.

Treatment is entirely symptomatic, no specific treatment being known.

Prognosis.

In cases that are treated promptly, return to normal health is rapid and occurs within two to three days. Where treatment has been delayed, or in severe cases, the animal may be sick for two to three weeks, and will not return to full milk supply in the current lactation period.

Though several outbreaks of the disease have been reported from infested paspalum areas, no mortalities have been definitely reported, and it may be assumed that mortality rate is low.

Contrary to popular belief, abortion is an uncommon complication.

Prevention.

Where practicable, mow and burn the affected grass, arrange to graze on fodder crops during the dangerous stage (late summer and early autumn), and adopt any reasonable measures to prevent ingestion of the infected material.

It is realised that in most cases little can be done to prevent ingestion of the infected material, and in prevention the farmer must adopt those measures within his power, dictated by an active and original mind.

FOR HEATING WATER.

Take an empty oil drum and at one end cut a good large hole for a doorway, as shown. Get two ¾-inch pipes, and run through the centre of the drum from end

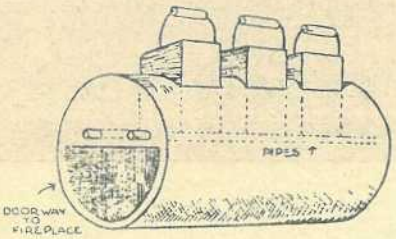


PLATE 73.

to end, placing them about 6 inches apart. Next cut three square holes in the top of the drum to allow the buckets to come down and rest on the pipes. A good fire can then be placed beneath the buckets of water, which will rapidly come to the boil.

PLATE 74.—CUTTING BURNT CANE.
A North Queensland plantation scene.
[*Photo. by courtesy of "The Telegraph," Brisbane.*

Value of Legumes in Mixed Pastures.

By C. W. WINDERS, B.Sc.Agr., Assistant (Agronomy), Agricultural Branch.

Mixed Pastures Provide Better Feed and More of It.

MOST dairy farmers and stock raisers to-day speak familiarly enough of "balanced rations" and are quite ready to apply the principles of scientific feeding of animals when hand-feeding has to be resorted to in times of pasture scarcity. They understand that the major portion of the ration should consist of carbohydrates (energy-producing and fat-forming materials) and proteins (essential to tissue-building, to wool growth, &c.) in proportions which will vary with the class of stock fed and the purpose of feeding, but when the stock are foraging for a ration on the pasture areas little thought is given at times to the nutrient requirements of the animals. It is true that on many dairy farms the value of grazing lucerne paddocks to provide a protein-rich supplement to the ordinary carbohydrate-rich grass pastures is realised, but in the majority of cases the lucerne areas are utilised for cash-cropping purposes, and their grazing value is a secondary consideration to the farmer.

The factor of high protein content which distinguishes lucerne from the ordinary pasture grasses in the stage at which they are usually grazed is shared by a large number of similar plants belonging to the family of legumes. Included in this family are lucerne, clovers, trefoils, vetches, cowpeas, numerous native plants, &c., and the occurrence of a fair proportion of palatable legumes in a pasture will mean that the pasture is supplying a ration well provided with both proteins and carbohydrates. Further, most of the legumes possess a higher proportion of useful minerals than the grasses, and this enhances the feeding value of the pasture as a whole.

It has been found that the productivity of a grass growing in association with a legume is higher than that of the same grass growing in a pure stand, so that mixed pastures of a grass and a legume, in addition to having a higher feeding value than single-type pastures, may be expected to yield more heavily than pure grass pastures.

What is the Secret?

The explanation of the higher protein content of legumes and of their effect on grasses growing in association with them lies in the little growths or nodules which are found on the roots of leguminous plants. Within these nodules occur bacteria which have the power, not possessed by flowering plants, of collecting nitrogen from the air and transforming it into a nutrient form. Portion of this transformed nitrogen is taken up by the leguminous plant and built up into proteins, and portion is transferred to grasses and other non-legumes growing with the legumes. The effect of this supply of nitrogen fertilizing material on grasses is to keep them in a condition of high production (provided other nutrient materials, such as phosphates and potash, are present in the soil in ample quantities), and so the decline in productivity of a

pure grass pasture due to rapid depletion of nutrient nitrogen in the soil may be arrested to some extent by incorporating in the pasture a legume which will build up the supply of nutrient nitrogen in the soil by liberating nitrogen taken from the air and changed into useful nitrogen compounds by the nodule bacteria. Occasionally it is found that lucerne and other legumes when planted on fertile new land in apparently suitable districts do not thrive, and examination shows that the nodules are absent from the roots. In such cases it is necessary to add the requisite bacteria to the seed before sowing, and cultures of these bacteria are prepared for seed inoculation purposes in most States.

Whenever Practicable Include Legumes in Pasture Sowings.

Though the number of species of legumes which will thrive in Queensland under intensive grazing conditions is not great, the range is sufficient to provide a legume for inclusion in most pasture mixtures. Many of our summer pasture grasses make too vigorous a growth during the flush period to allow of the extensive development of legumes in association with them, but if only a small proportion of legumes can be maintained in the pasture that proportion is still worth while. The legumes which are available for sowing in pasture mixtures have been described by the writer in a previous article ("Sown Pastures for Queensland": this Journal, November, 1935), and the chief ones are listed hereunder:—

Summer-growing legumes—Lucerne, Lespedezas, Townsville lucerne.

Winter and Spring-growing legumes—Lucerne, White Clover, Red Clover, Burr Trefoil, English Trefoil, Cluster Clover.

Lucerne is the most generally useful of the pasture legumes. It does particularly well in association with most of the winter pasture grasses, including *Phalaris tuberosa,* Prairie grasses, and Wimmera Rye-grass, and if conditions are suited to it at the time of germination and the pasture is well managed, it will establish and thrive in conjunction with Rhodes grass. Both paspalum and kikuyu grass are apparently too aggressive to permit lucerne to thrive in their pastures.

The Lespedezas or Japanese clovers are established in a few areas of paspalum and native pastures on the lower North Coast, and are worthy of sowing in pasture mixtures on the coast south of Rockhampton and on the Atherton Tableland.

Throughout the wet tropical coast, Townsville lucerne is the most useful legume for inclusion in pastures on scrub soils.

White clover is suitable only for southern coastal conditions and for the Atherton Tableand, where it blends well with paspalum. Red clover also mixes with paspalum, and both red and white clovers are valuable in winter pasture mixtures. The trefoils are best suited to the Darling Downs and to volcanic soils in the Burnett, Lockyer, and Fassifern. Cluster clover is a very hardy species, and a small amount should be included in pasture mixtures in areas with a poor winter rainfall.

PLATE 75.
Tiger Pear (*O. aurantiaca*) at Wheatvale on a Property at present being cleared by the Prickly-pear Land Commission.

PLATE 76.
Country at Leslie once infested with Tiger Pear and now Cleared.

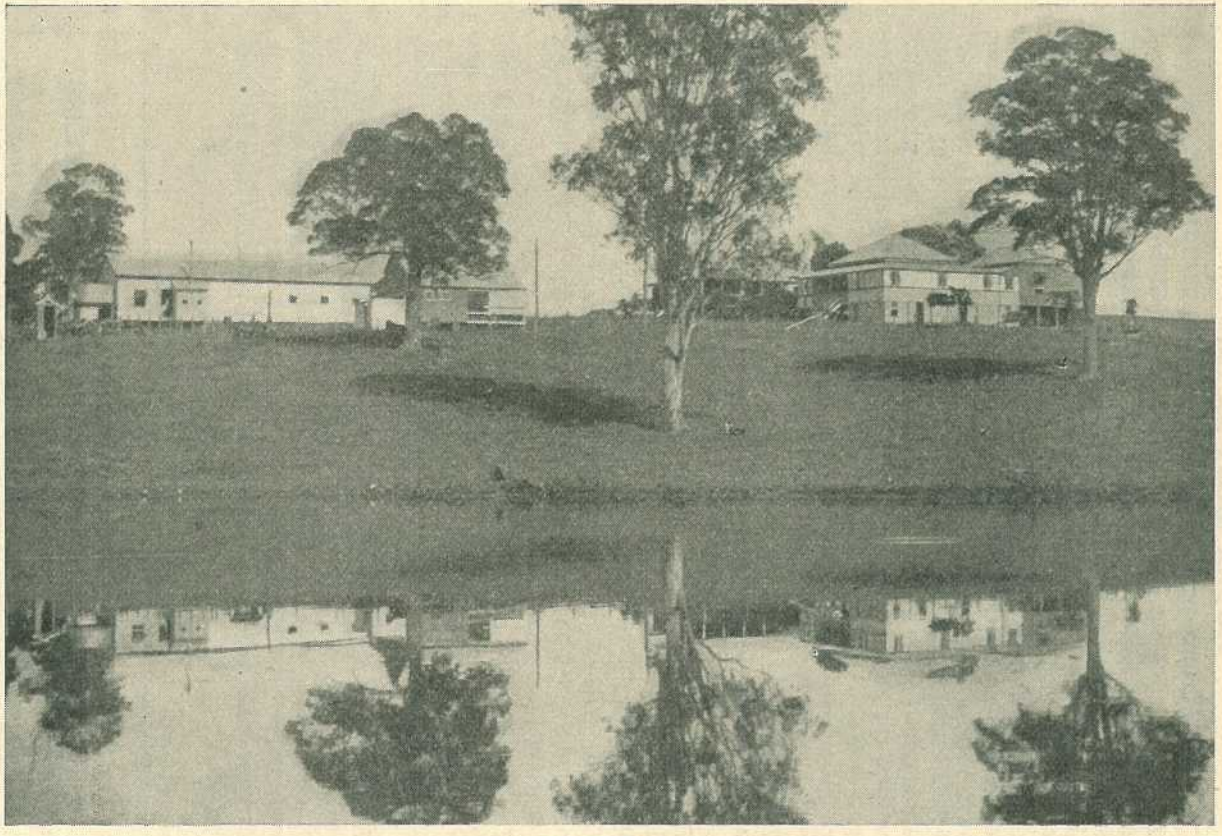


PLATE 77.

REFLECTIONS AT ST. LUCIA.

The Lagoon at St. Lucia Farm School for Boys is the irrigation source for a well-worked vegetable garden. It is also a sanctuary for aquatic bird life.

Queensland Weeds.

By C. T. WHITE, Government Botanist.

TRIDAX DAISY OR TRIDAX.

(Tridax procumbens, Family Compositae.)

Description.—A coarse herb spreading several feet and rooting at the nodes. Stems and leaves rough to the touch from being covered with rather scattered hairs. Leaves opposite, mostly about 1½ inches long and about half as wide in the broadest part, dark green above, paler beneath, edges deeply cut or toothed. Flowering stems terminal arising from forks in the branches, at first short but lengthening out later, when in full flower or seed from 9 inches to a foot in length. "Flower" or re-flower head ½ inch across, composed of a single series (about 7) of ray-florets, outside pale lemon-yellow cut into three teeth at the top and numerous darker yellow disc florets in the centre, the whole surrounded on the outside by several green, hairy, involucral bracts, simulating a calyx. "Seeds," achenes one line long, covered with long, white, silky hairs and surmounted by a ring of plumose hairs (the pappus) about twice as long as the seed itself.

Distribution.—A native of Tropical America now naturalised in many warm countries. It was first noticed in Queensland near Townsville, but is now widely spread along the coast as far south as Brisbane.

Botanical Name.—Tridax, from the Greek, meaning cut into three, in allusion to the ends of the ray-florets; procumbens, Latin, meaning leaning forward, referring to the procumbent stems.

Common Name.—Though an abundant weed, I have not heard a common name given to it. The generic one Tridax is short enough for general usage.

Properties.—The plant is not known to possess any harmful properties. One grazier informed me that horses were very fond of it, and eat it ravenously. Personally, I have not noticed stock eat it to any extent, though in some areas I have seen cattle eating it on a face along with other grasses and herbage.

Eradication.—The weed does not seem to call for any special method of treatment. Where difficult to eradicate the ordinary methods of chipping and cultivating. It would probably quickly succumb to weak arsenical and other weed sprays.

Botanical Reference.—Tridax procumbens, Linnaeus, Species Plantarum, 900.

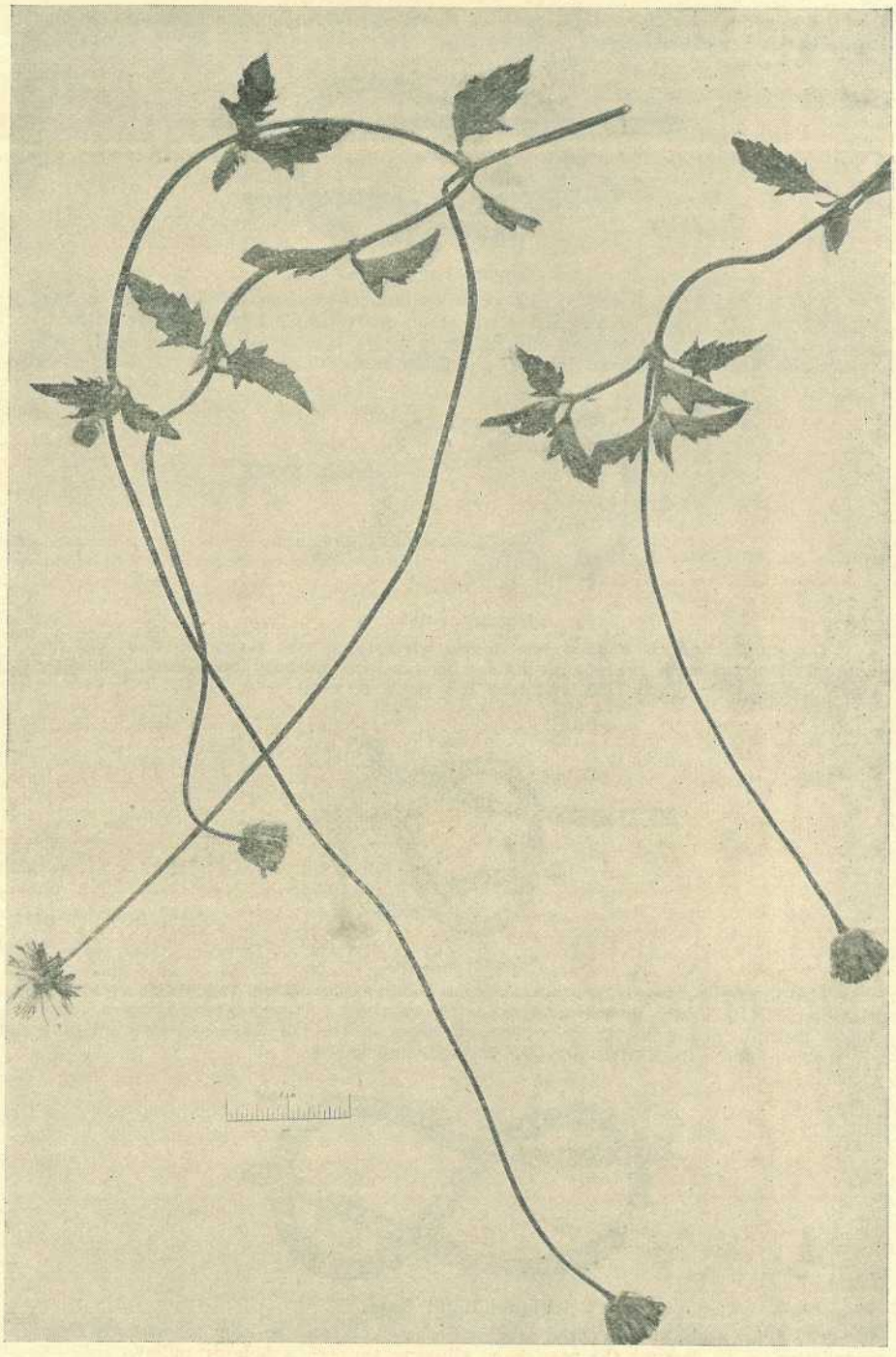
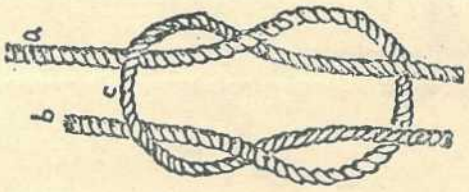


PLATE 78.
Tridax or Tridax Daisy (*Tridax procumbens*).

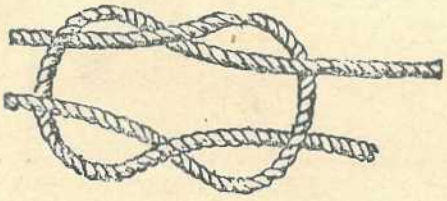
KNOTS AND HITCHES.

In handling stock and farm produce the necessity for a knowledge of suitable knots or hitches often arises.



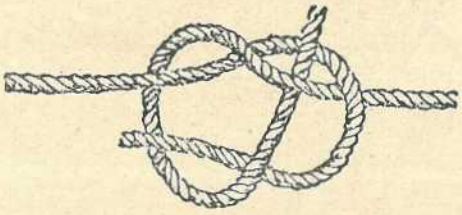
Square Knot.

One of the most common, and probably one that is used most often, is the square knot. It is easy to tie, and yet a great many people have difficulty with it. To tie it take your rope or cord and tie an ordinary right-hand overhand knot, and follow this with the left-hand form of the same knot.



Granny Knot.

The square knot is a good one to use when tying two ropes together, but do not get it mixed with the granny knot. This is the ordinary hard knot. It slips easily unless very tightly tied, and then it is hard to untie.



Weaver's Knot.

The weaver's knot is another one you can use for tying two ropes or straps together. It is easily untied, and never draws tight. If you are driving a four-horse team it comes in handy when you have to tie the lines together. Study illustration, and with a little practice you will find it easy.

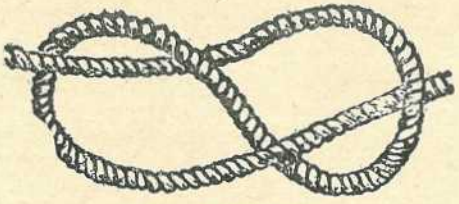
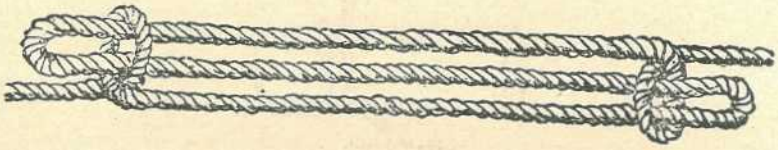


Figure Eight Knot.

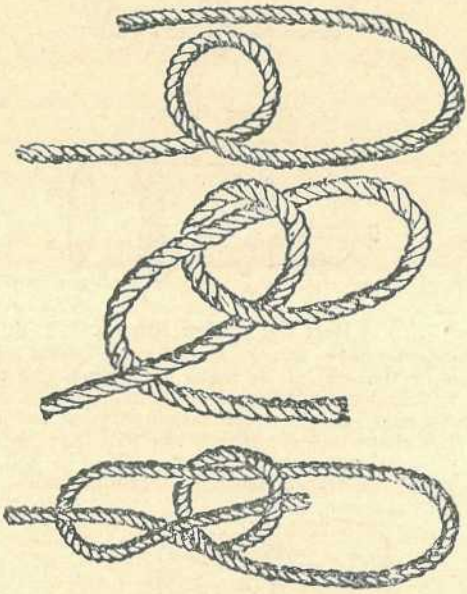
The figure eight knot is often used at the end of a rope to keep the strands from untwisting or to prevent the rope from slipping through a hole or pulley.

PLATE 79.



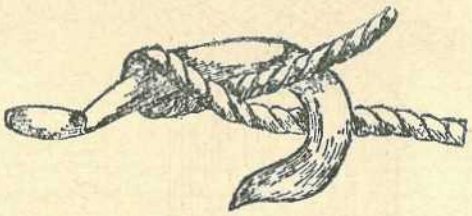
Sheepshank Knot.

Did you ever want to haul something with a rope, and, after the team was hitched on, find the rope too long? The sheepshank will help you out of just such a difficulty. It can be tied in a minute, unties easily, and will hold as long as the rope is tight. To keep is from untying when the rope is loosened fasten the loops to the main part of the rope.



Bowline Knot.

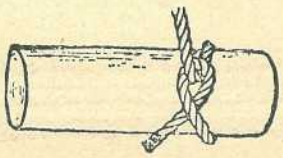
Probably one of the most useful knots of all is the bowline. You often want a loop that will not slip or pull, and the bowline knot is the easiest way to tie it. If you have not a neck-strap or halter for the horse a rope will do for the time being if you can tie a bowline. Illustration shows you how.



Blackwall Hitch.

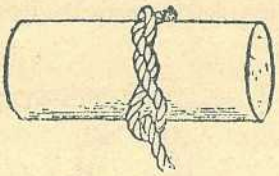
The blackwall hitch is the simplest of all hitches to make. It does not look very safe, but it really is so long as there is a steady pull on the rope. A big advantage is that a shake of the rope loosens it. It sometimes comes in handy when descending from a tree or other high place.

PLATE 80.

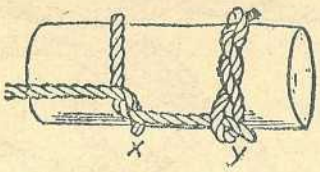


Half-hitch.

