A Cross in this space is a reminder that your Subscription to the Journal expires with this number.

ANNUAL RATES OF SUBSCRIPTION.
Farmers, Graziers, Horticulturists, and Schools of Art FREE on prepayment of 1/- to cover postage. Members of Agricultural Societies, 5/-, including postage. General Public, 10/- including postage

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXXIV. 1 OCTOBER, 1930. PART 4.

Event and Comment.

The Current Issue.

ANOTHER instalment of his story of the Queensland sugar industry is contributed by Mr. Easterby, in which he brings his narrative up to 1921 and gives an account of the inquiry, instituted in the following year, into suitable sites for future mills. The third part of Mr. Currie's paper on the Brown Cutworm is another valuable contribution. Mr. Carew has the first article of a series on farmers' sheep and wool, planned for the purpose of supplying some of the information sought from time to time by readers interested in sheep and wool; and also with the hope of stimulating further interest in sheep raising on comparatively small holdings. Tobacco growing in North Queensland, is the subject of an important announcement by the Minister for Agriculture and Stock, Mr. Harry F. Walker; and this is supported by notes on how to establish tobacco seed beds by Mr. Pollock, who also has a timely article on bright tobacco cultivation in the North, in which he gives some particulars of producing districts and of tests made on leaf grown since 1928. Mr. Munro has compiled a useful summary of breeding and feeding points relating to Angora rabbit keeping, as well as of the regulations prescribed for its proper control. Mr. Edmund Jarvis has his customary seasonal hints on entomology for canegrowers, and other sugar pages are well supplied. An excellent camera record of dairy cattle prize winners at the recent Brisbane Royal Show is also presented. General working notes cover a wide field in which farmers will find a fund of useful information.

The Price of a White Australia.

A RECENT "Times" message from Melbourne on the political activity of opponents of the renewal of the sugar agreement has aroused considerable interest in oversea sugar circles. It is recognised there that the embargo is a measure of protection which those in the northern half of Australia realise to be

a necessity, and therefore inevitable. It is also known that the embargo is the source of perpetual grumbling on the part of the much larger population inhabiting the southern half, hence their political activity as the time for renewal of the agreement approaches. The "Times" cable stated the opponents are claiming that the prohibition of foreign sugar costs the taxpayers five and a-half millions a year, and even the highly protectionist paper, "The Age," protests against this "outrage of legalised banditry as an act of definite hostility to the people," and asks only for a protective duty against imported sugar produced by cheap labour. This strong language is some indication of the bitter feeling that is being worked up in the South against the price that has to be paid for sugar produced in one corner of the continent. As has been pointed out so frequently, Queensland is not the only State that benefits materially from the sugar industry. Every State has its refinery, and every State otherwise shares in its wages, profits, and national benefits.

Commenting on the "Times" telegram, the "International Sugar Journal," a recognised authority on the cultural and technical sides of the industry, has this to say on the Southern agitation:—

> But it may be said with justice that these Australians cannot have their cake and eat it. Several decades ago, for good or ill, they decided to banish the coloured or kanaka labour from their canefields, this being part of their deliberate policy of keeping Australia "white." They ignored the fact that practically everywhere else in the tropics and semi-tropics the main labour of the canefields is coloured, and receives the pay of coloured labour. Queensland was purged of its cheap labour; white labour at trade union rates of pay (always high in Australia) steadily took its place and carried out the job of sugar production—at a price. But the world price of sugar is necessarily lower and has been markedly so the last few years, and but for the embargo on foreign sugar Australia would have proved a convenient dumping ground for the world's excess of sugar, as a consequence of which the Queensland sugar industry would have found its product unsaleable. Nor would things be better if there was, as suggested, merely a duty against sugar produced by cheap labour, for who nowadays is to decide whether sugar comes in that class or not, when the ruling world's price is lower than one at which most producers employing cheap labour can be said to make a profit at all. It seems clear to most onlookers that so long as Australia wishes to produce her own sugar and do so with white labour the price must be paid. This price is paid, *inter alia*, in consummation of a national policy of keeping the Northern Queensland littoral populated with whites, as a racial barrier against the oriental peoples living to the north of Australia. It is doubtful whether there is any other industry alternative to sugar that would suit the Queensland climate. Sugar, then, is so bound up with State policy that it is hard to conceive the Commonwealth Government making any radical change in the system at present in force. Unfortunately, there have not been wanting indications of late years that Commonwealth policy is apt to clash with the interests of individual States, and *vice versâ*. The larger part of the Australian population lives so remote from the Queensland canefields that it is conceivable that they may, through their State Legislatures, force the Commonwealth Government to modify the assistance granted to the sugar-producers. Time will show how far the opposition has gained force since the last agreement was signed. Those who see a future for Empire sugar in supplying the needs of the United Kingdom will regret it if, on the possible eve of the venture, the Australian sugar industry is launched on a sea of troubles owing to dissention within its borders.