The half-hitch is another good temporary fastening. So long as there is a fairly steady pull it will hold, and like the blackwall hitch, it is easily loosened. It is simply a loop around the standing part with the short end of the rope pinched beneath the loop.

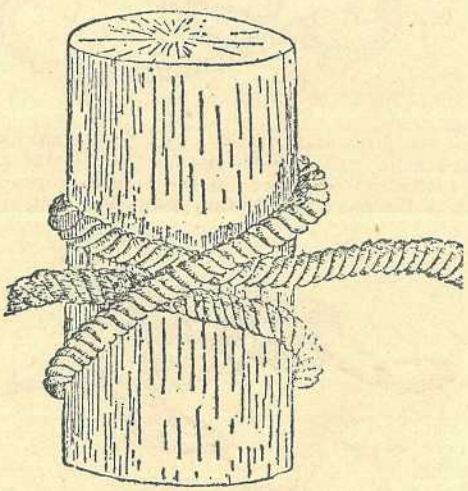


Timber Hitch.



Half and Timber Hitches.

The timber hitch is more secure, and, as the name suggests, it is often used in hauling logs or timbers. It is really very much like the half-hitch, except that the short end is wrapped around part of the loop one or more times instead of simply being pinched under it. The combination of these two hitches is much more secure than either one alone, and sometimes you will have use for it. It comes in handy if you have to lift long timbers or pipes out of a well, for instance, where there is a straight pull. Illustration shows the combination.



Clove Hitch.

The clove hitch is a much-used temporary fastening for boats, or even for hauling timbers, although it is less secure than the combination just mentioned. It can be made by having two half-hitches opposite each other and dropping the loops thus formed over the end of the timber or post.

PLATE 81.

CONSIGNMENT OF COTTON.

By W. G. WELLS, Director of Cotton Culture.

THE cotton areas of Queensland are mostly situated at some considerable distance from the ginneries, which are placed at the coastal centres of Rockhampton, Gladstone, and Brisbane, in order to be centrally located for the different railways, and also for the shipping facilities. It is necessary, therefore, for the grower to forward his cotton in containers, and the once used wool pack has been found to be very suitable for this purpose. By extending the pack to its full length and pressing the cotton in tightly, as much as 600 lb. of seed cotton can be put into it, although the usual content is generally around 500 lb., which is the desirable maximum amount.

Many growers pack more than 500 lb. into a bale, however, as they pay by the bale for the cartage from the farm to the railway. A grower with a large acreage producing a heavy yield can thus reduce transportation expenses considerably by sending heavy bales. It is inadvisable to do this, however, for heavy packing of a bale necessitates tramping the cotton in so tightly that it is difficult to clean it thoroughly. If the cotton has been picked when it is "green"—that is, before the fibres and seed have thoroughly dried out after the boll opens—there is grave danger of the contents of a tightly-packed bale heating or going through a "sweat," as it is described. This tends to make the fibres stick tightly to any foreign matter amongst them, and thus makes it difficult or almost impossible to remove much of the small leaf and pieces of the burr of the boll during the cleaning operations prior to ginning the cotton. The lint obtained may thus be of considerably lower value than would have been the case had the seed cotton reached the ginnery in a condition that would have allowed of a better removal of the foreign matter in it.

It can be realised, therefore, that cotton should not be picked after a storm, until the wind and sun have dried and fluffed out the locks. Likewise, cotton should not be "snapped" until the burrs are dead, for if packed with green burrs the fibres absorb the moisture from them and "heat" so badly that the cleaning machinery can remove only a

small proportion of the trash and material amongst them. The snapped cotton should also not be packed too tightly in the bale, for where this is done the fibres are pressed and twisted around the broken pieces of burrs and bracts to such an extent that much of the trash cannot be separated from the fibres even with the extra cleaning the snapped cotton is given.

It would be far better if all growers forwarded only bales weighing from 480 to 500 lb. Bales of these weights are easily handled in the operations at the ginnery, the contents, if of dry cotton, are cleaned better, and with fairly uniform weights of such nature, the ginning of the different grades and staple lengths can be done, in terms of bales of lint of 500 lb. weight, to better advantage.

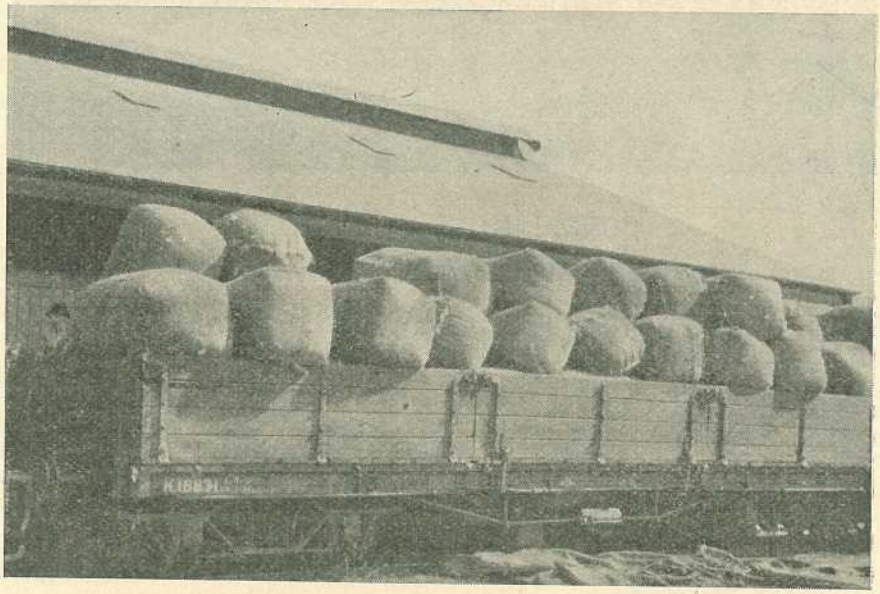


PLATE 82.

UNLOADING WOOL PACKS OF SEED COTTON ON ARRIVAL AT THE GINNERY.

During the peak period of arrivals as much as 120,000 lb. of seed cotton is received in a day. Growers should therefore forward cotton in wool packs only in order to assist, as much as possible, the grading and receiving of the crop.

Grade the Cotton When Baling.

The usual method of baling cotton is to attach the corners of the bale to heavy wires suspended from a square frame supported by posts upright in the ground. These baling points are generally built in different parts of the field in the case of large areas, or some central point in small fields, to facilitate the weighing and packing. As the pickers weigh their pickings for the day, the contents of the bags are emptied into a suspended bale and packed by means of tramping the cotton down tightly. This system tends to produce layers of cotton of different grades in the one wool pack, depending on the variation in the cleanliness of picking of the individual pickers. It is believed that better returns would be realised by the grower and more uniform content of the ginned bale of lint would be obtained, if growers with sufficient acreage to produce several bales at a picking would roughly grade the cotton of

each picker's sack into, say, one of three grades—clean, clean spotted, and dirty, dirty spotted or dull off-colour cotton. With a wool pack for each of these grades the pickings of a crew of pickers could be easily segregated, and a much more uniform content of each bale forwarded to the ginnery would be obtained. In the case of small acreages where only a few pickers are operating, it may not be possible to obtain enough cotton of each of the three grades to fill a bale of each. In such circumstances a careful blending of the cotton before baling greatly improves the uniformity. This is a very important point to which all growers should pay more attention, for such a practice would assist the grading operations and permit the obtaining of bales of lint with a high uniformity of content.

Pack Only Clean Containers.

Careful inspection of the container should be made before filling it with cotton. Some growers with small acreages use once used chaff bags, and unless these are carefully cleaned the cotton will contain bits of the chaff when the bags are opened at the ginnery. Picking sacks should also be cleaned before they are used. It is also advisable to shake the wool packs before filling them, in order to remove dust and trash that may collect on them during the transport to the field.

Another very important feature to observe is the removal of all seed cotton sticking to the bale before filling it. Cotton sticks easily to any rough surface, and a careful inspection should be made of each bale by turning it inside out and removing all cotton in the seams, &c., otherwise serious contamination of stocks of pedigreed seed may result.

Brand the Container.

Each grower should make a stencil for branding every container of cotton forwarded to the ginnery. This stencil should contain his initials and name, registration number, and railway address. The container should be clearly branded with this stencil on a smooth, clean face, using a lasting marking fluid so that the identity can be easily and quickly determined. Each season difficulty is experienced at the ginneries through growers failing to observe these details, and it is in their own interests that this position should be corrected.

Labelling Containers.

It is necessary to know the variety of seed cotton in each container that arrives at the ginnery in order to determine the estimated percentage of lint contained therein. This data is required, because the grower is paid on the basis of the amount of lint he forwards, and the grade and staple length thereof. Where a grower has only the one variety, no tagging is required, as this fact is recorded at the ginnery; but where it is necessary to have more than one variety, tags for each one are sent. When more than one variety is grown on a farm, every care should be taken to prevent mixture or loss of identity of the varieties, and each container should be carefully labelled under the brand, with the proper tag for the variety contained in it. The tag should be sewn on in the usual cross-diamond method, so as to protect it to the fullest extent from being torn off during the handling of the container.

Use Wool Packs.

It is especially urged that wool packs be used wherever the size of the crop will permit it. A considerable number of growers still forward their cotton in chaff bags, even from crops of 5 to 10 acres in extent. The use of chaff bags slows up the grading and weighing operations, for each container has to be graded and weighed separately, thus increasing the work of these operations five to six fold. The chaff bags are also more expensive to use, for the number required to forward 500 lb. of cotton will cost about as much as a once used wool pack purchased through the Cotton Board, while owing to their being so tightly packed, it is necessary to cut them open to empty the cotton, making them useless for forwarding cotton again. The wool pack, however, is cut down the seams, and thus can be sewed up and used repeatedly. The packs of each grower are sent back to him, after they have been heated at a high temperature to kill any pests in them, for a charge of 6d. per bale, which also covers the freight on it.

Conclusion.

It is strongly recommended that growers pay careful attention to the points that have just been touched upon. With a general observance of them, a greater efficiency and reduction in expenses can be obtained in the operations at the ginneries and on the farm, with a consequent increase in returns to the grower.

PLATE 83.
A pretty reach of the Russell River.

GRAPEGROWING IN THE STANTHORPE DISTRICT.

By F. L. JARDINE, Inspector of Plants, Stanthorpe.

ALTHOUGH the grape vine has been in cultivation in the Stanthorpe district for over half a century, it is only during comparatively recent years that this branch of industry has come into prominence. To such an extent, indeed, is this so, that it shows promise of being, in future, the premier grape-producing region of this State.

PLATE 84.
Portion of a typical Stanthorpe vineyard in winter garb.

History of the Industry.

As far back as 1873, when the settlers were engaged actively in the search for tin, the subject of fruit production had not claimed serious attention. Father Davidi, parish priest at that time, was a native of Italy, and was well versed in horticulture and viticulture. He saw the natural advantages that the district offered for the cultivation of deciduous trees and grape vines. He saw far beyond the tin fields, and

actually prophesied that one day the Stanthorpe district would be covered with orchards and vineyards like his native province in Italy. He even urged his congregation from the pulpit to engage in the cultivation of fruit trees and vines. To prove his faith in his own words,

PLATE 85.
A four-year-old Gros Colman vine.

he planted a small area himself; and to this day there remain in bearing some of the original trees and vines. Bearing in mind Father Davidi's prophecy, it affords a great feeling of satisfaction, to those acquainted with the district, to review the progress that has been made during the

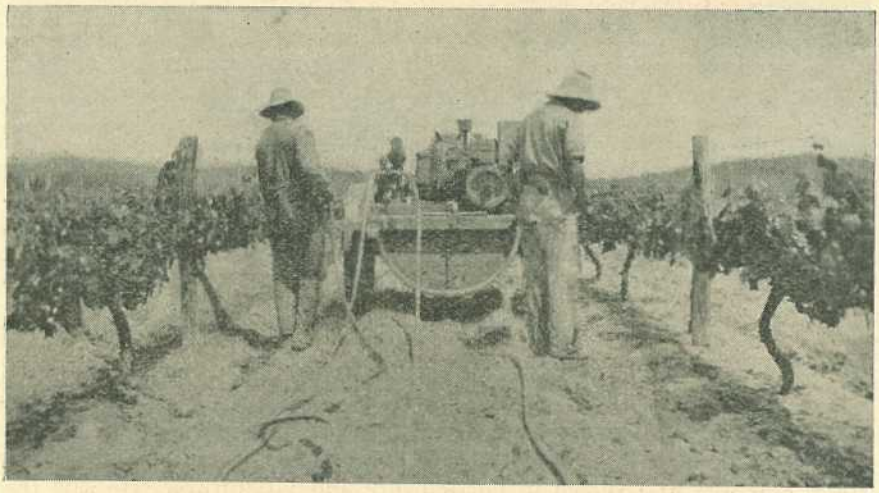


PLATE 86.
An early Bordeaux spray on young growth to check fungus diseases.

past fifty years. The growers themselves, who followed that advice, have proved the soundness of Father Davidi's judgment, and have profited by their foresight, and the methods which they adopted in establishing and developing the viticultural industry in the Granite Belt.

Climatic Advantages.

Both climate and soil are both naturally conducive to long life and the ripening of fruit. The district is endowed with other natural advantages so necessary for the successful cultivation of the grape vine, situated as it is over 3,000 feet above sea-level, with only a limited but well distributed rainfall of between 20 and 30 inches. The cold winters afford the vines a full measure of rest during their dormant period; while the dry, clear atmosphere during the summer months checks considerably the fungus diseases peculiar to the vine in coastal and more humid regions.

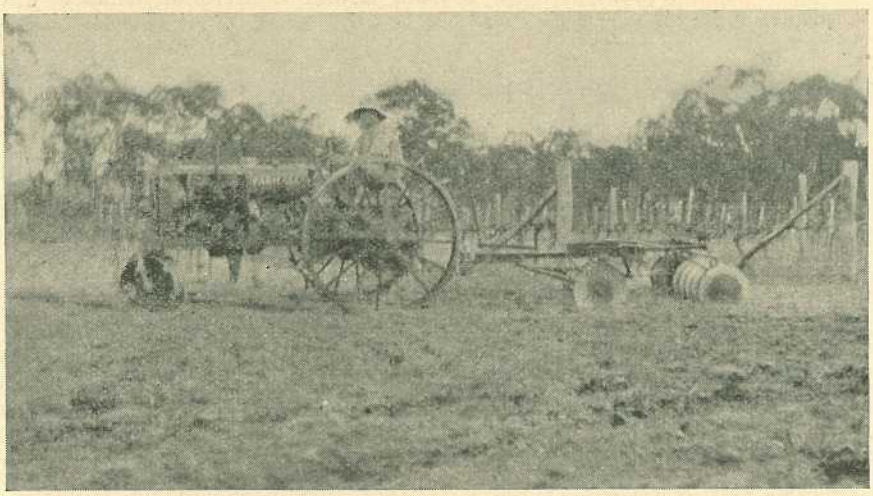


PLATE 87.
Disc cultivator and tractor working in a Stanthorpe vineyard.

During summer the vineyards are naturally at their best. The lines of green foliage sheltering a wide range of some of the choicest varieties of grapes.

Progress of the Industry.

Although progress has not been rapid, it has been developed along sound lines. The vineyards generally present an orderly and well-kept appearance, being established on the same system—namely, the trellis with 10-feet avenues, the distance between the vines averaging 6 feet.

Thirty years ago the area under vines would probably not exceed a hundred acres; while to-day the young vines and the vineyards in bearing would probably aggregate perhaps three thousand acres.

There is an increasing tendency towards the mechanisation of the industry. On the larger areas, the horse is being replaced by the tractor for purposes of cultivation; while power pumps have displaced the old-fashioned methods of spraying by hand.

Control of Disease.

Every precaution is being taken in the control of vine diseases. Growers realise fully that the devastating effects of the fungus enemies of the vines are not to be underrated. This is demonstrated by the systematic spraying and dusting campaigns carried out each year.

Varieties and Export.

Already trial shipments have been forwarded to Vancouver and to Covent Garden, as well as a trial shipment to the East. The results were encouraging, and provision is being made to send further consignments on a larger scale this year. It is hoped that in a few years the industry will have developed into a valuable addition to Queensland's export trade. Among the varieties cultivated are included Muscat, Hamburg, Waltham Cross, Purple Cornichon, Red and Black Malaga, Servant, Red Hanneport, Flame of Tokay, Gross Coleman, Belas Blanco, Red and White Ladies' Fingers, White Syrian, Grand Centennial, Chaoch, and Cinsaut.

SOME TROPICAL FRUITS.

No. 7.—THE FIVE CORNER.

By S. E. STEPHENS, Northern Instructor in Fruit Culture.

A TROPICAL fruit of Asiatic origin, the Five Corner, is now distributed widely throughout the warmer regions of the world. Its susceptibility to damage by frost limits its growth to the tropics, but in these regions of Asia, Australia, America, and the Pacific Islands it is now frequently met with. Its introduction into Queensland dates from about the end of the nineteenth century.

The tree is not very large, growing to an ultimate height of about 30 feet. The compound leaves, composed of two to five pairs of light-green leaflets 1½ inches to 3 inches in length, together with the clusters of small purplish flowers, and the yellow fruit give the tree a handsome appearance.

The flowers are borne in short racemes arising from both the young and old wood. The flowering period extends over about nine months of the year, and the cropping extends over a like period, ripe and green fruit being present on the tree together at any time except at the very end of the fruiting season.

The shape of the fruit is responsible for the common name which it bears. Three to five inches in length, oval or elliptic in outline, the fruit is ribbed longitudinally with three, four, or five (usually five) prominent and sharply angled ribs. When cut transversely the cross section is star-shaped. The fruit is glossy, translucent, and light-green when young, and changes to yellow or yellow-brown when ripe. The skin is very thin and covers a clear juicy flesh, rather astringent when green, but pleasantly acid and refreshing when ripe, and possessing a strong perfume.

Although no horticultural varieties are established sweet and sour types are recognised, and both are to be found in North Queensland. The sweet type is usually eaten fresh, but the sour type is too acid to be pleasant in the fresh state, and is more suitable for jelly or pickles. The fruit of the sour type is usually larger than that of the sweet type.

The common name of the Five Corner in most other countries is Carambola, following the specific botanical name. In various parts of the Philippines it is also called Daligan, Balimbin, Garangan, and Malinbin. The Indian name is Kamranga, and in China it is Yung tau. The botanical name is *Averrhoa carambola*, L.

The preference of the tree is for a rich deep soil, but it will grow on sandy soil, or even on a very heavy one. A moist climate is preferable, but is not an actual necessity, as is proved by its establishment in the dry climate of Northern India. Tropical temperatures are strictly necessary, however. When young the tree is rather delicate, but given a warm, moist climate with a suitable soil, it quickly establishes itself and makes rapid growth.

Propagation is usually by seed, and is easily effected. Only a small percentage of seed appear to be fertile, however, and care is necessary to select well developed seed for planting.

P. J. Wester, of the Philippines Department of Agriculture, has found that vegetative propagation may be carried out by shield budding. He recommends the selection of petioled budwood, ripe, smooth, and purple in colour. The buds should be cut 1 inch to 1½ inches long.

The young trees may be set in the field during the periods between September and November or February and April, and should be planted 20 feet apart.

FRUIT PACKING INSTRUCTION.

By JAMES H. GREGORY, Instructor in Fruit Packing.

IN these days of marketing difficulties, no fruitgrower need handicap himself by not adopting modern methods of marketing, for practical packing instruction is available to all. The policy of conducting packing classes of young people, adopted by the Fruit Branch of the Queensland Department of Agriculture and Stock, is now showing results. Close observers in the markets are unanimous in expressing the opinion that over the last few years the pack and general get-up of fruit has greatly improved. While this is true, there is still room for improvement. To-day, all successful growers have adopted the most up-to-date methods of marketing. Unfortunately, the smaller grower is often not showing the same advance in methods, and this fact at present constitutes something of a problem. Apparently unwilling to avail himself of the services of the Department, he is mainly responsible for the placing of poor-quality fruit on the market. The marketing of poor-quality fruit is, as has been pointed out on various occasions in departmental marketing notes, a great influence on reducing the market values to a lower level. We are loth to believe that these growers are deliberately avoiding their obligations to the fruit industry as a whole, and we assume that it is possibly ignorance of the services available that prevents their attempting to make an improvement.

In conjunction with the Department of Public Instruction, packing classes are held at many schools. At these classes pupils of twelve years of age and over attending the local school are taken into the class for training. It is felt that, generally speaking, pupils under this age are

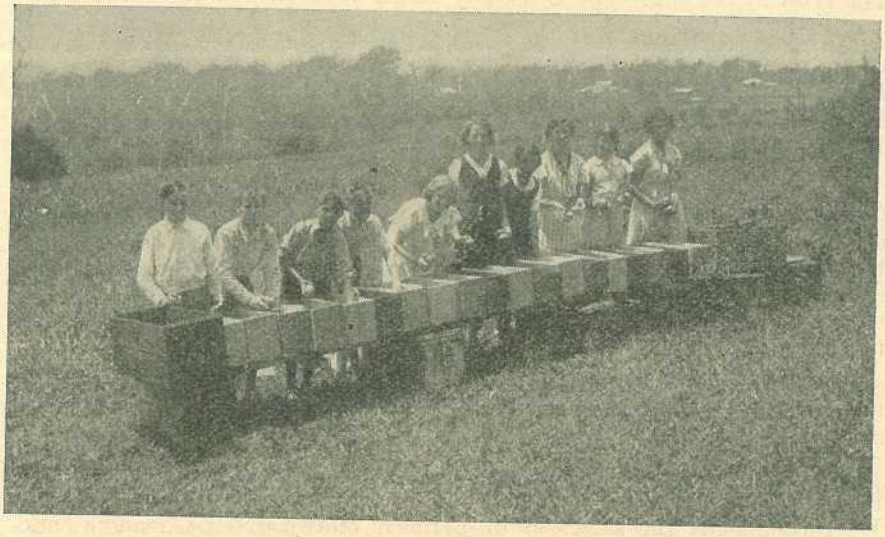


PLATE 88.
Tomato Packing Class at work at Russell Island on the farm of Mr. K. Holland.

too young. Classes are then formed of, if possible, not more than eight (8) pupils. More than eight in a class makes the class harder to manage by one teacher, with a consequent drop in efficiency. The class is then given instruction as regularly as possible—once a week if the means are available. Each lesson is of one hour's duration. At the

PLATE 89.
A Russell Island Fruit Packing Class. Some of the finished cases.

first class which is held at the school, the theoretical side of packing is given, essential notes are taken, and the pupils are generally prepared for the practical work. For the pupils to obtain the necessary practice in this, a grower's farm within reasonable distance of the school is then found. Many growers have shown a fine spirit of co-operation in assisting the Department by making available their farms, and providing the necessary fruit and materials, without in many cases having the incentive of having a member of their family as a pupil in the class. Of course, they get a return of having many cases of fruit packed up for them ready for market. The classes for any particular kind of fruit end with the season. Generally, up to six lessons of one hour each are

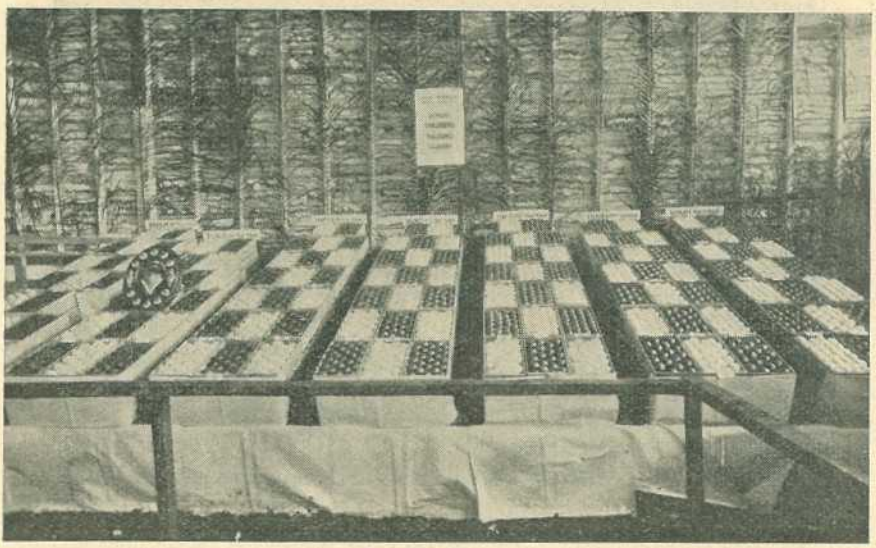


PLATE 90.

Competitive display of packed citrus fruits, Brisbane Royal National Exhibition, exhibited by citrus packing classes in competition for the John Macdonald Shield.

given to the classes. It has been said that the pupils are not expert packers when a season of classes ends. Reasonable packers of experience realise that they cannot expect the children to be expert packers after only six hours of broken tuition, but with children of average intelligence excellent results have been obtained in laying the foundation for good packers. After two seasons of tuition covering, say, ten to twelve lessons, many pupils are quite expert.

At the present time, classes are held in the citrus areas of the North and South Coasts, and Howard and Gayndah districts. Tamborine Mountain, Elimbah, Mapleton, Flaxton, Montville, Palmwoods, Woombye, Chevallum, Nambour Rural, Yandina, Buderim, Howard, and Gayndah schools have annual classes. At the Royal National Exhibition each year a packing competition is held amongst the above schools for a shield to be held for twelve months by the winning school. The entry, which comprises ten cases packed by a team of five pupils, is a keenly contested one. By winning this year the Mapleton school retained the John Macdonald Shield for all time. This shield was competed for over a period of eleven years, the school winning the shield the most number of times to retain it for ever. To replace the John

Macdonald Shield another has been donated by Mr. H. Walker, M.L.A., for future competition. The William Rowlands Shield is also competed for by North Coast schools at the Maroochy Agricultural Society's annual show. The competition for this shield was instituted in memory of Mr. William Rowlands, who was the first Government Packing Instructor in Queensland. Examples of the excellence of his work are still to be seen throughout the State, many growers having become good packers through his efforts. In addition to the classes for the younger generation, visits are paid to orchards and plantations for the purpose

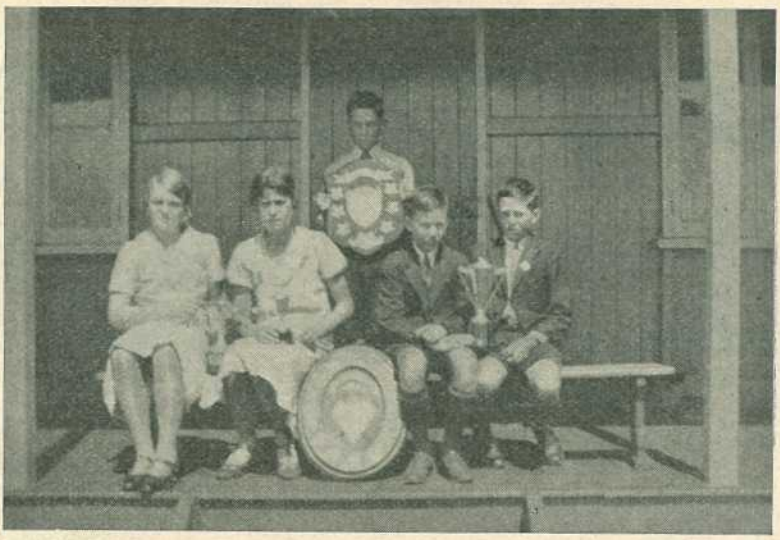


PLATE 91.—MAPLETON STATE SCHOOL FRUIT PACKING CLASS.

This class is the outright winner of the John Macdonald Shield, and are also the present holders of the William Rowlands Shield competed for at the Annual Show held by the Maroochy Agricultural and Horticultural Society at Nambour each year.

of first-hand instructions to growers. Observations and checks are made of consignments on the markets and in cold storage for growers anxious to know how their consignments when packed keep in transit and cold storage. Experiments in storage, various types of packing, improved boxes, and packing materials are constantly being made. Packing charts and pamphlets on packing, storage, and marketing of all fruits are published or in course of publication, and may be obtained free on application to the Under Secretary, Department of Agriculture and Stock, Brisbane. Applications for service should also be sent to the same address. For this short résumé of the operations of the marketing section of the Department's Fruit Branch, it can be seen that there is no need for growers to remain in ignorance of the latest marketing and storage methods.

FRUIT MARKETING NOTES.

By JAS. H. GREGORY, Instructor in Fruit Packing.

THE outstanding feature of the month's marketing operations has been the phenomenal drop in the price of Granny Smith apples. First consignments realised up to 12s. per case, but within a week

prices were touching as low as 6s. per case. One can only blame immaturity, the fruit being too green to be satisfactory, even as a cooker. The question is being raised, "Are we planting too many Granny Smith apples?" Rather, I would ask, "Are we spoiling the pride of Queensland apples by bad marketing methods?" It was pleasing to note that the price of Dunns was maintained better this season. Again, we might well ask whether Dunns are not being sacrificed by trying to market Granny Smiths too early. Local consignments of stone fruits are now decreasing on the market. The season on the whole has been a good one. Pineapples have maintained steady rates, but the prices of bananas have, unfortunately, been very unsatisfactory.

Apples.—Granny Smiths, at the start of the season 12s., are now 5s. to 7s. It is expected that better prices will be realised from the beginning of March. Dunns, 4s. to 5s.; Jonathan, 5s. to 7s.; Delicious, 4s. to 8s. Many growers are losing money through picking the whole of the crop instead of rotational picking, first harvesting the large fruit and permitting the smaller ones to grow before picking. If an apple grows a quarter of an inch more in size it becomes a third as large again. A study of packing counts proves this.

Stone Fruits.—All stone fruits have been good value, but have now eased in price and become slower of sale.

Plums.—Ponds, 6s. to 8s.; Grand Duke, 5s. to 6s.; President, 6s. to 7s. Fine quality Japs have realised up to 11s., but are now off the market.

Peaches.—2s. 6d. to 4s. 6d. a half-bushel.

Pears.—William Bon Cretian, 6s. to 9s.; others, 4s. to 7s. Growers are reminded of the absolute necessity for wrapping all lines of pears.

Grapes.—Muscatels, 4s. to 5s. 6d.; Colemans, 3s. 6d. to 4s. 6d.; Ascots, 3s. to 4s.; Black Prince, 4s. to 4s. 6d.; Walthams, 6s. to 8s. Many lines have been condemned for not conforming to the new Maturity Standard, which states that "Matured Fruit" means, in relation to fresh grapes intended for table use, grapes of which the specific gravity of the filtered juice is not less than 1·066, or 9 degrees Baume at 60 degrees Fahrenheit. Remember that the public wants sweet grapes only, and sending in poor-quality fruit only reduces the prices.

Papaws.—3s. to 7s. a bushel case were received, and the quality generally has not been the best.

Pines.—Prices have been maintained of late with the assistance of the factory clearances. Smooths, 4s. to 6s. a case; Roughs, 1s. to 5s. per dozen; Smooths (Melbourne), 7s. to 9s.; Smooths (Sydney), 7s. to 9s. A few blister-affected lines were received.

Citrus.—Supplies of oranges are being obtained from Southern States, and consist mainly of poor quality, poorly-coloured Valencias, selling at 6s. to 10s. Queensland lemons are in good demand, and are showing some very fine quality, "Benyenda" reaching 20s. to 23s., "Gayndah" 15s. to 20s., and other lines 14s. to 16s.

Bananas.—Heavy supplies are still coming to hand, and prices are low—4s. to 10s. in Brisbane. There has been a tendency on the part of some agents to return a flat rate for the whole consignment of all sizes. This is hard to understand, since there is a definite difference in values in the different sizes.

The prices on the Melbourne market, which are not the best, are as follows:—Nines and Eights, 10s. to 11s.; Sevens, 9s. to 10s.; Sixes, 8s. to 9s. Sydney prices—Nines and Eights, 10s. to 12s.; Sevens, 9s. to 10s.; Sixes, 8s. to 9s. The quality of the fruit coming to hand is better, although the influence of the season's frosts still appears to be manifest in some consignments.

Passion Fruit.—These have proved valuable, up to 25s. per case being obtained. Values have now eased, but are still profitable—Brisbane, 5s. to 10s.; Sydney, 7s. to 9s.; Melbourne, 7s. to 11s. The highest price is for extra special lines only.

Tomatoes.—Ripe, 2s. to 6s.; green, 2s. 6d. to 4s. 6d. Supplies have been lighter, so values have maintained. Too many immature lines are to be found. These do not colour satisfactorily, and help spoil the market.

Mangoes.—Mangoes have not been up to their usual standard this season, owing to the prolonged dry spell in the North; 4s. to 8s. has been the ruling price, with a few specials higher.

General.—Cucumbers have been over-supplied of late. Good vegetables have maintained even prices. Lettuce received 6d. to 2s. per dozen. Many lines are spoiled through bad handling. Packing in cases would be a great improvement, the tropical fruit case being ideal for the purpose.

Export.—Growers are requested to make themselves familiar with the changes in the export regulations for apples. Care must also be taken to procure correctly-cut case timber.

Apple-packing charts are available free to all growers.

WINES FROM TROPICAL FRUITS.

By S. E. STEPHENS, Northern Instructor in Fruit Culture.

AT times every orchardist has a quantity of fruit which, owing to some slight superficial blemish, or perhaps because it is too ripe to pack, is unfit for market. Such fruit is usually discarded and goes to waste. Some, at least, of this could be turned into a profitable commodity by converting it to wine.

The process is a simple one, but to be assured of success the producer must not be impatient to achieve monetary results. The secret lies in proper fermentation and lengthy maturing. Although some of the recipes given below stipulate a few weeks or months in the wood, an improvement in quality would be obtained by allowing twelve months for maturing before bottling off.

The process is essentially the same with all fruits. Variations in the processes with any one kind of fruit are largely a matter of individual fancy, as, for example, the adding of brandy or rum after fermentation. Whilst it is my opinion that this definitely improves the wine, some may hold a contrary opinion and prefer to omit it. Indeed, many of the recipes do omit it.

Before proceeding to detail a few recipes the following general remarks, which apply to all wine making, may be made.

Firstly, only wood or earthenware vessels should be used. Wood is preferable. Under no circumstances should a vessel of iron or any other metal be used.

Secondly, the vessels used must be perfectly clean.

Thirdly, during fermentation the cask must be filled daily almost to the bung hole from a small quantity retained for this purpose. If this should be all exhausted before fermentation is complete clean cold water must be used. Fermentation usually takes about three weeks.

Fourthly, throughout the whole process and while the wine is maturing in the wood the temperature should be as even as possible, and around 60 deg. Fahr.

The following recipes have been collected from various sources. Several are personally known to the writer to produce good wine, whilst all are reputed to be good. Quantities may be increased or reduced in proportion, according as it is desired to make a greater or less quantity.

Orange Wine No. 1.

Squeeze sufficient oranges to make 2½ gallons of juice. Add 25 lb. of sugar. Put the orange pulp into a separate tub and cover with cold water, allowing it to stand for twenty-four hours. Then strain and add the liqud to the juice and sugar. Add more water, if necessary, to make the quantity up to 10 gallons of liquor, and let stand for twenty-four hours. Then strain off and fill cask. Keep cask filled with additional liquor or cold water, and when fermentation is complete bung up and set aside for twelve months.

Orange Wine No. 2.

Put 40 lb. of sound, peeled oranges into a well-cleaned wooden tub or vat. Bruise the fruit and pour over it 4 gallons of water. Stir the whole thoroughly and work the fruit with the hands until the juice and pulp is separated from the pith and rag. Then allow it to stand for twenty-four hours. Strain through a coarse cloth with gentle pressure. Wash the mash with a gallon of clean water to remove any remaining soluble matter and strain it through into the other juice. Dissolve 25 lb. to 30 lb. of sugar in the liquor and then add sufficient water to make up to 10½ gallons. Cover the vat with a blanket and board, and allow to stand twelve to twenty-four hours, according to the state of the fermentative process. Draw off into a cask, filling almost to the bung hole, so that the scum may overflow as fermentation goes on. Add a little liquor daily to keep the level just below the bung hole. When fermentation is almost complete knock the bung in tightly and bore a small gimlet hole in the side, pegging it lightly. Remove the peg from time to time to allow the gas to escape. When the gas escape is so feeble that it will not extinguish a lighted match the peg may be knocked home. Then add a tablespoon of isinglass to fine the wine, and in a few weeks it will be fit for bottling.

Orange Wine No. 3.

Dissolve 15 lb. of loaf sugar in 4 gallons of water over gentle heat. Add the whites and broken shells of three eggs. Bring to the boil and then reduce the heat so that the syrup only simmers. Remove from the fire after twenty minutes, and when nearly cold strain into a large tub. Squeeze and strain the juice of fifty large seville oranges. Stir it into the syrup and add three tablespoons of brewer's yeast. Cover with a cloth and leave for at least twenty-four hours. Pour into a dry cask and leave loosely bunged until fermentation stops; then tighten up and

leave for three months. At the end of that time prepare another cask and draw the wine off into it, at the same time adding a pint of brandy. Bung down, and after twelve months bottle.

Mango Wine No. 1.

Choose very ripe fruit. Put them in an earthenware vessel or cask without removing either the skins or seeds. Cover with water and allow to stand for three days. Stir or squeeze the fruit three times a day until the flesh leaves the seeds. At the end of this period strain the mash through a fine cloth and measure it. To every gallon of juice allow 3½ lb. sugar. When this is dissolved pour the wine into bottles, but do not cork them. Allow to ferment, each day filling the bottles with liquor retained for the purpose. When fermentation stops cork the bottles and put them away. The longer this is kept the better it becomes.

Mango Wine No. 2.

Select ripe fruit and place them in a wooden tub or cask with one end knocked out. Bruise the fruit well and pour in 1 gallon water for every 10 lb. to 12 lb. of fruit. Let stand for forty-eight hours, then strain and measure into a cask. For every gallon of liquor add 2 lb. to 2½ lb. of white sugar, according to the sweetness of the fruit used. Set aside to ferment, and when this is complete add ½ pint of rum or brandy for each gallon of wine and bung down tightly. After nine to twelve months bottle it off. The wine will be fit to drink in about six months, but if kept longer it will be better.

Granadilla Wine.

To make 5 gallons of wine mash ten medium-sized granadillas, fully ripe, and well cover with water in an earthenware or wooden vessel. Let stand forty-eight hours, then strain off. Dissolve 10 to 12 lb. sugar in hot water, and add to the juice while warm, and add sufficient more warm water to make up 5½ gallons of liquor. Pour into a cask and keep the extra ½ gallon aside for filling as the fermentative process reduces the level of the wine each day. When fermentation is finished, which should be in about three weeks, 2 pints of brandy may be added and the bung driven in. The wine may be bottled off in nine to twelve months.

Pineapple Wine.

Mash 10 lb. ripe pineapples, including the skins, and cover with 2 gallons water. Let stand twenty-four to forty-eight hours, then strain off. Add 6 lb. sugar and stir till dissolved, then strain off into a keg or earthenware demijohn. When fermentation is complete seal down. The wine may be bottled off after six months.

Mulberry Wine.

Use quite ripe fruit, and to every pound of mulberries add 1 gallon water. Stir well, and leave for twenty-four hours. Strain, and to every gallon of juice add 3½ lb. sugar. When dissolved put the liquor into a cask. When fermentation has ceased bung tightly. Three months later the wine may be bottled off, adding three cloves and a lump of sugar to each bottle. It should then be stored away for a year.

Strawberry Wine No. 1.

To 1 quart of strawberry juice add 1 quart of water and 1 lb. sugar, and stir well. Strain and allow to ferment in an open jar. When fermentation is complete, draw off and bottle. Set the bottles aside for at least six months.

Strawberry Wine No. 2.

Take 3½ gallons cold water, 3 gallons cider, and 3 gallons strawberry juice. Ferment, then add 8 lb. sugar, 1½ oz. red tartar finely ground, juice and rind of one lemon, and 1 quart of brandy. This will make 9 gallons of wine. For strawberry wine the fruit should be picked in fine weather after several fine days.

Raspberry Wine.

Gather the fruit when quite ripe, bruise and strain the juice through a bag. Boil the juice in an enamel pan, and for every gallon add 1½ lb. sugar. Also add the whites of one to three eggs, according to the quantity to be made. Let this boil for fifteen minutes, skimming it as the froth rises. When cold and settled decant into a cask, adding a bottle of yeast to aid fermentation. When this is complete add 1 pint of white wine or ½ pint of proof spirits to each gallon, and hang in the cask a bag containing 1 oz. of bruised mace. Keep the cask in a cool place. The wine should be fit for use after three months. This wine may be made from the wild raspberries which grow prolifically throughout Queensland.

Rosella Wine No. 1

Put the fruit into a wooden tub and pour over it boiling water rather more than sufficient to cover it. Let stand for three days, stirring now and then. Strain off and measure. For every gallon of juice take 3 lb. of sugar and make into a thick syrup with boiling water. Pour this into the juice while still hot and stir well. Pour into a cask, filling almost to the bung hole, and allow to ferment. If fermentation does not start within twenty-four hours add a bottle of yeast. When fermentation is complete, bung up and leave for three months, when it will be ready to draw off and bottle.

Rosella Wine No. 2.

To 1 gallon of rosellas add 1 gallon of water. Let stand twenty-four hours, then add 4 lb. sugar, ½ oz. allspice, ½ oz. whole ginger, ½ oz. cloves tied in a muslin bag. Boil steadily for one hour, then strain off. When cold, bottle, seal, and put away in a dark place for six months.

Raisin Wine.

Take 10 lb. raisins and 1 lb. sugar. Pick the raisins clean and chop them fine. Pour 1 gallon of hot water on them and press the juice through a bag. Let stand for twelve hours, then add the sugar and leave to ferment. When fermentation is complete cask and bung up. After three months draw off into another cask and bung it closely. Bottle off in ten months, and it will be fit to drink in a year.

FARMERS' WOOL SCHEME.

THE Minister for Agriculture and Stock (Mr. Frank W. Bulcock) in a recent statement commented on the objects of the Farmers' Wool Scheme now in operation in his Department.