Tobacco Growing in the North.

THE attractive scheme adopted by the Government to stimulate tobacco production in North Queensland by opening for early selection an area of Crown land in the Mareeba district, comprising twenty-five portions specially selected for tobacco production, with due regard to quality of soil, water supply, and ease of access, under certain conditions, cannot but be regarded as the praiseworthy result of careful and lengthy consideration on the part of those responsible. The production of a crop of 5 acres on each of the twenty-five farms, which will mean 125 acres under tobacco this coming season, with a probable yield of 30 tons of cured leaf, carrying a value of approximately £9,000, will be a comparatively small set off against the total quantity at present brought annually into this country, and may be regarded as the beginning of a rapid decline in imports and consequent obviation of the necessity of our continuing to send so much of Australia's gold overseas in payment for them. The profitable return, which may reasonably be expected to

follow the investment made by the successful growers, will no doubt stimulate a rapid settlement of land suitable for tobacco cultivation, which exists in considerable areas in the North. The use of local available labour in grubbing and clearing to allow of 5 acres being cropped on each farm this coming season is also commendable. The cost, not exceeding £12, for grubbing, clearing, and ploughing each acre, must be regarded as a moderate charge in the class of country which it is proposed to bring into production, and one that will meet with the approval of the selector. Reproductive work of this nature, particularly at a time like the present, is most desirable, not only in respect of its promotion of settlement, but also in its relation to the general wealth and progress of the State.

The Passing of Ernest Baynes.

THE primary industries of Queensland sustained another great loss by the death of Mr. Ernest Baynes, President of the Royal National Association, on 22nd September. His passing is deeply deplored by all associated with country life and work, as well as by citizens generally. At every Brisbane show for nearly forty years he was a notable figure, and the Royal National Association, of which he was an active member for thirty-eight years, owes much to his strong and unfailing advocacy of everything that made for the advancement of rural enterprise in this State. To him always nothing short of the best possible was good enough, and he certainly gave of the best of his own great ability to Queensland. In later years, having retired from a successful commercial career, he devoted his time to the Royal National Association as an active and enthusiastic promoter of its interests and as a shrewd director of its great influence in developing the resources of the State. He watched the association grow from its infancy to its present full stature as a sturdy figure and beneficial force in our national life. The high regard of his co-workers as their president was due to his long service to the association. For many years he was ringmaster at every Brisbane show, and relinquished that post to become chairman in 1920. In 1923 he was appointed acting president, and on the death of Mr. C. E. McDougall in 1924 he became president, a position he had occupied ever since. He was a great judge of live stock, especially horses, and was a member of the Stallion Board of Queensland.

The late Mr. Baynes was born in South Brisbane in 1864, and spent his childhood there. His early education was entrusted to the late Major A. J. Boyd, F.R.G.S., who later occupied the editorial chair of this journal for twenty-four years, and his secondary training was received in Horton College, Tasmania, and in the Grammar school, Toowoomba. On leaving school Mr. Baynes worked in various capacities on Queensland stations, and spent some years droving in the far West and in the North. Later he went to Western Australia to assist the Durack pioneers in establishing their cattle station in the Kimberley district. Subsequently he was one of a party sent out by Sir Thomas McIlwraith to investigate the possibilities of sugar-growing in the Western State. On his return to Queensland he joined his brothers in the business of the Graziers' Butchering and Meat Export Company, subsequently known as Baynes Brothers, who held properties on the Burnett and on the Darling Downs. Not only in Queensland but in the Southern States Mr. Baynes enjoyed a deservedly high reputation as a judge of live stock. As a judge of horses his services were always in request. He represented the association on many occasions at all the big shows in Australia, and has adjudicated at Melbourne, Sydney, and Adelaide. He owned many famous ring champions, including Comet, a champion buggy horse of Australia, and Spondulix, the great high jumper. For many years he served as honorary judge of the Queensland Turf Club, and was a member of that body for some time, and was a very popular and prominent participator for many seasons. He was also one of the founders of the Queensland Ambulance Transport Brigade. It was, however, as president of the Brisbane show that he was best known, and the "Brisbane Courier" in the course of a graceful and fitting tribute remarked:—"For that position the late Mr. Baynes was splendidly fitted, because he had an unusually wide knowledge of the primary and secondary industries of Queensland; he was a lover of good stock; he had a very sincere sympathy with the producer; and he was gifted with an engaging manner that helped to smooth away difficulties. In a masterful way Mr. Baynes performed a really great service for the Royal National Association, and incidentally for the State. He was essentially a worker, always anxious to help his association and his country, and he realised very fully the great importance to Queensland of the primary industries. His loss to Queensland will be considerable; to the Royal National Association it will be very great, because it will not be an easy matter to combine in one man the wide knowledge, the keen enthusiasm, and the genial manner of the late Mr. Ernest Baynes."