Recognising the economic loss suffered by owners of small lines of sheep in the matter of wool values received, the Department inaugurated this scheme some fifteen years ago. Broadly, its objects are to receive small lines of wool in bales, bags, butts, or fadges, and to class these wools, as an accumulation offers, into lines sufficiently large to be taken out of star lots, and to merit offer in the main catalogue, where it meets with world competition. Results have been highly satisfactory, and the prices received, when the nature of the wools handled is taken into consideration, have been an object lesson in the profits to be derived from scientific and honest classing. As an instance of the benefits of the scheme, the Minister referred to the results of the January series of sales in Brisbane, where the average for the whole of the sale (50,000 bales) was 14·99 pence per lb., and the departmental offer of 107 bales averaged 14·8 pence per lb.

The Minister, in outlining the scheme, pointed out that wool consigned to the Department was immediately weighed and valued, and the consignor received an advance of 60 per cent. of the estimated value free of interest. This advance is made in view of the fact that it is sometimes necessary to hold wool for a period for the purpose of matching it with similar wools, in order to achieve the objects and benefits of the scheme. The wool is then scientifically classed, and every pound of wool is handled, even the locks going over the table. The wool is sold as soon as practicable by brokers selected in rotation, and after the sale the moneys are distributed pro rata, less the handling costs, which consist of railage, road carriage, brokerage, and a service charge of 10s. per bale of 250 lb. This charge does no more than meet the cost of the service. The work involved in the administration of the scheme is carried out under the supervision of an officer of the Department attached to the Sheep and Wool Branch. The Wool Room is an

up-to-date structure, specially lighted and fitted with the necessary appliances for handling the staple, and in view of the increase in the amount of wool handled, it was necessary to recently install an up-to-date electrical power press.

As an example of the diversity of wools handled, it may be mentioned that, whereas an ordinary merino clip would class into, say, fourteen or fifteen lines, no less than eighty-six classes in merino comeback and crossbred were dealt with by the Department last year.

Mr. Bulcock pointed out that this scheme was for the benefit of the smaller owner, and was limited to clips from holdings carrying less than 1,500 merino sheep. The scheme, however, has also been extended to permit of the receipt of wool from crossbred and British breeds from any holding. Bags and butts are also taken from any holding, and arrangements are made with the selling agents to submit star lots received by them for inclusion in the catalogue, thus ensuring the consignors of these lots a better return.

QUEENSLAND SHOW DATES.

March.

Allora, 4th and 5th.
Milmerran, 6th.
Oakey, 7th.
Pittsworth, 11th and 12th.
Goombungee, 13th.
Warwick, 18th and 19th.
Toowoomba, 23rd to 26th.

April.

Crow's Nest, 1st and 2nd.
Dalby, 1st and 2nd.
Chinchilla, 7th and 8th.
Tara, 15th and 16th.
Nanango, 16th and 17th.
Miles, 15th.
Kingaroy, 22nd to 24th.
Wallumbilla, 28th and 29th.
Monto, 29th and 30th.
Wondai, 30th April and 1st May.

May.

Goondiwindi, 1st and 2nd.
Longreach, 4th to 7th.
Taroom, 4th to 6th.
Mundubbera, 6th and 7th.
Charleville, 5th to 7th.
Beaudesert Show, 6th and 7th.
Beaudesert Camp Draft, 8th and 9th.
Biloela, 7th, 8th, and 9th.
Wowan, 14th, 15th and 16th (Camp Draft).
Murgon, 7th to 9th.
Goomeri, 13th and 14th.
Mitchell, 13th and 14th.
Ipswich, 19th to 22nd.
Roma, 19th to 21st.
Biggenden, 21st and 22nd.
Gympie, 22nd and 23rd.
Warrill View, 23rd.
Maryborough, 26th to 28th.
Toogoolawah, 29th and 30th.
Kalbar, 30th.

June.

Childers, 1st and 2nd.
Marburg, 6th and 8th.
Bundaberg, 4th to 6th.
Lowood, 5th and 6th.
Boonah, 10th and 11th.
Esk, 12th and 13th.
Rockhampton, 23rd to 27th.
Laidley, 24th and 25th.
Marburg, 27th and 29th.
Mackay, 30th June, 1st and 2nd July.

July.

Bowen, 8th and 9th.
Townsville, 14th to 16th.
Cleveland, 10th and 11th.
Ayr, 10th and 11th.
Rosewood, 10th and 11th.
Nambour, 16th to 18th.
Cairns, 21st to 23rd.
Maleny, 23rd and 24th.
Gatton, 29th and 30th.
Caboolture, 31st July and 1st August.

August.

Pine Rivers, 7th and 8th.
Royal National, 17th to 22nd.
Home Hill, 28th and 29th.

September.

Tully, 11th and 12th.
Innisfail, 18th and 19th.
Southport, 26th.

VETERINARY MEDICINES ACT.

ANNUAL REGISTRATION LIST, 1936.

THE requirements of the Veterinary Medicines Act relating to registrations have been met within the specified time limit in respect of the veterinary medicines listed as follows:—

	Reg. No.
A. C. F. and Shirley's Fertilizer Ltd., Little Roma street, Brisbane—	
Andrew Dryden's Famous Blood and Water Powders	446
Andrew Dryden's Famous Embrocation	447
Andrew Dryden's Famous Gripe Drench	448
Andrew Dryden's Famous Liquid Blister	449
Andrew Dryden's Famous Scour in Calves	451
Andrew Dryden's Famous Specific	450
Andrew Dryden's Famous Worm and Condition Powders	452
Dairy Ointment	454
Dryden's Cleansing Drench for Cattle	455
Dryden's Gall Cure	456
Dryden's Invaluable Specific (Warts on Poultry)	453
Australian Chemical Co., Donkin street, South Brisbane—	
Acco Special Sedative Drench	61
Acco Savol	62
Acco Tetrachloride Drench	59
Kreeola Tetrachloride Drench	60
Australian Disinfectant Co., Albert street, Brisbane—	
Safonia	400
Wagstaff's Stock Drench	471
Berry and Co., Pty., Ltd., Henry, Adelaide street, Brisbane—	
Carbox	345
Bickford and Sons, Ltd., A. M., Tank street, Brisbane—	
Bone-Radiol	45
Radiol	44
Radiol Leg-wash Powder	46
Radiol Kidney Powder	439
Bryce Ltd., Adelaide street, Brisbane—	
Bio Blackleg Pellets	171
Pegasol	249
Pegasus Blackleg Aggression (Liquid)	172
Pegasus Gall Cure	173
Pegasus Mammitis Toxiculture	174
Pegasus Stock Drench	175
Pegasus Vaginitis Capsules	176
Pegasus Worm Drench for Horses	177
Campbell Bros., Pty., Ltd., Bowen Hills, Brisbane—	
Safa	413
Dalgety and Co., Elizabeth street, Brisbane—	
Sayer's Green Seal Drench for Fluke, &c. (Single Strength)	162
Sayer's Green Seal Drench for Stomach Worms, &c. (Double Strength)	163
Dryden, Victor, 10 William street, Lutwyche—	
Gall Ointment	27
Victor Dryden's Embrocation	29
Victor Dryden's Liquid Blister	31
Victor Dryden's Poultry Specific	32
Victor Dryden's Scour in Calves	33
Victor Dryden's Specific	34
Victor Dryden's Worm and Condition Powders	35
Evans Products Agency, Dayboro'—	
Evans Scour Cure	278
Evans Mammitis Treatment	1131

	Reg. No.
Moss and Co., T. W., 121 Eagle street, Brisbane—	
Bronkos Cough Paste	478
Osmond and Sons Life Saving Red Draught	329
Osmond's Antiseptic Pessaries	134
Osmond's Bot Capsules	210
Osmond's Brown Draught	1073
Osmond's Cattle Oils	348
Osmond's Cattle Shampoo	1132
Osmond's Fluid Zenos Disinfectant	337
Osmond's Fluke Kill (Double Strength)	432
Osmond's Fluke Kill (Single Strength)	431
Osmond's Foot Rot Paste	1074
Osmond's Oxygas	409
Osmond's Pig Powders	347
Osmond's Saltonia Blood Salt	330
Osmond's Special Scour Cordial	481
Osmond's Special Worm Drink for Horses	482
Osmond's Vaccadyne	331
Noble and Sinnamon, W. A., Toowoomba—	
Noble's Aperient Pills for Large Dogs	213
Noble's Aperient Pills for Small Dogs	212
Noble's Blight Lotion	80
Noble's Cleansing and Dairy Drench	79
Noble's Dog Alterative	160
Noble's Mange Oil	161
Noble's Physic Balls for Horses and Cattle	434
Noble's Poultry Powder	81
Noble's Scour Remedy for Calves	82
Noble's Tonic, Alterative, and Condition Powders	426
Noble's Vettoll	83
Noble's Worm and Condition Pills (Large Dogs)	215
Noble's Worm and Condition Pills (Small Dogs)	214
Noble's Worm Specific for Puppies	84
Noble's, Pty., Ltd., Eagle street, Brisbane—	
Contagious Vaginitis Ointment	36
Sykes's Animal Colic Remedy	37
Sykes's Animol	38
Sykes's Concentrated Animal Chemical Food	39
Sykes's Creatol	40
Sykes's Drench	41
Sykes's Farm and Home Embrocation	42
Sykes's Udderine	43
Poultry Farmers' Co-operative Society Ltd., Roma street, Brisbane—	
"Healo"	48
"Red Comb" Bronchitis Cure	49
"Red Comb" Chick Tonic	50
"Red Comb" Cleansing and Tonic Drench	51
"Red Comb" Eye Roup Cure	52
"Red Comb" Fowl Pox Vaccine (Attenuated)	76
"Red Comb" Iodine Specific	470
"Red Comb" Roup Cure	53
"Red Comb" Scaly Leg Ointment	54
"Red Comb" Veterinary Iodine	55
"Red Comb" Wart Preventative	56
"Red Comb" Worm and Condition Powders	57
"Red Comb" Worm Capsules	75
"Red Comb" Worm Killer	436
Vitone	437
Puritan Packing Co., Bowen Hills, Brisbane—	
Vetonia	412
Queensland Chemical Distributing Co., 111 Elizabeth street, Brisbane—	
Nopara Dual Liver Fluke and Worm Remedy	136

	Reg. No.
Queensland Pastoral Supplies Ltd., Bowen street, Brisbane—	
Hibiscus Carbon Tetrachloride Fluke Branch	264
Robinson and Bott, Pty., Ltd., Adelaide street, Brisbane—	
Rawleigh's Colic and Bloat Ease	23
Rawleigh's Poultry Powder	232
Rawleigh's Roup Powder	129
Rawleigh's Stock Tonic	233
Rawleigh's Veterinary Embrocation	24
Salmond and Spraggon (Aust.) Ltd., Eagle street, Brisbane—	
Bob Martin's '92 Ointment	421
Bob Martin's Antiseptic Dog Soap	429
Bob Martin's Tasteless Condition Powders	399
Bob Martin's Tasteless Distemper Powders	422
Bob Martin's Worm Tablets	419
Bob Martin's Worm Powders	420
Elliman's Royal Embrocation	47
Spedosol Supply Co., Queen street, Brisbane—	
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Surgical Supplies Ltd., Queen street, Brisbane—	
Alterative Worm and Condition Powders	137
Dr. Metcalfe Sharpe's Application	138
Dutton's Mange Specific	139
Dutton's Redwater Cure	140
Equine Cough Syrup	141
Gripe Drench	216
Scour Powders	142
Spavin Paste	217
Special Bull Tonic	143
SS Antiseptic Vaginal Kugloids	144
SS Black Oil	145
SS Blight Powder	146
SS Heal-all Ointment	147
SS Lung Worm Specific	148
SS Reliable Embrocation	149
SS Scour Cure	150
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Surgical Supplies Blister	153
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Surgical Supplies Ltd. Cleansing Drench	155
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Surgical Supplies Ltd. Worm Powders for Horses	157
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Wart and Horn Solvent	159
Taylors, Elliotts, and Australian Drug Pty, Ltd., 154 Charlotte street, Brisbane—	
"Austral" Aloetic Physic Ball	94
"Austral" Arsenic and Copper Worm Drench for Sheep	73
"Austral" Barb Wire Embrocation	95
"Austral" Blood and Water Drench	96
"Austral" Calcifer Powder	97
"Austral" Calcifer Solution	98
"Austral" Caustic Stick	99
"Austral" Cleansing Drench	100
"Austral" Cooling Lotion	101
"Austral" Dairy Ointment	102
"Austral" Dusting Powder	103
"Austral" Eye Blight Tablets	104
"Austral" Gall Ointment	105
"Austral" Garget Powder	106
"Austral" Gripe Drench	107

	Reg. No.
Taylors, Elliotts, and Australian Drug Pty., Ltd., 154 Charlotte street, Brisbane—*continued.*	
"Austral" Horse Blister	108
"Austral" Iodine Capsules	109
"Austral" Liquid Blister	110
"Austral" Lung Worm Drench	74
"Austral" Mange Dressing	111
"Austral" Pig Cough Powder	112
"Austral" Pig Purgative Powder	113
"Austral" Pig Worm Powders	114
"Austral" Regulating Drench	115
"Austral" Ringworm Ointment	116
"Austral" Scour Drench	117
"Austral" Trypan Blue	118
"Austral" Vaginal Douche Powders	119
"Austral" Vaginal Pessaries	120
"Austral" Veterinary Embrocation	121
"Austral" Wart Paint	122
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Cee-Tee-Cee	1064
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Red Spot Double Strength	225
Tetralene	226
Tri Kos	1130
Wilmolene	227
Winchcombe, Carson, Ltd., Eagle street, Brisbane—	
Anti Mammitis	343
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SUCCESS.

Success is a hard castle to take. The walls are impregnable. You cannot make a breach in them. There is only one way in. That is by the gate of hard work, the key of which is enthusiasm.—SIR WALTER PLUMMER.

Agriculture in Other Countries.*

Subjoined is a summary of conclusions drawn by Mr. W. J. Spafford, Deputy Director of Agriculture, South Australia, from investigations made by him during a recent tour of portions of the principal agricultural countries in the same climatic zones as the settled portions of Australia. Mr. Spafford was commissioned by the South Australian Government to inquire into and report on production and preparation for marketing of agricultural products, including crops and livestock in South America, South Africa, and New Zealand.

BESIDES being a beautiful country, New Zealand is a remarkably good agricultural country, particularly as regards the production of dairy produce and sheep for meat.

In all probability the best pastures in the world are to be found in New Zealand, the natural conditions encouraging the full growth of pasture plants, and the farmers being extremely efficient managers of pasture lands.

The seed certification scheme, as inaugurated in New Zealand, and developed and controlled by the Department of Agriculture, is playing a great part in the improvement of New Zealand pastures.

The Meat Producers' Board of New Zealand has been functioning for thirteen years, and so successful have its efforts been that it is the envy of most meat-exporting countries. Producers are adequately represented on this Board, for five of the eight members are direct representatives of meat producers.

Co-operation is very important in the dairying industry of New Zealand, and it appears that much of the success attained in this branch of agriculture is due to this fact.

We have so much to learn from New Zealand in connection with pastures, dairying, fat lambs, and co-operation that officers of the Department of Agriculture should be sent more frequently than in the past to that country, to get first-hand knowledge of the progress being made.

Chile is a direct competitor with Australia with wines and barley, and although the agriculture is rather backward in some directions, has great potentialities for the production of all Mediterranean-climate crops. It appears, however, that the development of her agricultural resources cannot be brought about quickly, and, further, she is handicapped in a similar manner to Australia in the time taken to place primary products on the European markets.

Argentina is such a wonderful agricultural country that she could, if allowed, swamp the markets of the world in which Australia is interested, with all the agricultural products which are produced in the temperate and sub-tropical portions of the Southern Hemisphere, except merino wool.

The greatest competitor of Australia at the moment, Argentina is likely to become still greater as time goes on.

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* From *Agriculture in the Temperate and Sub-Tropical Climates of the South*, Bulletin No. 310, by W. J. Spafford, Deputy Director of Agriculture, South Australia, reprinted from the *Journal of Agriculture of South Australia*, 1936.

To be able to contend with the competition of Argentina Australia is dependent upon the political advantage she has in being one of the units of the British Empire.

It will be necessary to extend the political advantage of Australia to enable her to meet the increasing competition from Argentina, and this can probably be done best by forming a close association with other outlying parts of the Empire, and more particularly those in the Southern Hemisphere, of which the most important are New Zealand and South Africa.

To encourage Great Britain still further to purchase Empire products in preference to foreign an effort should be made to balance the trade to and from that country. Other things being at all equal preference should be given to the purchase of goods from the United Kingdom.

Although Uruguay maintains a fair number of sheep and is an exporter of wool and sheep meat, it does not appear as though this country can ever develop into an important competitor of Australia with any agricultural product.

Southern Brazil exports a lot of oranges to Europe, and is constantly increasing supplies, but being of the type produced in sub-tropical climate, they do not compete directly with Australian export oranges.

Zebu cattle and their crossbreds are giving complete satisfaction in the tropical parts of Southern Brazil, and will probably do the same for the portions of Australia with similar climatic conditions.

Throughout South America livestock for slaughter are sold by live weight—a method which ensures that the producer gets paid for what he produces, and at the same time simplifies things for the buyer.

South Africa is a direct and important competitor with Australia with merino wool, and it appears that her wool industry would be improved by the lifting of the embargo on the exportation of stud merino sheep from Australia.

Everything possible should be done towards retaining the most friendly relationships with South Africa, for it appears that it will take the combined efforts of New Zealand, South Africa, Australia, and other parts of the Empire located in the Southern Hemisphere to compete successfully with South America.

Arising from the tour of portions of the Southern Hemisphere is one conclusion which overshadows all others, and that is that the competition now being faced by Australia from South American products will get greater and greater in the near future, and that the sooner steps are taken to combat it the better. In this connection the following suggestions are made:—

(*a*) A serious endeavour should be made to balance the trade between the United Kingdom and Australia by purchasing goods made in Great Britain whenever possible.

(*b*) A close trade association between the parts of the Empire located in the Southern Hemisphere should be developed as soon as possible.

(*c*) To educate agriculturists in the needs, aims, production, and practices of the various parts of the Empire an Empire Agricultural Convention should be organised to meet every year, or at least every second year, in one or other of the Empire countries.

(*d*) Australia, being dependent upon its agriculture, and the progress of agriculture being dependent upon selling overseas, every effort should be made to produce and prepare articles of a quality to retain any market once gained. This can be done by very rigid inspection to high standards of quality at ports of embarkation, and helped by attaching to all Departments of Agriculture a commercial branch to advise agriculturists on market requirements, current prices, co-operation, &c.

(*e*) To help counteract the wonderful natural advantages of South America the cost of production of agricultural produce must be lowered, which can only be done by increasing the yield per unit. To do this agriculturists must be kept abreast of the times, and so a fully-staffed, efficient Department of Agriculture, including officers for field crops, horticulture, viticulture, veterinary science, cattle, sheep, pigs, wool, poultry, bees, irrigation, and marketing, must be maintained at all times.

(*f*) In South Australia (this applies to Queensland, also—Ed.), where manufacturing advantages are not great, the development by the people of an agricultural outlook would help maintain an export balance.

EMPTYING THE DIP.

With the approach of the dipping season many farmers whose dips are not fitted with waste pipes will be confronted with the task of emptying their dips by hand. Here is a way to lighten the labour. Put a tall post in at the side of the dip, and

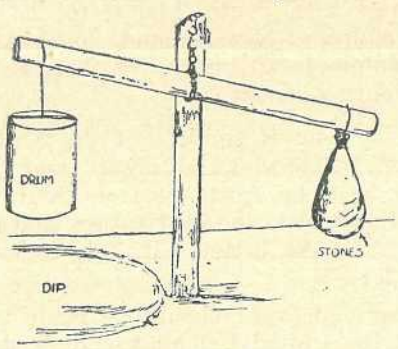

PLATE 92.

on this, by means of a chain, hang a free-moving beam. To one end of the beam hang a sack of stones and to the other a 10-gallon (or larger size) drum. The rest is simple.

Sorghum Poisoning.

IN view of the numerous inquiries received from farmers regarding the poisonous properties of immature sorghum, attention is drawn to the characteristics of the chief types in general cultivation.

All grasses of the sorghum family, which includes Sudan grass, Johnson grass, the sweet or saccharine sorghums, such as Saccaline, and the grain sorghums represented by Feterita, contain a hydrocyanic acid-yielding glucoside, usually termed prussic acid, or HCN, which is often responsible for fatalities among stock where reasonable precautions are not adopted.

The poison is chiefly concentrated in the young stalks, and persists in decreasing quantities as the plant grows, entirely disappearing by the time maturity is reached. Stock should, therefore, never be allowed access to immature sorghum, especially if wilted through dry weather. Second growth and immature frosted material is also dangerous. It is safe to feed the young growth if cut and allowed to dry, but as sorghums are most palatable and nutritious when the grain is in the milky stage, this is obviously the most opportune time to cut for silage or fodder purposes. Once the heads are well out, stock can be grazed or fed with safety.

Sudan grass is largely grown as a grazing crop, and many farmers have successfully fed this grass to stock in all stages for many years. It contains approximately one-quarter as much HCN as sorghum at corresponding periods of growth, and farmers should therefore feed with caution in hot dry weather, and not turn in hungry stock to graze.

It is important to secure pure seed, as all sorghums hybridise readily, and fatalities have been reported, possibly as a result of using hybrid seed.

Johnson grass is distinctly poisonous, as it contains a greater quantity of HCN than any of the cultivated sorghums. This grass should be eradicated wherever possible, as it spreads rapidly from roots and seed. The seed is difficult to distinguish apart from Sudan seed, but the plant can always be identified, owing to its deep rooting habit, whereas Sudan grass has shallow fibrous roots.

PLATE 93.
Cleaning a cane furrow with a "Cotton King" and rake attachment—Sugar Experiment Station, Mackay.

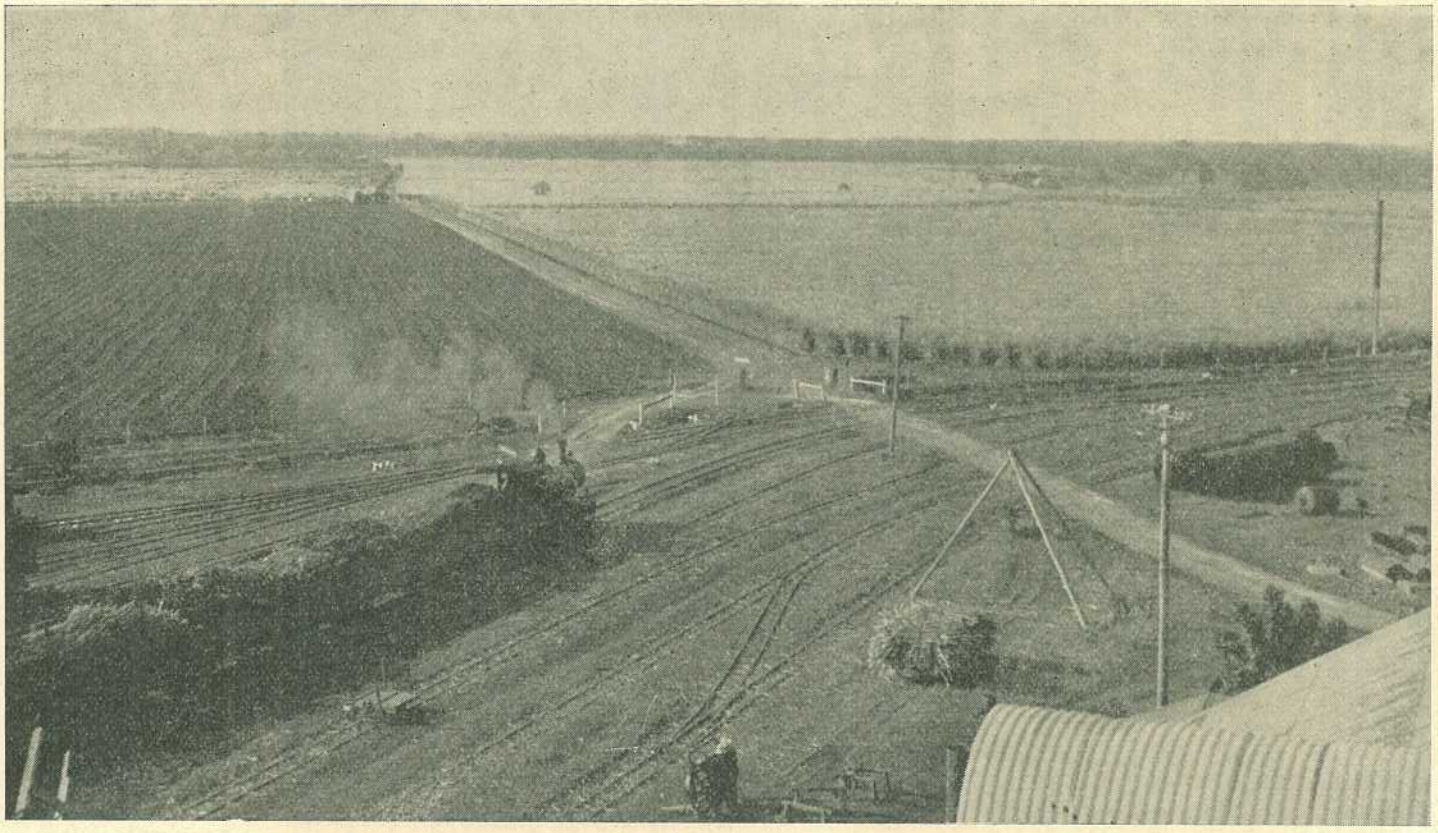

PLATE 94.
Overlooking a portion of Bingera Plantation, near Bundaberg.

Tobacco.

Once again splendid rains have been received in all tobacco districts, and from reports received, all areas with the exception of Mackay and Sarina give promise of returning splendid yields. In this latter district, the excessive rainfall has caused considerable damage, the result of which will not be known until conditions improve.

Curing is now in full swing at Texas and Miriam Vale, and leaf harvested to date is of fairly good quality. Apart from severe outbreaks of mould in isolated areas at the commencement of the season, disease has not been troublesome. Of the pests, the stem grub is again causing considerable trouble, necessitating the continual cutting back of affected plants.

Cotton.

The progress of the cotton crop during February has been rather irregular, according to the amount and frequency of rainfall experienced. Broadly speaking, in the districts which have received good rains during the month, fairly satisfactory development has occurred,

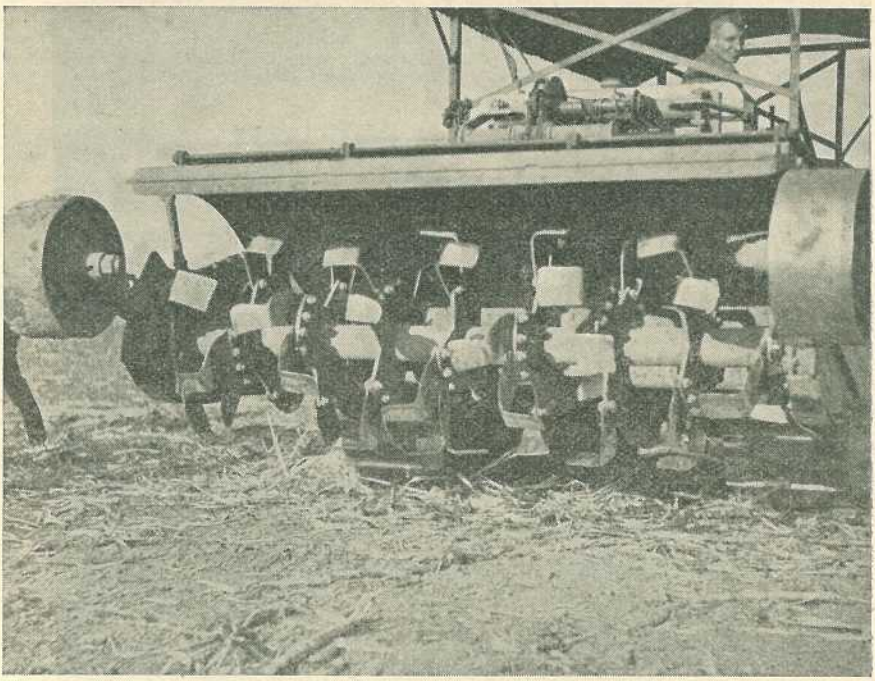

PLATE 95.
Giant rotary hoe chopping out old cane stools, Fairymead Plantation, Bundaberg—A 75-h.p. caterpillar tractor provides the power.

and many crops give promise of yielding very good returns if favourable conditions are experienced for the rest of the season. In the districts which did not receive rains, the crop prospects are not so satisfactory, however, some shedding of the flower buds and young bolls having taken place, and unless good rains are soon experienced, the development of the plants will be seriously checked. Soaking rains would be acceptable, therefore, in all the cotton districts.

The earliest-planted crops have started opening during the month, and harvesting operations are under way in all districts. The ginneries at Glenmore and Whinstanes were opened on the 24th to receive cotton.

Sugar.

With the exception of the southern districts, heavy rains were experienced throughout the cane areas during February. To date no serious flood damage has been reported, and it may be assumed that crops will benefit widely from the downpours.

Prospects for the 1936 crop are at the present time very bright.

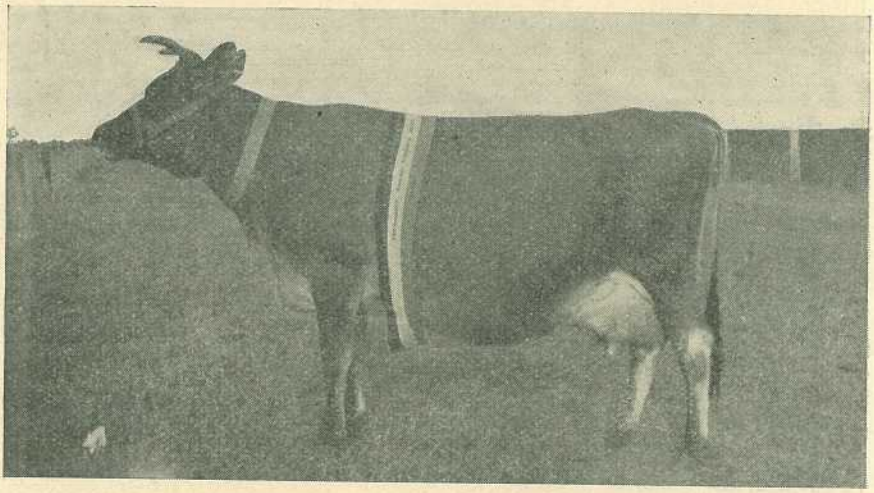

PLATE 96.

W. R. TULIP XII. (H.B. No. 6989).

Tulip XII. is the "star producer" in the dairy herd of Westbrook Farm Home for Boys, near Toowoomba. She was first in Queensland for all cows completing their tests in January last. During her test she was milked at regular hours twice daily, and had no feed other than that produced on the farm. Five different boys had charge of her in the course of the test, and had she been forced and milked solely by one experienced milker throughout it is probable that her production would have been even greater. She is by Westbrook Councillor II. (2047) ex Montrose Tulip IV. (1436), and was Champion Jersey Cow at Toowoomba last year. The Superintendent of Westbrook, Mr. Thos. Jones, received recently the calf roll entry for Westbrook Tulip 71, all bred from Montrose Tulip IV., the dam of Westbrook XII. Some little time ago one of this family was the highest producer in the Affleck Cup competition for Queensland.

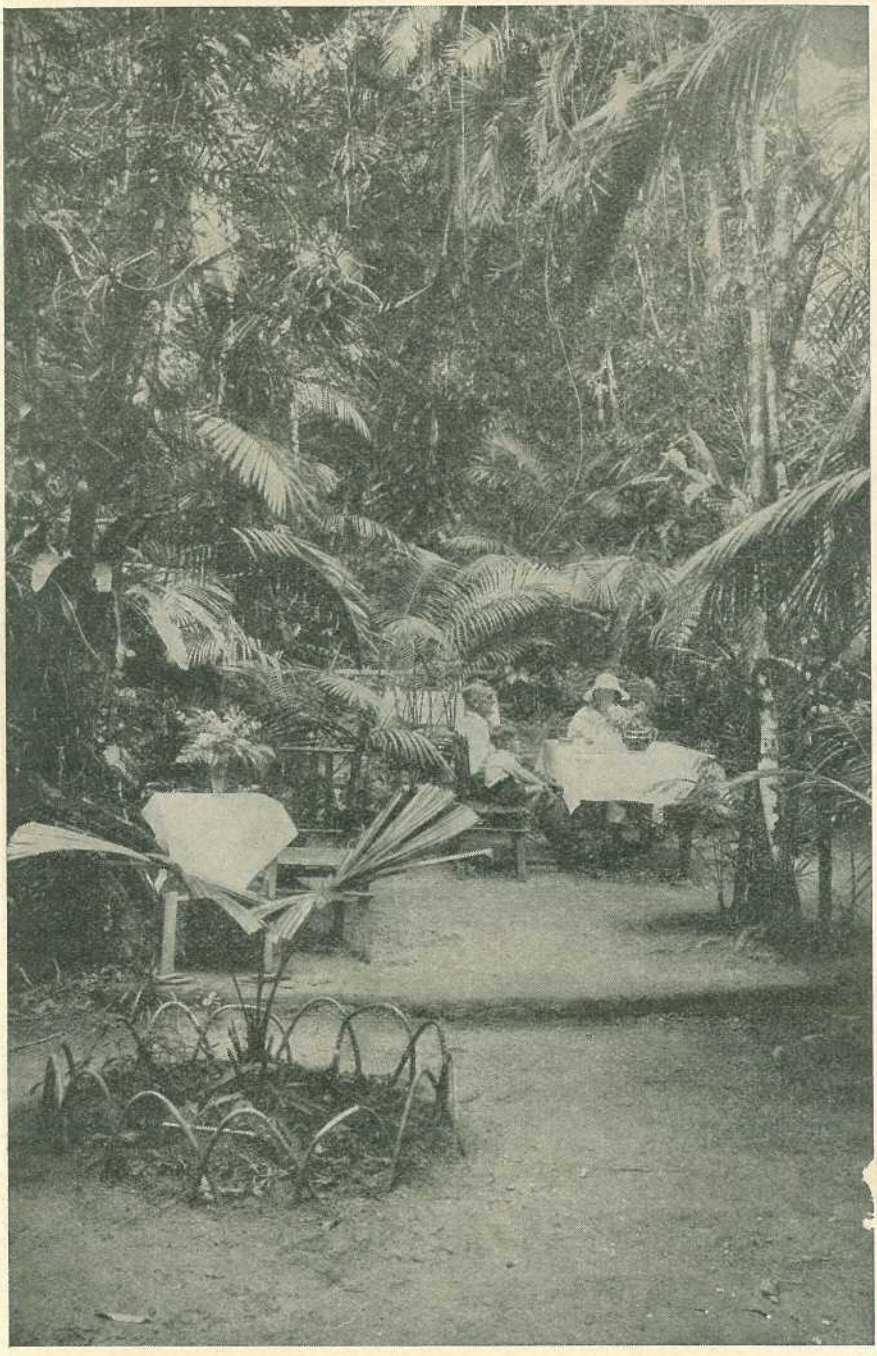

PLATE 97.
The Tea Gardens, "Fairyland," Kuranda.

PLATE 98.
On the Herbert River at Macknade, near Ingham, North Queensland.

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 Advance 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 January, 1936 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
MATURE COW (OVER 5 YEARS), STANDARD 350 LB.				
Plum 3rd of Hawthorn (264 days)	H. M. Graham, Goomeri	9,137·9	369·369	General of Croydon
JUNIOR, 3 YEARS (UNDER 3½ YEARS), STANDARD 270 LB.				
Rhodesview Kitty 7th	W. Gierke and Sons, Helidon	9,043·71	394·593	Blacklands Prospector
Glencairn Pearl (271 days)	H. M. Graham, Goomeri	7,248·07	316·9	Roslyn of Woodmerle
JUNIOR, 2 YEARS (UNDER 2½ YEARS), STANDARD 230 LB.				
Kingsley Pigeon II.	S. L. Holmes, Goomburra	7,558·29	275·257	Glimpse of Blacklands.
JERSEY.				
MATURE COW (OVER 5 YEARS), STANDARD 350 LB.				
Westbrook Tulip 12th	Farm Home for Boys, Westbrook	9,404·35	502·117	Westbrook Councillor 2nd
JUNIOR, 4 YEARS (UNDER 4½ YEARS), STANDARD 310 LB.				
Myrtle of Glencairn (270 days)	C. Huey, Sabine	5,859·65	326·677	Trecarne Farm Lad
SENIOR, 3 YEARS (OVER 3½ YEARS), STANDARD 290 LB.				
Bellgarth Roselea	D. R. Hutton, Cunningham	5,759·25	341·124	Bellfaire Blondes Bellringer
Bellgarth Birthday	R. D. Hutton, Cunningham	6,116·75	331·591	Bellfaire Blondes Bellringer
SENIOR, 2 YEARS (OVER 2½ YEARS), STANDARD 250 LB.				
Bellgarth Madora 2nd	D. R. Hutton, Cunningham	5,703·48	296·158	Bellfaire Blondes Bellringer

JUNIOR, 2 YEARS (UNDER 2½ YAERS), STANDARD 230 LB.

Kathleigh Sunflower	F. W. Kath, Ellesmere	6,502·8	347·734	Retford King's Thorn
Kathleigh Florrie	F. W. Kath, Ellesmere	6,989·9	334·572	Acrefail of Banyule
Kathleigh Christmas	F. W. Kath, Ellesmere	5,526·5	317·926	Retford King's Thorn
Pineview Poppy	J. Hunter and Sons, Borallon	4,772·74	286·107	Pineview Starbright
Pineview Lady	J. Hunter and Sons, Borallon	4,883·77	253·34	Oxford Jeweller
Cleeve Jeanette	R. A. Slaughter, Clifton	4,471	238·378	Trecarne Larkboy

In Memoriam.

MR. LOUIS GEORGE JONES.

The Department of Agriculture and Stock lost a valued officer by the death of Mr. L. G. Jones, on 9th January after a brief illness, and which is recorded with profound regret.

The late Mr. Jones was born in 1872 at Oatlands, Tasmania, where his grandfather, the late Robert Jones, was a pioneer grazier. His father, the late William Jones, was among the first to establish a flock of Corriedale sheep which he bred on his well-known property, Ballochmyle. So from his earliest years the late L. G. Jones was associated with rural pursuits, stock raising particularly, in one way or another. For some years he was engaged in the pastoral industry in New South Wales. Coming to Queensland, he settled near Jericho in the Central Division of the State.

Invalided from active service overseas with the 41st Battalion, Australian Imperial Force, he joined the Commercial Branch of the Department in 1917. For a time he held an appointment as officer under the Animals and Birds Acts, and subsequently as Quarantine Officer (Plants). He was noted for his high sense of duty, assiduity, and complete dependability in everything he undertook. These and other fine qualities, added to an innate courtesy, won for him many friends, especially among those with whom he had dealings from day to day.

By nature an earnest student, he interested himself closely in stock and plant problems, and this interest continued as an absorbing hobby until the end. He was the author of a number of publications relating to stock breeding and management, including "The Flockmaster's Companion" and "Stock Breeding Simplified."

In the presence of many sorrowing friends, including departmental colleagues and comrades of his old battalion, the late Mr. Jones was laid to rest in the Lutwyche Cemetery on Friday, 10th January. He is survived by his widow and three sons, and to them deep sympathy is extended.

Answers to Correspondents.

BOTANY.

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

Heart-leaved Poison Bush.

A.L.C. (Atherton)—

The specimen is the heart-leaved poison bush, *Gastrolobium grandiflorum*, very common in parts of Central and Northern Queensland. The poisonous principle is an alkaloid. This plant is one of the most serious poisonous plants we possess, and much more remains to be discovered concerning it, particularly at what stage of its growth it is most toxic. Most graziers believe that the plant is worst following a burn, but this is probably due to the fact that the sheep would eat more of the tender young shoots following a burn than they would of the somewhat dry and harsh adult leaves. Gastrolobium is one of the few plant poisons for which an antidote is known. The use of Condy's crystals (permanganate of potash) administered as a drench is said to be a sure and safe treatment, although, of course, it must be administered before the animal has gone too far. Dr. A. Herbert, in a valuable bulletin on the poisonous plants of Western Australia, quotes several cases of the successful use of the antidote in that State, and recommends as effective dose for sheep and pigs 10 grains (about as much as will comfortably lie on a sixpence), for horses 15 to 20 grains, and for cattle 30 to 50 grains. He states that the action of the antidote is more rapid when the stomach is in an acid condition. There are two or three methods of attaining this end. The use of lime juice or vinegar has been recommended, but, as you probably know, the experiments of Chestnut and Wilcox, Americans working on allied leguminous plants, show that aluminium sulphate is the most satisfactory substance. The genus *Gastrolobium* is very strongly developed in Western Australia, and about fifteen species or different sorts are known to be poisonous to stock in that State. We only have the one species in Queensland.

Poison Peach.

M.E.B. (Coolum)—

The specimen is the wild or poison peach, *Trema aspera*. This shrub is very common in coastal Queensland, and has a very bad reputation as a poisonous plant. At times it develops a prussic-acid-yielding glucoside, and if eaten in any quantity then trouble is likely to follow. This trouble is more likely to occur in weak and hungry stock than in paddock stock. The formation of the poisonous principle is very erratic, and what controls its formation we do not know. Personally, we have seen wild peach eaten to a very large extent in some places, and no trouble has ensued.

Plants from Brisbane Valley Identified.

D.C. (Toogoolawah)—

1. *Baccharis helimifolia* (groundsel bush).—This shrub has been suspected of poisoning stock at different times, but feeding tests carried out at Yeerongpilly with it some time ago gave negative results. After the animals had been feeding on it for about a fortnight they became very emaciated and constipated, but when put back on to normal fodder they soon recovered. The plant has little or no fodder value. We have seen stock eat it on the North Coast line, but more or less neglected by them usually.
2. *Physalis minima* (green gooseberry).—This is not known to be poisonous or harmful in any way.
3. *Phyllanthus maderaspatanus*.—A plant belonging to the family Euphorbiaceae for which we have not heard a common name. It is a fairly common weed in pastures in coastal Queensland. It has no poisonous properties.
4. *Rhynchosia minima*.—A legume very common throughout the coastal Queensland pastures and for some little distance inland. It is generally considered as quite a useful herb in the mixed pasture.