THE QUEENSLAND SUGAR INDUSTRY.

By H. T. EASTERBY, Director, Bureau of Sugar Experiment Stations.

PART X.

(b) Review of the Industry since Federation

(Continued).

THE last section of this history finished with the year 1921. In the following year the Government of the day decided to appoint a Royal Commission to inquire into the most suitable locations for sugar-mills which might be erected in the near future. This Commission, consisting of Mr. W. Harris, P.M., Chairman, and Messrs. Easterby and Salisbury, as members, commenced its investigations in October of that year. The localities in respect to which representations had been made to the Treasury as being probable or possible locations for the erection of new sugar-mills were as under:—

1. Cooktown.
2. Bailey Creek and Daintree River.
3. Atherton Tableland.
4. Liverpool Creek and Maria Creek.
5. Tully River and Banyan.
6. Ingham (Long Pocket and other lands).
7. Lower Burdekin district (Inkerman lands).
8. Bowen.
9. Mackay (Silent Grove, St. Helens, &c.).
10. Rockhampton district.
11. Goodnight Scrub (Bundaberg district).
12. Gayndah (Binjour Plateau and Reid's Creek).
13. Gympie (Goomboorian).
14. Yandina.
15. Buderim.
16. Miscellaneous (Peter Botte, Bloomfield, Lockhart, and Gilbert River).

This was a pretty formidable list, larger even than that which the two previous Commissions had to deal with.

Between 10th October and 13th December the Commission visited all the localities suggested, except those in No. 16.

Their report was made on the 30th December, 1922, and states that after carefully considering the evidence available with respect to each locality reported on, it was affirmed unhesitatingly that the most suitable location for a sugar-mill to be erected in the near future was undoubtedly in the Tully-Banyan area. In that locality the Commission considered there was room for a mill of a capacity at least equalling the South Johnstone Mill.

Two other sites were selected provisionally, viz.:—

(*a*) Bailey Creek and Daintree, conditionally on its being ascertained by a sufficient survey that satisfactory tramway connection at a reasonable cost could be made from Bailey Creek with the Daintree River lands beyond Thornton Range.

(*b*) Inkerman (Home Hill), if it is found that the increase in the production of cane in the Inkerman irrgation area and other lands in the vicinity became so great as to be beyond the crushing capacity available, and that crops other than sugar-cane could not be successfully raised.

A thorough and exhaustive inspection was made of the Tully lands; scrubs were traversed and mill and wharf sites inspected, while a great deal of evidence was taken in connection with these and other matters affecting the project. The mill site then selected by the Commission (Smyth's) was the one ultimately chosen for the erection of the Tully Mill.

As the outcome of the Commission's report the Government decided to at once proceed with the erection of the Tully Mill.

As this was the last Commission up to the present to sit on the subject of Central Mills, it may be of interest to refer to sites that were not visited, and of which little is yet known. At the present time there is small chance of these lands being required in the near future for sugar cultivation; but in the course of time, when the present lands can no longer provide for Australian consumption, attention will be drawn to the possibility of opening up new areas.

Good country was mentioned to the Commission as existing near Mount Peter Botte, which is situate between Port Douglas and Cooktown. These lands lie approximately between Peter Botte and the China Camp Diggings, and are surrounded by ranges 2,200 feet high, which have to be crossed to provide access. The area of cane land is estimated approximately at 20,000 acres, and is compact and fairly level; the soil is of good quality, alluvial, and covered with tropical jungle. The general trend of the country is along Roaring Meg River.

The Bloomfield lands were also spoken of, but these are of limited area, as far as good cane areas are concerned. Some of them were cultivated many years ago, but were abandoned. This district also suffers from difficulty of access.

The Lockhart country on the eastern side of the Peninsula was also brought under notice, but no information could be obtained as to this area.

The Gilbert River lands in the west of the Peninsula were stated to be suitable for canegrowing with irrigation, and it was considered that these lands possessed better soil than the Lower Burdekin district.

The small rainfall in these two lastmentioned localities, and the difficulty of access to market, may militate against their success as canegrowing districts, although the former disadvantage might perhaps be overcome by irrigation. It will be many years, however, before it will become necessary to search for new cane areas, and there may be other localities that would be suitable as well.

Continuing with the year 1922: This season opened up splendidly, and the sugar yield was the best since 1917—viz., 287,785 tons of 94 net titre sugar; but for a falling off in rainfall during the latter part of the year it would have been much higher.

The 1922 season was the last one covered by the Agreement between the Commonwealth and State Governments, which was made in 1920 for three years, providing for the payment of £30 6s. 8d. per ton for raw sugar. This Agreement was not renewed, and a protective duty of £11 6s. 8d. was asked for, but not granted. A duty of £9 6s. 8d. was fixed, which was felt to be disappointing.