We do not consider any of these plants responsible for your trouble. If the losses are serious and still continuing, it might be best to have an examination of the paddocks.

Wild Mint.

R.P. (Grantham)—

The specimen represents wild mint or narrow-leaved sage, *Salvia reflexa*, a native of the United States now naturalised in parts of Queensland, where it has become a very serious weed pest. The plant has been proved to be poisonous by feeding tests. Most of the serious trouble seems to have been with travelling stock, ordinary paddock or resting stock not being affected, or at least to the same extent. A peculiar feature of poisoning by this plant is that sometimes no symptoms are noticed for a couple of days after ingestion. There is generally a twitching of the muscles, and death follows a few hours after the appearance of marked symptoms. A bulletin by the Poison Plants Committee of the Council for Scientific and Industrial Research advises that on post mortem all the organs were found engorged with blood, and a slight inflammation of the fourth stomach and bowels was also noticed.

Two Reputedly Poisonous Plants.

J.J. (Kingsthorpe, via Toowoomba)—

Of the two specimens, the flat-leaved one represents a species of *cotyledon* or *echeveria*. This plant is common in garden culture, but we have never known it to be eaten here before. However, the plant has a very bad reputation as a poisonous one, and if eaten by your pigs we think it is almost sure to cause trouble.

The longer, narrower, and somewhat triangular leaf is a species of *Mesembryanthemum*, or pigface. This likewise is supposed to be poisonous, causing stupor, but we think the other plant is more likely to be the cause of your trouble. In any case we would keep pigs away from both of the plants or dig them out.

Black Bean.

A.E.H. (Kulara, via Cairns)—

The specimens represent *Mucuna gigantea*, a vine widely spread through coastal Queensland and extending into New Guinea. It is sometimes known as black bean. We have never heard of the species being eaten, and most species of *Mucuna* are somewhat deleterious. Although we have had no experience with them, we should think it unwise to try them as food.

Bottle Tree.

E.A. (Toowoomba)—

The specimen forwarded with your letter of the 4th instant is *Sterculia discolor*, sometimes known as the scrub bottle tree. It is a native of Southern Queensland, and is mostly found in the drier scrubs. It grows to a large size and makes a handsome tree well worthy of cultivation. There are one or two in gardens about Brisbane, and we have seen it as a street tree at Grafton, in New South Wales. There is a very fine avenue of them in the main street of Augathella, Western Queensland. It should grow quite well at Toowoomba. It is usually propagated by seed. If you are unable to get seed, try cuttings. We have had no experience with the tree, but do not see why it should not strike from cuttings.

Sturt's Pea.

H.W. (Proston, via Murgon)—

Clianthus Dampieri, Sturt's pea, is not at all likely to become a pest if cultivated in the garden. We have never seen it run out anywhere in Queensland—in fact, a number of people seem to have difficulty in growing it. It is very abundant in some of the drier parts of Australia in its native habitat, as at Broken Hill and parts of South and Western Australia. We have never heard of it causing trouble to stock, and it is not known to possess any poisonous or harmful properties. We should think the chances are that the flower is self-fertilized, but on this point we have no definite knowledge.

Plants from the South-West Identified.

H.S. (St. George)—

1. *Tetragonia expansa* (New Zealand spinach).—A very common farm and pasture weed in parts of Queensland. The leaves are used as a substitute for ordinary spinach, hence the local name.
2. *Tribulus terrestris* (caltrops or goat head).—A very common pasture weed in Queensland. It produces a very troublesome burr.
3. *Eriochloa* sp.—The name "early spring grass" is sometimes given to species of *eriochloa*, but we do not know that the name is appropriate, as it is not earlier than many other native grasses. All species of *eriochloa* are excellent fodders and worthy of encouragement.
4. *Chloris truncata.*—The native chloris grasses, of which truncata is a species, are very valuable sheep fodders, producing a good, leafy bottom. They are among the first to respond to spring rains, and we have noticed this particularly with the present species.
5. *Cyperus* sp.—It looks like *Cyperus rotundus*, nut grass, but as there are no seed heads we cannot be sure.
6. *Sporobolus pallidus*, sometimes called fairy grass, but this name is applied to other grasses also with somewhat similar seed heads. It grows rapidly following rain, but is rather short lived.
7. *Hibiscus trionum.*—This is a very common weed over the warm temperate regions of the world. It is very common on the Downs and in parts of Central Queensland. We cannot say that we have seen stock eat it, at least to any extent.
8. *Eragrostis cilianensis* (stink grass).—This is a very common grass in Queensland. It mostly occurs as a farm weed. Generally it is left untouched by stock, owing to the peculiar odour given off by the leaves. The only cases where we have heard of stock eating it are where horses ploughing have taken to it rather readily, but under these conditions horses eat almost anything.
9. *Verbena officinalis.*—This is a very common weed in Queensland which is not eaten by stock so far as we know. It is not known to possess any harmful or poisonous properties.
10. *Dicanthium sericeum* (blue grass).—One of the best grasses of the Western Downs.
11. *Dactyloctenium radulans* (button grass).—This is an excellent fodder readily eaten by stock both in the green and dry state.
12. This does not look to us like a native plant, but we think is a shoot from a pomegranate, *Punica Granatum.*
13. *Capparis lasiantha.*—This is a very common climbing plant on the Darling Downs and parts of Western Queensland. The fruit is edible and sometimes called mulpup.
14. *Zygophyllum apiculatum* (twin-leaf or gall weed).—This plant is extraordinarily drought-resistant, and is often seen in great abundance in cleared brigalow and belah country. It has been accused of poisoning stock, but we have not seen stock eat it to any extent. We are doubtful if it possesses any harmful properties, as an allied species in Western Australia has some reputation as a fodder during times of drought.
15. *Brachycome microcarpa.*—A native daisy.
16. *Atriplex Muelleri.*—A saltbush.
17. *Rumex bidens.*—A dock.
18. *Evolvulus alsinoides.*
19. *Solanum esurale.*—Potato bush.

A Poisonous Plant *(Wedelia asperrima)*

R.W.B. (Hughenden)—

The specimen forwarded and suspected of causing losses of sheep has been determined as *Wedelia asperrima*, a very common plant in North-Western Queensland and parts of Northern Territory. It has been received on several occasions as a plant poisonous to sheep. Sheep apparently only eat it in the young stages. It has been reported to cause pneumonic symptoms, and as similar ones are found to be caused by a closely allied plant in Southern Queensland and Northern New South Wales this supposition seems to be justified.

Oakey District Plants Identified.

M.I.R. (Devon Park, Oakey)—

1. *Paspalum dilatatum.*—The common paspalum.
2. *Danthonia* sp.
3. *Dicanthium sericeum,* (blue grass).—One of the best known fodders in Queensland.
4. *Echinochloa colona* (wild millet).—This is very closely allied to such well-known cultivated crops as Japanese millet and white panicum. It is a very good fodder.
5. *Paspalidium globoideum* (shot grass or sago grass).—It is very palatable to and much eaten by stock.
6. *Sporobolus pallidus.*—A short-lived grass coming up after the summer rains, which seeds quickly and dies off. It provides a fair amount of bottom, and is one of a number of grasses which are commonly called fairy grass.
7. *Dicanthium sericeum.*—Same as No. 3.
8. *Eulalia fulva* (brown top).—It is very common in Queensland, and is widely distributed throughout this State and New South Wales. Its reputation as a fodder varies greatly with the different districts. The coarser forms are not of much fodder value, but the finer forms are very useful.
9. *Themeda australis* (kangaroo grass).
10. *Sporobolus elongatus* (rat's tail grass).
11. *Cyperus* sp.—A sedge.
12. *Sorghum leiocladum.*—A tall-growing native sorghum.
13. *Eriochloa* sp. (early spring grass).—This name is not particularly appropriate, as species of *Eriochloa* are not more responsive to early rains than any other native grass. They are all good fodders, however.
14. *Cymbopogon refractus* (barbed wire grass).
15. *Digitaria Brownei.*
16. *Eragrostis cilianensis* (stink grass) so called on account of glands on the leaf edge giving off a peculiar odour. It is generally left by stock, although it may be occasionally eaten by horses when ploughing.
17. *Aristida leptopoda* (a three-pronged spear grass).—From the point of view of fodder this is perhaps the best of the aristidas, the others being all fairly wiry.
18. *Tragus racemosus* (small burr grass).
19. *Chloris ventricosa.*—A native chloris or star grass which makes an excellent bottom fodder for sheep.
20. *Aristida leptopoda.*—Same as No. 17.
21. *Digitaria divaricatissima.*
22. *Eragrostis leptostachya* (paddock love grass).
23. *Enneapogon nigricans.*
24. *Sporobolus pallidus.*
25. *Chloris divaricata.*—See note to No. 19.
26. *Agropyron scabrum* (wheat grass).—It varies considerably in fodder value in different districts. Most of the common forms on the Downs are rather wiry and not eaten to any extent.

Ground Berry.

J.K. (Clifton)—

The specimen represents *Physalis subglabrata,* a native of the United States. It is a species of gooseberry or, as it is known in America, ground berry. If it gets into cultivation it is a serious pest. We have had it on several occasions in Queensland, but mostly just scattered here and there, once from Kingaroy and several times from the Downs about Warwick. Eradication is certainly difficult. Ploughing and hoeing and ordinary mechanical means only cause fresh plants to grow from each piece cut off, as you have found out. You tried covering them with straw, but we do not think this will be very effective, as the plants will either grow through, or, as soon as you lift it, they will spring up again. The only mechanical means would be to keep the green parts cut off so that the underground roots would gradually die out. This is all right in a small garden, but it is practically impossible under field conditions, except in a small patch. The best means would be a slow poison that would penetrate to the roots, and we have asked the Agricultural Chemist to advise you on this matter.

Paspalum Urvillei.

N.R.C. (Currumbin)—

The specimen represents paspalum urvillei, a tall-growing paspalum boomed some time ago as a fodder under the name of *Paspalum virgatum*. It has never taken on very readily, and seems to have gone completely out of favour. It sometimes grows quite well on poor country, but as far as our experience goes stock reject it unless driven to it by extreme hunger.

Two Fodder Shrubs.

W.S.C. (Roma)—

1. *Ehretia membranifolia.*—This is a very common tree or shrub in parts of Western Queensland, and it is generally regarded as a good fodder.
2. *Celastrus Cunninghamii.*—This is fairly common in Queensland, growing both on the coast and inland. In the Maranoa district it mostly grows as a shrub. It is generally resgarded as a good fodder, but we have not seen stock eat it.

These specimens are in full flower, and there is no doubt of determination. They are moderately common in parts, but we have not heard local names given to any of these plants.

Clover and Rye Grasses.

PROJECT CLUB, Garnant State School (via Rockhampton)—

Common Name.	*Botanical Name.*	*Country of Origin.*
Suckling Clover ..	*Trifolium minus* ..	Europe (widely spread).
Berseem Clover ..	*Trifolium alexandrinum*	It has never been found growing wild, but is supposed to have originated in Egypt or the near East.
Bokhara Clover ..	*Melilotus alba*	Probably Western Asia. Now widely spread over Europe, Northern Asia. It has been introduced into America, New Zealand, and Australia.
Perennial Red Clover	*Trifolium pratense* ..	Europe and Western Asia. Now so widely spread in cultivation, it is rather hard to say where it is truly a native and where introduced.
White Clover ..	*Trifolium repens* ..	Europe and Western Asia.
Cocksfoot Grass ..	*Dactylis glomerata* ..	Europe and Temperate Asia.
Italian Rye Grass ..	*Lolium multiflorum* ..	Southern Europe and Northern Africa (Mediterranean region).
Perennial Rye Grass	*Lolium perenne* ..	British Isles and Central Europe.
Wimmera Rye Grass	*Lolium subulatum* ..	A native of Southern Europe. It first attracted attention as a fodder in the Wimmera district, Victoria, hence local name.
Western District Rye Grass	*Lolium* sp.	Probably of cultivated origin.

Cape Cotton.

W.H. (Mount Samson, Dayboro' Line)—

The specimen represents Cape or balloon cotton, *Gomphocarpus fruticosus*, a native of South Africa, but now a common naturalised weed in Queensland. It is sometimes encouraged on a property when it first makes its appearance on account of its ornamental appearance. It can become a very serious pest, however, and eradication of the plants you have is recommended.

Candle Nut.

"SAP" (Townsville)—

The nut is the Candle Nut, *Aleurites moluccana*, a native of North Queensland, but also widely spread through New Guinea, parts of the Malay Archipelago, and islands of the Pacific. The nuts yield a valuable drying oil for which it is hoped to find a market in the future. We have known people to eat the nuts frequently, but sometimes they cause gastric trouble, with purging and vomiting, possibly from being eaten in a somewhat rancid state.

Grasses from Condamine Identified.

J.L.B. (Condamine)—

1. *Dicanthium* sp.—This looks like a form of blue grass, *Dicanthium sericeum*. These grasses are at present under review, and all of our material is in the hands of a specialist to classify.
2. *Dicanthium* sp.—The same remarks apply as to No. 1.
3. *Chloris ventricosa*.—A native chloris grass, which are amongst the best of the native grasses, especially in the brigalow and belah country. They give a good quantity of leafy bottom relished by sheep.
4. *Eleusine indica* (crowsfoot grass).—This grass mostly occurs in Queensland as a weed of cultivation, around cowyards, or anywhere the ground has been disturbed rather than in the ordinary pasture. It is fairly coarse, but is readily eaten by stock. Like young sorghum and other grasses it contains a prussic-acid-yielding glucoside, but there has been very little trouble from it in Queensland.
5. *Chloris ventricosa*.—Same as No. 3.
6. *Digitaria divaricatissima*.—A very common grass on the Downs country, and generally regarded as quite a good fodder.
7. *Bothriochloa intermedia* (sometimes called tall or Queensland blue grass).—It is generally regarded as a good fodder.
8. *Digitaria marginata* (summer grass).—This mostly occurs in Queensland as a weed of cultivation and in somewhat similar situations as *eleusine indica*. It is quite a good fodder.

We are very interested in your notes on the blue panic grass. We think it is quite a good grass in certain situations, particularly for small paddocks for grazing off. Mitchell grass should grow well with you if you can establish it, but the chief objection raised to Mitchell grass on small areas in the Western Downs is that its carrying capacity is not thought to be high enough. If sown, however, this would probably not hold, as it would grow much thicker than under ordinary conditions in the normal pasture.

Ulceration of the Skin of Pigs.

A dairy farmer writes—

"I have two pigs that have large sores on the skin; in one case the sore is as large as a saucer on the shoulder, and it seems to be spreading. It came on very suddenly, and there was no swelling as there is in the case of ordinary abscesses. Can you tell me what the disease is and how to control and treat it?"

This is a condition known as ulceration of the skin. It has been described by Departmental veterinary officers as ulcerative spirochaetosis of pigs and ulcerative granuloma of pigs. Mr. K. S. McIntosh, B.V.Sc., states that, as the name denotes, the disease is caused by a spirochaete or spiral-shaped germ which apparently gains entrance to the body through wounds or scratches of the skin or deeper structures. It is not uncommon to find the sockets of the teeth affected when the milk teeth are being shed, and it is frequently seen causing large abscesses following castration. Other organisms are also present, but are regarded as secondary invaders and not the primary cause. The condition is described fully by Mr. McIntosh in the "Queensland Agricultural Journal" for May, 1935, and is now available in leaflet form at the Animal Health Station, Department of Agriculture and Stock. The disease is generally, though not always, associated with dirty, unhygienic, and badly managed piggeries, and no doubt is encouraged by lice and other parasites. Treatment is not easy, but must be persevered in if results are to be obtained and the disease controlled or eradicated.

General Notes.

TUNG OIL GROWERS.

All growers of Tung Oil who will have seed nuts available for disposal during the present season are asked to forward, without delay, an estimate of their crop (weight of dried nuts) to the Under Secretary, Department of Agriculture and Stock, Brisbane.

An endeavour is being made to arrange for the milling of the crop, but unless a sufficient quantity is available, no finality can be reached; consequently, the importance of an early reply will therefore be realised.

No attempt should be made to include last year's seed, as it has been found unprofitable to treat year-old nuts. Growers should, therefore, thoroughly clean under their trees before new season's nuts commence to fall.

E. GRAHAM, Under Secretary.

Staff Changes and Appointments.

Mr. K. D. Hoffmann, Inspector under the Diseases in Plants Acts, and Agent under the Banana Industry Protection Act, has been transferred from Stanthorpe to Nambour.

The resignation of Mr. G. F. Young as Inspector under the Stock, Dairy, and Slaughtering Acts, Crow's Nest, has been accepted as from the 25th February, 1936, as tendered; Mr. F. H. D. Marshall, Inspector under the Stock, Dairy, and Slaughtering Acts at Oxley, has been transferred to Crow's Nest; and Mr. J. E. Ladewig has been appointed Inspector under the Slaughtering, Stock, and Dairy Acts at Oxley.

Constable T. R. Doyle, Mount Larcom, has been appointed an Inspector under the Slaughtering Acts, as from the 29th February, 1936.

Dr. F. H. S. Roberts, Entomologist, Department of Agriculture and Stock, has been appointed Entomologist and Parasitologist, Animal Health Station, Yeerongpilly.

Mr. L. H. Mansell, Bundaberg, has been appointed Agent of the Central Sugar Cane Prices Board for the purpose of making inquiries in regard to sales and leases of assigned lands during the absence on leave of Mr. A. E. Aitkin.

Mr. James Purcell, Toowoomba, Chairman of the Butter Board, has been appointed Chairman of the Dairy Products Stabilisation Board until 30th April, 1936.

The following honorary rangers under the Animals and Birds Acts have been appointed to supervise the protection of native animals and birds on the Cooby Creek Reserve, near Toowoomba, which was recently declared a sanctuary under the Acts:—Messrs. M. J. Barry, Health Inspector; H. J. Wrembeck, Councillor of Rosalie Shire; A. H. Hart; G. Haig; and W. H. Clark, Shire Overseer.

Messrs. P. F. A. Hardman, B.V.Sc., and M. R. Irving, B.V.Sc., have been appointed Government Veterinary Surgeons, Department of Agriculture and Stock, Brisbane.

The following members of the Committee of the Queensland Cane Growers' Council have been appointed honorary rangers under the Animals and Birds Acts:—Messrs. A. W. Browne (Edmonton), J. Mann (Edmonton), J. J. Mason (Yorkey's Knob road, Cairns), J. Moore (Double Island road, Cairns), W. C. Griffin (Gordonvale), T. H. Sheppards (Gordonvale), R. M. Bennett (Aloomba), J. B. Anderson (Edmonton), S. H. Warner (Cairns), T. Boylan (Babinda), H. J. Thomas (Bartle Frere), and J. C. McPaul (Bellenden-Ker). Mr. N. G. Scott, Ingham, has also been appointed an honorary ranger under the abovementioned Acts.

Messrs. W. G. Merrill (Finch Hatton) and F. W. Valentine (Sybil Creek, via Mackay) have been appointed canegrowers' representatives on the Cattle Creek Local Sugar Cane Prices Board, and Messrs. P. E. Neilsen (Septimus, Mirani) and T. F. Ross (Oakenden, Eton) have been appointed canegrowers' representatives on the North Eton Local Sugar Cane Prices Board.

Messrs. B. Henry (Tully), N. Reynolds (El Arish), M. Scanlan (Tully), P. Byrne (Tully), and P. Baxter (South Johnstone), have been appointed honorary rangers under the Animals and Birds Acts.

The following have been appointed honorary rangers under the Animals and Birds Acts and the Native Plants Protection Act:—Messrs. A. D. Moore (Dalby), G. Hussey (Goomburra Homestead, Goomburra), F. Windolf (care of J. Maddox, Cunningham Gap road), R. A. Clelland (Douglas street, Greenslopes), W. C. Clelland (162 Edward street, City), O. M. Higginbottom (Warren street, Valley), E. Buzzacott (Wilton avenue, Yeronga), H. Wetherell (Victoria avenue, Chelmer), and Dr. W. H. Bryan (Sandgate road, Nundah). In addition, Messrs. R. W. Lahey (Feez street, Yeronga), Dr. E. O. Marks (Wickham terrace, Brisbane), M. P. M. Campbell (Wilston), C. T. White (Government Botanist), J. Nebe, Fifth avenue, Coorparoo), and J. E. Young (Graceville), have been appointed honorary rangers under the Animals and Birds Acts. All of the abovenamed, with the exception of Messrs. Moore, Hussey, and Windolf, are members of the Council of the National Parks Association of Queensland.

Compulsory Branding of Pigs.

Attention has been drawn recently to neglect on the part of many farmers who fail to correctly identify their pigs before sale or disposal, remarked the Minister for Agriculture and Stock (Mr. Frank W. Bulcock) when discussing these matters recently.

Mr. Bulcock has issued instructions for the strict enforcement of the Regulations under the Pig Industry Act which have a special bearing on pig branding, and reports in all cases where the regulations are being deliberately contravened.

This subject came up for discussion at a meeting of the Queensland Pig Industry Council held at the Department of Agriculture and Stock prior to the Christmas holidays, when a motion was referred to the Minister asking that special attention be given to the compulsory branding of all pigs offered for sale, irrespective of age, and whether consigned direct to factories, sold "over the scales" at country sidings, sold to dealers, or submitted for public auction in country or city saleyards.

At that meeting it was remarked by Mr. Shelton that at no previous stage had this matter been emphasised so much as during the past two years, the result being that the majority of pork and bacon pigs slaughtered at Queensland factories to-day are identified, the method of branding being more acceptable, and the losses from improper fire branding being fewer than they were even twelve months ago. However, there are still a large number of farmers and dealers (in particular) who either do not properly identify their pigs before sale or despatch, or who depend upon somebody else to do the work they are legally expected to do themselves. Many farmers fail to identify the pigs they offer for sale in store condition, or, as weaners, pigs which are purchased by other farmers or by dealers who, in due course, market them, often having little or no record of previous ownership—information which is absolutely necessary in investigation into disease. Farmers are, therefore, losing money through neglect on the part of those who fail to brand their pigs before sale.

The Department of Agriculture and Stock is at all times willing to supply information free of charge that will enable the farmer to comply with the Regulations, and thus encourage the factories to pay a better price for a necessary supply of suitable quality pigs.

The Departmental pamphlet "Identification of Pigs" is free of cost on application, and deals very fully with the various systems of branding, and has special reference to those Regulations under the Pig Industry Act which govern this portion of the farm routine.

It is worthy of note, also, that auctioneers, agents, and dealers who offer pigs for sale or who purchase stock from farmers with that object in view have a special responsibility, because the regulations specify that all such transactions shall be properly recorded, the record to contain the identification mark, the age and description of all pigs sold, and such other information as may be required by an inspector in the course of his duties.

It is of particular interest to note that one inspector reported recently that at the principal pig sale in his district every pig offered for sale carried an identification mark. "This," said Mr. Bulcock, "shows that it can be done if all work together co-operatively."

Citrus Levy Regulations.

A Regulation under the Fruit Marketing Organisation Acts provides for the extension of the Citrus Levy Regulations for a further period of twelve months as from the 1st March, 1936.

Canadian Wonder Beans—Caution Necessary.

The Minister for Agriculture and Stock (Mr. Frank W. Bulcock) desires to issue a warning to purchasers and vendors of Canadian Wonder French beans that, in their own interests, they should exercise great caution in dealing in this variety. As a minimum germination of 75 per cent. is prescribed under the Pure Seeds Regulations, purchasers should insist on this standard, and should secure with the purchase an invoice warranty as to quality.

Mr. Bulcock pointed out that Queensland is entirely dependent upon outside sources of supply for French bean seed for sowing, and during last year, owing to the poor quality of the commodity, it was found necessary to introduce effective methods of control involving the examination of each bag of Canadian Wonder beans received in Brisbane from overseas or on offer for sale by local seed vendors. Results of these examinations indicated that on account of faulty germination 20 per cent. of the bags presented for admission had either to be destroyed or returned to the country of origin. In addition, a large proportion of the samples obtained from the stocks on offer were found to be low in germination value, resulting in their withdrawal from sale. In all, 328 bags were involved. The examination of samples during the month of January in the present year resulted in the condemnation of approximately 50 per cent. of offerings, and in one instance no germination was recorded.

Mr. Bulcock pointed out that insistence on a minimum germination of 75 per cent. could not be viewed as a harsh measure, in that certain offerings have shown a germination of 90 per cent. in three days. The minimum germination standard is prescribed in the interests of growers, as it is obvious that when the germination falls below 75 per cent. only a corresponding proportion of the area planted would bear productive plants.

The Minister stated that the sale of beans that do not germinate up to standard is viewed very seriously by the Department, and provision is made in the Pure Seeds Regulations for a penalty not exceeding £20 for the first offence and not exceeding £50 for every subsequent offence, in cases where the sale of seeds does not comply with the prescribed standards.

In order to more easily detect the faulty beans the Seed Testing Station carries out all tests on Canadian Wonder beans free of charge, and particulars incidental to the submission of samples can be had on application to the Department of Agriculture and Stock, Brisbane.

Importation of Potatoes and Onions.

The Regulations under the Diseases in Plants Acts with reference to the importation into Queensland of potatoes and onions have been amended, and now provide that no potatoes or onions shall be imported into Queensland unless they are packed in new bags or cases, or in clean cases that have not previously been used for holding potatoes, and are accompanied by a certificate issued by a Plants Inspector of the Department of Agriculture in the exporting State setting out that such potatoes or onions are apparently free from any disease defined as such by the Queensland Diseases in Plants Acts affecting potatoes or onions. Further, in the case of potatoes and onions imported into Queensland in a bag or other package, the grower's or exporter's name and address must be in letters or figures not less than one and one-half (1½) inches in length.

Branding of Bags of Seed Potatoes.

A new Regulation has been issued under the Fruit and Vegetables Act providing that, in the case of any potatoes contained in a bag or package and intended for seed purposes, the packer shall, before such bag or package is taken from the premises where it has been packed and before it is sold or offered for sale, effectively obliterate all previous markings (if any), and mark or cause to be marked legibly and durably on the outside, in letters not less than one and one-half (1½) inches in length, the name and address of the packer and the name of the variety.

The Slaughtering Act.

In 1904 a Proclamation was issued under "*The Slaughtering Act of* 1898" declaring the provisions of the Act to be in operation in all the cities, towns, and shires of the State. This Proclamation has been rescinded and a new Proclamation issued reapplying the Act to be in force in the districts including all cities, towns, and shires comprising the State of Queensland.

Rural Topics.

Tamworth Pigs from New Zealand.

Three Tamworth pigs—a boar and two sows of unrelated Canadian strains—were delivered recently from New Zealand to the order of the Wide Bay Stud Piggery, Gympie. Considerable progress has been made in the New Zealand pig industry in recent years. The Tamworth breed has been found most suitable to the climatic conditions and trade requirements, and special attention has been given to the breeding of a type that will reproduce itself faithfully and prove prepotent and prolific.

Classification of Stock Foods.

Foods are classed according to their composition, and the substances which are utilised in the animal body may be roughly classified as:—(1) Starchy and fatty materials, which produce heat and fat in the body, and are known as carbohydrates; (2) substances containing a large amount of nitrogen, commonly called proteins, and essential to the muscular growth and development of the body; and (3) mineral salts, which are necessary to body changes and the building up in the growing animal of the harder tissues of the body, such as bone.

All foods contain a combination of these materials to a greater or less extent, but some are richer in one or more classes than others. Thus, most root crops, such as potatoes, sweet potatoes, turnips, arrowroot, artichokes, grains, such as maize, wheat, &c., and vegetables and fruit are very rich in starch and sugar, while linseed meals, oil cakes, &c., and unseparated milk contain a large percentage of oil. Peas, beans, lucerne, clovers, milk, meat-meal, flesh, and other animal products have a big percentage of protein. Mineral matters are present to a great extent in milk, oats, mill offal, lucerne, peas, and beans.—"A. and P. Notes," New South Wales Department of Agriculture.

Foundation of the Australian Wool Industry.

Captain John Macarthur's part in the history of Australian woolgrowing is told by himself in a statement which he laid before Lord Hobart, then Secretary of State, on 26th July, 1803, when on a visit to England. His object in going to England was twofold. He sought by an appeal to His Majesty's Ministers a diversion in his own favour of the primitive Land Law of the colony. He also wished to interest British capitalists in the formation of a pastoral company to take up land in New South Wales. Referring to samples of wool brought by him from New South Wales, he said that it had excited the particular attention of merchants and leading English manufacturers. He had found the climate of New South Wales peculiarly adapted to the increase of fine-woolled sheep, and that from the unlimited extent of luxuriant pastures with which the country abounded millions of those valuable animals could be raised in a few years at small expense. The sheep producing this fine wool was of the Spanish kind, sent originally from Holland to the Cape of Good Hope, and taken from thence to Port Jackson.

When Captain Macarthur left Port Jackson in 1801 the heaviest fleece that had been shorn weighed only 3½ lb. In 1802, however, fleeces of his sheep were increased to 5 lb. each (in the grease), and the wool was finer and softer than that of the preceding year. The fleece of one of the sheep originally imported from the Cape of Good Hope was valued in London at 4s. 6d. a lb., and a fleece of the same kind bred in New South Wales was estimated at 6s. a lb. Being once in possession of this valuable breed and having ascertained that they improve in the climate, Captain Macarthur became anxious to extend them as much as possible. He, therefore, crossed all the mixed-bred ewes of which his flocks were composed with Spanish rams. The lambs produced by this cross were much improved, but when they were again crossed the change far exceeded his most sanguine expectations. In four crosses he believed that no distinction would be perceptible between the pure and the mixed breed. As a proof of the extraordinary and rapid improvement of his flocks Captain Macarthur exhibited the fleece of a coarse-woolled ewe that had been valued at 9d. a lb. and the fleece of her lamb begotten by a Spanish ram, which was allowed to be worth 3s. a lb. In 1803 Captain Macarthur had about 4,000 sheep, among which there were no rams but those of the Spanish breed.

Crop Rotation.

Thus "Himi," in the current "New Zealand Farmer":—"In the age-old practices of agriculture in the old country succeeding years have always revealed new problems. It was not long, for instance, before it was discovered that the growing of cereal crops year after year created a cumulative breeding ground for all kinds of weeds, until a culminating point was reached and cropping operations had to be abandoned. Then arose the need for rotations as an aid to the destruction of weeds. This was the origin of one of the oldest rotations practised—wheat, beans, fallow—a three years' rotation in which one year was occupied in getting rid of the accumulated weeds encouraged by the two "cash" crops. In good farming districts in Great Britain and on the Continent the rotation of crops was universally practised for generations. The systems employed were imported to New Zealand, and, under the differing conditions, not always with satisfactory results. But vast changes have come about as a result of the gospel of all-grass farming for one of the greatest of New Zealand's primary industries—dairying. There are now many farms that have not grazed a horse or seen a furrow turned for years. The writer knows one farmer who meanders round his paddocks kicking the cow-packs away and who, when the due seasons arrive, engages a neighbour who possesses a distributor to "sprinkle" the necessary topdressing. Others use a spade, a shovel or other implement for scattering the cow-dung. On these places grass harrowing never occurs. (And, after all, the only real service that the chain harrows appear to perform is to scatter the packs and other surface accumulations.) It must not be thought that the foregoing are the common forms of farming in this Dominion. They are not. These cases are merely mentioned to emphasise the expansion of the "all grass" cult, and to register a question mark as to the problems that this system of dairy farming will create for the future. A couple of years ago, when a more or less mysterious ailment was prevalent among cattle, one prominent veterinarian attributed it to "grass sickness." The situation is worth watchful attention. Many farmers, of course, still firmly adhere to the growing of roots or other crops, even if only as an insurance against poor seasons for good grass.

When to Water your Horse.

A horse requires from 6 to 8 gallons of water a day under ordinary conditions. When grazing on green pasture or when fed succulent foods such as carrots and other roots with chaff, less will be required. Water consumption will be increased when the weather is very hot, when the horse is hard at work and perspires freely, when the food is very dry, and in the case of mares in foal or with foal at foot. The stomach of the horse is small, and cannot contain a full feed and several gallons of water at the same time. It is important, therefore, that water should be given before feeding, or not for one or two hours after feeding. If water be given immediately after feeding a certain amount of undigested food will be flushed out of the stomach and carried into the intestinal tract, where it may cause colic and other digestive troubles. It also weakens the digestive juices, and thereby retards digestion of food in the stomach. If the water contains a large amount of sediment it is likely to cause a mechanical irritation of the mucous membrane of the stomach and intestine. This finally results in the form of colic known as sand colic. Water may be given in small quantities within an hour of feeding if desired, but when the practice of watering before feeding is made a regular habit water will not be consumed in sufficient quantity after feeding to produce any ill-effects.

After a long journey the horse may be watered a mile or so before the journey's end, and take the horse in slowly afterwards. This prevents chills and colic due to taking in large quantities of water when in an exhausted state. If this is not possible it is advisable to give the horse a little water before removing the harness, then turn him into a clean yard, where he can have a roll before stabling. Give the body, thighs, and arms a brisk rub down with a coarse cloth or a handful of straw, then allow another drink before feeding. After prolonged exertion or fast work the animal's system is depleted of fluid. He will not eat sufficiently until his thirst has been satisfied, therefore water should come first, and while the animal is still warm is the best time to give it. Horses kept in the stable should be allowed water at least three times a day. When running in the open or if kept in stable yards, it is advisable to have a supply of clean water accessible at all times. When given free access to water animals will not take more than is necessary, and the appetite is usually a very safe guide to the requirement of the system.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staffs of the Queensland Baby Clinics, dealing with the care and general welfare of babies, has been planned in the hope of maintaining their health, increasing their happiness, and decreasing the number of avoidable deaths.

THUMB OR FINGER SUCKING.

Some Suggestions for Prevention.

FIRST of all, how does the habit start? Baby associates anything which touches his mouth with the art of sucking. All's fish that comes to that net. Wandering fingers find the mouth, and almost at once association sets up a habit, as a result of which the fingers or thumbs go automatically to the mouth.

Tuck baby's hands up in his shawl, so that he will not find and exploit this trick in his drowsy or going-to-sleep times. You need not be afraid of hampering him too much if you bring the shawl round over the shoulders and tuck it back in under the arms. There are many ways of preventing the tiny baby from getting into the habit whilst still allowing freedom of movement.

Try making a splint to fit over baby's elbow. This is easily done by procuring a piece of good cardboard about 4 inches wide and long enough to fit comfortably round the arm at the elbow. Score it with a knife to enable it to bend round the arm, and then cover with old linen. Have two tapes on each end long enough to fasten the splint. Sew a small loop of tape to the top edge to allow the splint to be fastened with a small safety pin to the garment the child is wearing. This prevents the splint from slipping once it is applied. This has been proved most effective, and has the advantage of allowing baby free use of his hands and arms, except that he cannot bend his elbow joint.

As baby grows, however, it is essential for him to have his hands free, because his sense of touch is his first and most important means of exploring his world. His own hands and toes, his bed, clothes, toys—everything should come into contact with his hands; not to stay at first, but every different touch teaches him something. Here you see how baby's field of activity and interest is restricted if he is abnormally occupied with his mouth. Is it fair to permit him to cultivate a habit which almost entirely shuts him off from the joys experienced by every child as he explores each new object with his hands?

However, at this very time baby may develop the habit from boredom, if he has not enough normal, natural, healthy stimulation from his immediate environment.

Toys.

It is quite allowable to have a pretty toy, perhaps with a tinkling bell, where it is just within reach of baby's exploring hands. Take care that it is not too low or too near the eyes. Never force it on his attention. Have it there for him to discover, and do with as he can and will. At first he will lie and look at the slightly moving object, then a moving hand touches it, a sensation and a sound result. Gradually, very gradually, it comes under his control, and meanwhile no boredom, but still no over-stimulation. Never jingle the plaything or bounce it up and down. It is a baby's toy, for him to use, not yours.

Mothering.

Sometimes thumb sucking starts when a baby is weaned, or even later, when another baby comes. It is in this instance probably due to loneliness and want of comfort and love or an unconscious longing to remain the baby. This may be prevented or cured by extra mothering, wise, loving management, healthy, absorbing occupation, and the companionship of other children. Life should be altogether too interesting and happy an affair for the normal baby to want to suck his thumb.

Once the habit is firmly established much patience and perseverance will be needed and much supervision to cure it. One "do or die" fight is infinitely better than a prolonged half-hearted struggle, in which the mother loses influence and the habit gains strength, whilst nerves and tempers are frayed all round.

Gloves, splints, and pinning the hands down may all be tried in dealing with the young baby, and any of these methods, combined with an overhauling of daily routine and management, usually puts things right quite quickly. For the older child more subtle treatment is necessary, as we have indicated. Gloves and finger stalls and bitter aloes may effect a cure in mild cases, but often they are simply disregarded with the most utter unconcern. The aim is to help the child forget the bad habit. If he is nagged at and scolded about it, it is only the more firmly fixed in his mind. Let him do things and feel things, and rampage generally in a safe place. As he learns to do more for himself and others, he tends to become so happy and engrossed that he does not seek the consolation of thumb sucking, which he associates unconsciously with the warmth and comfort of breast feeding and nursing times. The comfort which was normal then if prolonged beyond its natural limits tends to dwarf the child's growth mentally, emotionally, and physically.

IN THE FARM KITCHEN.

PEACHES.

Baked Peaches.

Take 6 slipstone peaches, sugar, butter, lemon juice, nutmeg.

Peel, cut in half, and remove the stones from the peaches. Place in a shallow fireproof dish. Fill each cavity with one teaspoonful of sugar, one half teaspoonful butter, a few drops of lemon juice, and a grating of nutmeg. Cook in a hot oven for twenty minutes and serve on circular pieces of buttered toast with cream.

Peaches au Gratin.

Take 1 jar peaches, breadcrumbs, butter, sugar, lemon juice.

Choose a flat fireproof dish, butter it well, arrange halves of peaches on it, round sides upwards, and fill up the spaces with breadcrumbs. Mix with the syrup from the peaches a squeeze of lemon juice and a little sugar. Pour over the peaches and cover them with breadcrumbs. Place small pieces of butter all over the top. Put the dish in a quick oven and brown nicely. Serve with cream or custard.

Peach Foam.

Take 4 ripe peaches, ½ cupful fine sugar, 1 egg-white.

Skin and cut the peaches into quarters, put them into a basin and add the sugar. Beat them together, add the egg-white, and go on beating till a perfectly smooth cream. Put into custard glasses and top with whipped cream. Place a glace cherry on each and serve very cold.

Peach Meringues.

Take 4 large slipstone peaches, 8 shortbread biscuits, 1 egg-white, jam, 1 tablespoonful castor sugar.

Peel the peaches, cut in half, and remove the stones. Cook in a small quantity of water with sugar to taste. Drain the peaches from the syrup and place one on each biscuit cup side upwards. Whisk the egg-white to a stiff froth, then fold in the castor sugar. Put the meringue into an icing bag with a rose or shell tube fixed in the bottom of it, and force it out to form a border all round each peach. Put in a cool oven to set and lightly brown the meringue, and when cold serve with a little jam on top of each peach.

Peach Jam.

To every 1 lb. stoned fruit allow ¾ lb. sugar.

Peel peaches and cut into slices, cover with 2 or 3 lb. of the sugar, and leave all night. Next day boil with a little water for half an hour or until the peaches are tender. Add the remainder of the sugar heated in the oven. The sugar should be quite hot so that it does not stop boiling. Boil from one and a-half to two hours briskly. The syrup should be rather thick when done. Use yellow peaches for making jam.

Peach Milk Mould.

Take 1 large tin sliced peaches, 2 oz. castor sugar, juice ½ lemon, ¾ oz. gelatine, ¾ gill water, ½ pint milk cream.

Turn the peaches into a basin, keeping back a few slices for decorating them, add the castor sugar and strained lemon juice and stir till the sugar is dissolved. Melt the gelatine in a saucepan with the water and strain into the peaches. Stir in the milk, leave the mixture till it begins to set, then turn it into a mould that has been rinsed out with cold water. When set turn out and decorate with whipped cream, sweetened and flavoured to taste, and a few sliced peaches.

Peach Betty.

Take 3 cupfuls sliced fresh peaches, 3 cupfuls coarse breadcrumbs, ½ cupful melted butter, sugar, grated orange-peel, nutmeg, cream.

Melt the butter and add to the breadcrumbs. Mix with a fork until well blended. Slice the peaches thinly. Put a layer of buttered crumbs in a greased pudding dish, cover with a layer of peaches, sprinkle with sugar and a grating of orange-peel. Continue alternate layers until crumbs and peaches are used. Cover dish and bake one hour. Remove cover the last half-hour to brown crumbs. Serve hot with sweetened cream flavoured with nutmeg.

Peach Batter Pudding.

Take 3 ripe peaches, ¼ cup sugar, 1 cupful flour, ½ teaspoonful salt, 1 cupful milk, 2 eggs.

Mix in a basin the flour, sugar, salt, and well-beaten eggs. Add gradually the milk and beat until the batter is smooth. Pare and slice the peaches very thinly, add to the batter and turn into a buttered piedish and bake very slowly for one hour in a moderate oven. Serve at once.

Empress Peaches.

Take 4 oz. rice, 4 ripe peaches, 2 oz. castor sugar, 4 tablespoonfuls red currant jelly, 1½ pints milk, vanilla.

Cook the rice in the milk in a double boiler with the sugar till the rice is soft and the milk has been absorbed, then add flavouring to taste. Peel and halve the peaches and place the fruit on a baking tin. Cook for a few minutes in the oven. Heap the rice on a hot dish and arrange the cooked peaches on top. Put the red currant jelly in the baking tin, and when it is dissolved pour over the peaches. This sweet can be served either hot or cold.

Peach and Passion Fruit Jam.

Take 1¼ lb. peaches, ½ dozen passion fruit, some lemon juice, 1 lb. sugar.

Peel peaches and cut into slices. Cover with half of the sugar and leave till next day. Boil till tender, then add remainder of sugar, lemon juice, and the passion fruit with some of the seeds strained out. Boil one and a-half to two hours or until it sets.

Mango Chutney.

Materials—To each 1 lb. of mango pulp—½ lb. cooking apples; 1 pint vinegar; ¼ lb. seedless raisins; ½ lb. brown sugar; 2 oz. garlic; 2 oz. mustard seed; 2 oz. salt; 1 oz. ground ginger; ½ oz. cayenne.

Utensils—Knife; preserving-pan; wooden spoon; bottles; muslin bag.

Method—Peel and slice perfectly firm, ripe mangoes; they must be neither green nor over-ripe. Put them into a preserving-pan; add vinegar, apples, seedless raisins, brown sugar, garlic, mustard seed (tied in a muslin bag), salt, cayenne, and ground ginger. Boil slowly until the fruit is tender; remove mustard seed. Bottle and cover.

Papaw Chutney.

Materials—1 large pawpaw; ¼ lb. seedless raisins; 1 dessertspoonful sugar; 1 level teaspoonful salt; 6 peppercorns; blade mace; 6 cloves; 2 bay leaves; 1½ pints white vinegar.

Utensils—Saucepan; knife; muslin bag; jars.

Method—Peel pawpaw; cut it into small squares. Cut raisins into two. Put fruit into saucepan; add peppercorns, mace, cloves, bay-leaves, all tied in muslin bag. Add sugar and salt; cover with white vinegar. Boil till fruit is tender; remove muslin bag. Bottle; cover down air-tight. Stand in sun to clear.

Tomato Chutney.

Materials—2 lb. green tomatoes; ¾ lb. onions; 6 peppercorns; 1 blade mace; 3 bay leaves; 1 oz. whole ginger; 6 chillies; ½ tea-spoonful salt; 1 dessertspoonful sugar; 1½ pints of vinegar.

Utensils—Cloth; preserving pan; knife; jars; wooden spoon; muslin bag; string.

Method—Wipe tomatoes; cut into circles. Peel and cut up onions. Put onions and tomatoes into a preserving pan; add sugar and salt. Cover well with vinegar. Add peppercorns, whole ginger, mace, and bay leaves, all tied up in a muslin bag. Add chillies cut into three lengthways. Boil gently for 1½ hours, stirring occasionally. Bottle; cover down air-tight. Stand in sun for ½ an hour.

Tomato Sauce.

Materials—6 lb. tomatoes; ½ lb. apples; ½ lb. onions; ½ lb. sugar; ¼ lb. salt; ½ oz. garlic; ½ oz. allspice; ½ oz. peppercorns; 2 teaspoonfuls chillies; 2 teaspoonfuls crushed mace; 2 teaspoonfuls cloves; 2 teaspoonfuls curry powder; 1 pint vinegar.

Utensils—Cloth; knife; preserving pan; sieve; bottles.

Method—Wipe tomatoes and apples; peel onions. Put sliced tomatoes, apples, onions, and chillies into a preserving pan. Add sugar, salt, garlic, allspice, mace, cloves, peppercorns, curry powder, and vinegar. Boil for 3 hours. Strain and bottle.

Quince Jam.

Materials—Quinces; 1 cup of sugar to 1 cup of pulp; 1 lemon to 4 cups of pulp.

Utensils—Bowl; knife; cloth; preserving pan; cup; wooden spoon; plate; jars.

Method—Wash, pare, and core quinces. Cut into convenient pieces; put fruit into a preserving-pan. Add sufficient water to cover bottom of pan. Boil till the fruit is quite tender; add sugar and lemon juice. Boil till a small quantity jellies on a cold plate. Bottle; seal; cover down.

Quince Jelly.

Materials—Quinces; water; 1 lb. sugar to each pint of fruit juice.

Utensils—2 bowls; cloth; knife; preserving-pan; wooden spoon; flannel strainer; cup; jars.

Method—Wash quinces; wipe carefully; cut them into pieces. Put pieces into preserving-pan, being careful to add the seeds and milky-looking jelly round them. Cover with cold rainwater. Boil till the fruit is soft. Strain through coarse flannel into a basin. Measure liquid into a second basin. Add 1 cup of sugar to 1 cup of fruit juice; stir till sugar is melted. Allow to boil till a drop from a spoon sets on a cool plate; it may take 1 hour. Bottle while hot; cover down airtight.

Note.—The peel and seeds of quinces that have been used for quince jam make excellent jelly.

Rosella Jam.

Materials—Rosellas; 1 cup of sugar to each cup of pulp.

Utensils—Saucepan; knife; wooden skewer or blunt stick; cheese cloth strainer; preserving pan; wooden spoon; cup; jars.

Method—Cut off stalks; with a blunt stick push seeds out of the husks. Put stalks and half of seeds into a saucepan; cover them with water. Boil for 1 hour; strain through cheese cloth into a preserving-pan. Add the rosella husks; boil for 20 minutes. Measure; add 1 cup of sugar for each cup of pulp. Boil rapidly for 20 minutes, stirring continually. Bottle and seal.

Pumpkin Jam.

Materials—For each pound of pumpkin, take juice of one and rind of half a lemon; ¾ lb. of sugar; 1 teaspoonful ground ginger; 2 tablespoonfuls water.

Utensils—Knife; bowl; squeezer; preserving pan; wooden spoon; teaspoon; jars.

Method—Peel pumpkin; remove seeds. Cut the pulp into thin slices. Put slices into a bowl in layers; sprinkle each layer with lemon juice and sugar. Allow to stand for at least 12 hours. Pour contents of bowl into a preserving pan. Add water, grated rind of lemons, ground ginger, and remainder of sugar. Cook slowly till a small quantity jellies on a cool plate. Bottle; seal; cover down.

Peanut Toffee.

Materials—½ lb. sugar; ¼ teaspoonful cream of tartar; ½ cup water; 3 drops essence of lemon; 2 oz. peanuts.

Utensils—Saucepan; wooden spoon; cup.

Method—Put sugar, cream of tartar, and water into a saucepan. Boil to the crack degree (300 degrees F.). Grease a plate; cover with shelled and blanched peanuts. Flavour the boiled sugar; pour over nuts; when cool cut into squares.

Orchard Notes for April.

THE COASTAL DISTRICTS.

IN the Orchard Notes for March the attention of citrus growers was called to the necessity of their taking the greatest possible care in the gathering, handling, sweating, grading, and packing of the coming crop of fruit, as the returns for the labour expended in the upkeep of their orchards will depend entirely on the condition in which the fruit reaches the market. Many growers fail to realise the very important fact that the success of fruitgrowing does not depend merely on the proper working and management of the orchard, so essential for the production of a good crop of high-class fruit, but that the manner in which the fruit is handled and placed on the market is of even greater importance. In no branch of fruit culture is this more evident than in the case of citrus fruits, as no fruit pays better for the extra care and attention necessary to enable it to be marketed in the best possible condition. Every season there is more or less loss in the consignments sent to the Southern markets, the percentage depending mainly on the weather conditions, the loss in a wet year being much heavier than that in a dry year.

A very large percentage of the loss is due to what is known as blue mould—a rotting of the fruit caused by a mould fungus—and this loss can be prevented, provided necessary precautions are taken. Although this matter was dealt with last month, it is of such vital importance to our citrus-growers that it is necessary to again refer to it.

In the first place, growers must clearly understood that blue mould cannot occur on perfect fruit, the skin of which is free from injury of any kind. The fungus causing blue mould can only obtain an entry into the fruit through an injury to the skin; it will thus be seen that the remedy is to take every possible care not to injure the skin of the fruit in any way.

Few growers realise how easily the skin of citrus fruits is injured, especially that of fruit grown under moist and humid conditions, when the skin is full of moisture and so tender that the least sign of rough handling causes serious injury. The cells of the skin are so brittle that they are easily broken, and when so broken a ready means of entry for the mould fungus is provided, and blue mould follows in due course.

The remedy for blue mould is in the hands of the grower, who must learn so to gather, handle, and transport the fruit from the orchard to the packing-shed that it does not receive the slightest injury, and further, that when it has reached the packing-shed it must be carefully placed in shallow bins or on trays and be exposed to the air for at least seven days, so that the surplus moisture in the skin may be removed, and the skin thus become toughened and less easily injured. This drying of the skin is known as "sweating," and during the time the fruit is being sweated it should be kept under observation, and all fruit showing signs of blue mould or injury from fruit flies, sucking or boring insects, mechanical injury or bruising, should be removed.

In order to prevent injuring the skin when gathering, all fruit must be cut and not pulled. Gloves should be used to handle the fruit, and when cut it should be placed in padded baskets or other suitable receptacles. Any fruit that falls or is injured in any way should be rejected, as it is not fit to send to a distant market. At the same time, if the injury is only slight, it can be sent to a local market for quick sale.

For oversea and interstate markets only perfect fruit should be selected, and further, it must be graded for size, colour, and quality, and properly packed, only one grade of fruit being packed in a case. The cost of cases, freight, and marketing is now so high that only the best fruit will pay to export, and even the best fruit must be properly graded and packed in order to produce the best returns.

All orchards, vineyards, and plantations not thoroughly clean should receive immediate attention, for from now until the next rainy season the ground must be kept in a thorough state of tilth and free from weeds in order, firstly, to retain moisture in the soil, and, secondly, to enable birds, ants, and predaceous insects to get at and destroy the pupæ of fruit flies and other pests harbouring in the soil.

Banana and pineapple plantations must be put into good order, and kept free from weed growth.

Land to be planted with trees should be got ready, as, if possible, it is always advisable to allow newly-cleared land time to sweeten before planting.

Farm Notes for April.

FIELD.—Those areas already lying in fallow for subsequent sowing with wheat should be kept in good tilth, using field implements that have a stirring effect in preference to those which tend to reverse the surface soil. The surface should never be allowed to cake; consequently all showers must be followed by cultivation, as soon as conditions will permit of teams and implements working freely.

Early fodder crops, such as barley (skinless or Cape) and certain varieties of wheat may be sown during April. Growers of winter fodders will be well advised to study the article dealing with dairy fodder plots which appeared in February, 1922, Journal.

Potatoes should now be showing good growth, and must be kept free from all weed growths by means of the scuffler. If sufficiently advanced, and any doubt exists as to the prevalence of blight, advantage should be taken of fine weather to give a second spraying of Bordeaux mixture, a calm and somewhat cloudy day being chosen if possible for the spraying.

Where land has been previously well prepared, lucerne sowing should be carried out this month, and intending growers of this fodder will be well advised to ascertain the germinating qualities of seed submitted to them for purchase. The difference between a good and bad "strike" is often traceable to the poor class of seed sown.

Maize and cotton crops should now be in the harvesting stage, and, once matured, are better in the barn than the open paddock, where weevils and other insects are usually prevalent at this season of the year.

Root crops sown last month should now be making fair growth, and during the early period of such should be kept free from weeds, and where necessary thinned out. Sowings of mangels, swedes, field carrots, sugar-beet, and rape may still be made where conditions of moisture will permit.

As the sowing season is close at hand for certain varieties of wheat—i.e., those which require a fairly long period to develop in—every effort should be made to bring the seed-bed into the best possible tilth and to free it from foreign growths of all kinds. The grading of all seed-wheat is strongly recommended, and growers who favour certain varieties should adopt a system of seed selection from prolific strains with a view to the raising of larger quantities of pure typical grain for ultimately sowing in their larger fields.

Pickling of wheat to prevent smut (bunt) is necessary. Germination tests should be carried out prior to commencing seeding operations.

Sorghums which have matured and are not immediately required as green fodder should, wherever possible, be conserved as ensilage to provide for a reserve, to tide over the period when grasses and herbage are dry. Succulent fodder of this description is the best possible form of insurance against drought, and for maintaining dairy and other stock in thrifty condition.

HOLDING UP THEIR MILK.

The power of a cow to retain her milk at will has never been satisfactorily explained. This power can be exerted instantaneously, and as long as the cow cares to exert her will in this direction the very best milker will not get a drop from her. The retention of the milk is not affected by the closing of the sphincter at the end of the teat—the cow seems to have little or no power over that part.

Holding up the milk is often the result of some irritation, and may be entirely the fault of the milker. Some cows are extremely sensitive, and a strange milker, even although a good one, will often cause them to withhold their milk for the time being. Very sore teats are a common cause, and occasionally the result is a bad quarter. Some heifers, under careless management, will hold up their milk day after day until the habit becomes confirmed, and in some cases it would seem to be hereditary.

There is a good deal of controversy on which side a cow should be milked; but in point of fact there is no correct side. It is all a matter of custom. If milking is done by hand it should always be done from the same side, but it does not matter whether it is right or left.—"Farmers' Gazette" (Ireland).

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1933 AND 1935, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of Years' Records.	Jan., 1936.	Jan., 1935.		Jan.	No. of Years' Records.	Jan., 1936.	Jan., 1935.
North Coast.	In.		In.	In.	*Central Highlands.*	In.		In.	In.
Atherton	12·10	35	8·35	5·04	Clermont	5·11	65	4·88	2·40
Cairns	16·70	54	16·76	5·58	Gindie	3·68	37	4·78	2·04
Cardwell	17·02	64	10·69	2·36	Springsure	4·21	67	5·43	4·49
Cooktown	14·51	60	10·01	10·82					
Herberton	9·72	50	7·20	6·34					
Ingham	15·77	44	10·65	3·61					
Innisfail	20·44	55	10·53	7·10					
Mossman Mill ..	18·19	23	12·11	18·97	*Darling Downs.*				
Townsville	11·03	65	7·66	2·76					
					Dalby	3·31	66	3·25	7·02
Central Coast.					Emu Vale	3·19	40	4·47	2·67
					Hermitage ..	3·22	30	..	1·99
Ayr	10·98	49	10·75	0·93	Jimbour	3·50	48	2·29	3·84
Bowen	10·03	65	8·15	2·37	Miles	3·66	51	1·61	5·23
Charters Towers ..	5·46	54	2·39	3·02	Stanthorpe	3·59	63	2·88	4·00
Mackay	14·18	65	8·78	4·34	Toowoomba ..	5·05	64	4·24	3·34
Proserpine	15·74	33	18·81	7·04	Warwick	3·55	71	4·44	2·50
St. Lawrence ..	9·28	65	10·14	5·58					
South Coast.									
					Maranoa.				
Biggenden	5·20	37	4·92	3·15					
Bundaberg	8·71	53	4·77	2·97	Roma	3·09	62	2·18	2·76
Brisbane	6·44	85	5·73	5·75					
Caboolture	7·62	49	5·12	5·96					
Childers	7·45	41	4·48	4·81					
Crohamhurst	12·41	43	6·01	7·45					
Esk	5·72	49	6·44	6·18					
Gayndah	4·59	65	5·78	2·24					
Gympie	6·62	66	6·74	3·74	*State Farms, &c.*				
Kilkivan	5·53	57	6·14	4·44					
Maryborough ..	7·17	65	2·86	4·66	Bungeworgorai ..	1·82	22	..	2·76
Nambour	9·68	40	7·03	6·67	Gatton College ..	4·29	37	..	3·73
Nanango	4·66	54	3·05	5·78	Kairi	9·53	22	3·82	2·42
Rockhampton ..	7·68	65	5·98	4·11	Mackay Sugar Experiment Station	14·05	39	11·72	3·75
Woodford	7·81	49	5·76	5·23					

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—JANUARY, 1936.

COMPILED FROM TELEGRAPHIC REPORTS.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·74	90	72	101	30	67	24	986	14
Herberton	..	83	65	94	29	59	26, 27, 29	720	14
Rockhampton	29·83	89	72	96	14, 17, 24, 29	68	27, 8	598	11
Brisbane	29·91	84	68	97	24	62	19	573	15
Darling Downs.									
Dalby	29·87	89	64	104	29	56	19, 20	325	7
Stanthorpe	..	82	59	100	29	53	19	288	14
Toowoomba	..	84	61	99	29	57	2, 31	424	13
Mid-Interior.									
Georgetown	29·77	97	74	103	24, 25	69	14	817	12
Longreach	29·76	100	74	111	29	66	13	432	5
Mitchell	29·81	92	69	107	24, 25	60	7	370	10
Western									
Burketown	29·74	98	78	107	5	72	19	127	7
Boulia	29·73	102	77	114	29	67	6	229	6
Thargomindah	29·76	97	75	113	25, 28	63	6	322	3

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	March, 1936.		April, 1936.		MOONRISE. Mar., 1936.	April, 1936.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	5·46	6·24	6·2	5·50	1·27	2·29
2	5·46	6·23	6·3	5·49	2·20	3·2
3	5·47	6·23	6·3	5·48	3·9	3·33
4	5·47	6·22	6·4	5·46	3·49	4·3
5	5·48	6·21	6·4	5·45	4·26	4·33
6	5·48	6·21	6·5	5·44	5·0	5·3
7	5·49	6·20	6·5	5·43	5·30	5·35
8	5·49	6·19	6·6	5·42	6·0	6·10
9	5·50	6·18	6·6	5·41	6·29	6·45
10	5·50	6·16	6·7	5·40	7·0	7·27
11	5·51	6·15	6·7	5·39	7·32	8·14
12	5·51	6·14	6·8	5·38	8·8	9·7
13	5·52	6·12	6·8	5·37	8·45	10·2
14	5·52	6·11	6·9	5·36	9·29	11·1
15	5·53	6·10	6·9	5·35	10·19	
						a.m.
16	5·54	6·8	6·10	5·34		12·5
17	5·54	6·7	6·10	5·34	11·14	1·7
					a.m.	
18	5·55	6·6	6·11	5·33	12·11	2·11
19	5·55	6·5	6·11	5·32	1·15	3·16
20	5·56	6·4	6·12	5·31	2·18	4·23
21	5·56	6·3	6·12	5·30	3·24	5·30
22	5·57	6·2	6·13	5·29	4·31	6·42
23	5·57	6·1	6·13	5·28	5·39	7·53
24	5·58	6·0	6·14	5·26	6·47	9·0
25	5·59	5·59	6·14	5·25	7·57	10·2
26	5·59	5·57	6·15	5·24	9·8	10·58
27	6·0	5·56	6·15	5·24	10·15	11·48
						p.m.
28	6·0	5·54	6·16	5·23	11·18	12·28
29	6·1	5·53	6·16	5·22	12·15	1·2
30	6·1	5·51	6·17	5·21	11·6	1·35
31	6·2	5·50			1·51	

Phases of the Moon, Occultations, &c.

8 Mar.,	○	Full Moon	3 13 p.m.
16 ,,	☽	Last Quarter	6 35 p.m.
23 ,,	●	New Moon	2 13 p.m.
30 ,,	☾	First Quarter	7 22 a.m.

Apogee, 10th March, at 2.18 p.m.
Perigee, 23rd March, at 7.24 p.m.

Neptune, which is never visible to the naked eye and takes 164½ years to get around the Sun, will be in opposition to it on the 6th, rising as the Sun sets.

On the 21st the Sun will be on the celestial equator at the time of rising. Whoever will then carefully note its position on the horizon with reference to some fixed object, and repeat the observation at the time of sunset, provided a clear view of the western horizon near sea level can be obtained, will have accurate points for east and west, from which equally accurate points for north and south can be obtained.

The path of the Moon for March, commencing at 8 p.m. on the 1st will be almost on the border line between Taurus and Gemini, slightly more than three times the diameter of the Cross to the North East of Aldebaran. It will reach Cancer early in the morning of the 4th, and be on its eastern border very nearly on the 6th, and on the eastern border of Leo about 5 a.m. on the 9th. It will be in Virgo till the 12th (passing about three degrees south of Spica on the 11th), in Libra, and a narrow portion of Scorpio till the 15th, in Orphincus till the 16th; in Sagittarius till the 19th, passing across the bow of the archer and near a fairly bright star of second magnitude near its right hand, pointing the arrow at the Scorpion. It will pass through Capricornus till the 21st, through Aquarius till the 22nd, through Aries, south of Hannal and Mesartim, two second magnitude stars, till the 26th, then into Taurus, passing between the Pleiades and Hyades until the 29th, and through Gemini till the 31st, at 8 p.m.

Mercury rises at 3.42 a.m., 2 hours 4 minutes before the Sun on the 1st, and at 4.12 a.m., 1 hour 41 minutes before it on the 15th.

Venus rises at 3.20 a.m., 2 hours 22 minutes before the Sun on the 1st, and at 3.47 a.m., 2 hours 6 minutes before the Sun on the 15th.

Mars sets at 7.40 p.m., 1 hour 16 minutes after the Sun on the 1st, and at 7.15, 1 hour 5 minutes after it on the 15th.

Jupiter rises at 11.51 p.m. on the 1st, and at 11.0 p.m. on the 15th.

Saturn sets at 6.36 p.m. on the 1st; on the 15th it rises at 5.7 a.m.

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7 April,	○	Full Moon	8 46 a.m.
15 ,,	☽	Last Quarter	7 21 a.m.
24 ,,	●	New Moon	10 32 p.m.
28 ,,	☾	First Quarter	9 16 p.m.

Apogee, 6th April, at 3.36 p.m.
Perigee, 21st April, at 6.12 a.m.

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

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

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