The Commonwealth Government, however, was anxious to decontrol those industries (including sugar) which they had been handling in the

war period, and although the industry put up a strong fight for the £30 6s. 8d. Agreement the Commonwealth finally decided that they would grant an embargo against the entry of black-grown sugar into Australia up till 30th June, 1925, the industry to form a pool free from Commonwealth control to buy raw sugar for the 1923 season at £27 per ton of 94 net titre sugar f.o.b. mill. The price for the 1924 season to be determined after investigation by a tribunal, but not to exceed £27 per ton.

Another dry period was experienced in 1923, which was especially felt in the districts below Townsville. The Maryborough, Isis, Bundaberg, Mackay, and Lower Burdekin areas harvested poor crops. This low yield was compensated for by the excellent crops in all districts above Townsville. Although it was one of the driest years experienced, the yield of cane and sugar per acre in the far North was high. This bears out the general impression that dry years in the wetter districts of the North, such as Innisfail and Babinda, usually produce much better crops than do very wet seasons. No real droughts have ever occurred in Innisfail and Babinda, where the rainfall (though only about half the average in 1923) reached 78 and 94 inches respectively from 1st January to the end of October. The sugar crop for this year was 269,175 tons.

A tender for the erection of the Tully Mill was let this year to Walkers Limited, of Maryborough, the construction work being in the hands of Messrs. Barbat and Sons, of Ipswich. The clearing of the land for the mill site was commenced, and preparation made for the erection of the mill buildngs. Farmers, too, that year were busy clearing their holdings and getting in cane, and there was, even at that time, a considerable population and four stores.

An important event took place in December of this year when the through line from Brisbane to Townsville was opened, which again opened up new country, particularly north of Mackay as far up as Bloomsbury.

In January, 1924, a tribunal appointed by the Commonwealth and State Governments, as provided for in the Agreement of 1922, made investigations into the industry. The basis of the inquiry was to be the cost of efficient production in reasonably good districts, and under normal conditions, and the price fixed was not to exceed £27 per ton. This tribunal, after careful investigation, concluded that the price of £27 per ton for raw sugar was fair and reasonable.

Following on perhaps the severest drought experienced in many of the sugar areas, 1924 proved an excellent season. The drought persisted into January, but after that the rains were plentiful and well distributed, and the crop was a record one, the yield of sugar being 409,136 tons, of which it was necessary to export 74,000 tons overseas. This was the commencing year of the export trade in sugar, which has continued ever since.

During this year Messrs. Bennett, Bell, and Kerr were sent abroad to receive special training in the sugar industry, in sugar-mill technology, sugar-cane diseases, and soil physics and chemistry, respectively.

The erection of the Tully Mill was proceeding this year, and tramway work and bridge building was going on rapidly. A large area of

scrub had been fallen, and numerous business places were established. A temporary school with about seventy-eight children on the roll was also opened.

In 1924 the last link of the main line from Brisbane to Cairns was completed by the placing in position of the last span of the Daradgee Bridge, over the Johnstone River, and in December passengers were able to travel by rail from Brisbane to Cairns.

The Babinda Mill was this year taken over from the Government by the farmers concerned.

In April, 1925, a conference of those interested in the milling and growing of cane was called by the Minister of Agriculture, when the position as to surplus sugar was carefully reviewed. It was then determined that the whole of the season's crop of cane should be harvested, and that the making of the necessary arrangements as to the marketing, &c., should be left in the hands of the Sugar Board.

During this year (1925) the embargo was extended for three years as from the 31st August, 1925, under certain conditions as to prices and concessions to manufacturers.

A Royal Commission in the person of Mr. T. A. Ferry, who was then Under Secretary to the Chief Secretary's Department, was appointed to inquire into and report on the social and economic effect of the increase in number of aliens in North Queensland. This will be dealt with in a subsequent section.

Later in the year trouble arose with the export sugar through an unfortunate dispute on British ships. In consequence, large quantities of sugar remained in mill stores, and some of the mills had to erect increased storage accommodation to meet the situation.

Industrial unrest on interstate vessels and the railways also affected the industry, and some of the mills had to close down for a period, thus extending the crushings into less satisfactory months of the year. A rotary strike of wharf labourers at Cairns and Innisfail had the effect of holding up for some time the transport of sugar to Australian refineries.

Proposals for the erection of a distillery at Plane Creek were made this year to utilise molasses and cassava for the purpose of manufacturing power alcohol.

The yield of sugar this season was particularly good, being 485,585 tons—the record to date. This meant a big export which reached 211,000 tons. This large surplus having to be sold overseas at world's prices caused considerable loss, and gave rise to much discussion. Many schemes were brought forward with the view of alleviating the trouble, including proposals for the allocation of quotas to the various mills. The principal reason for the surplus sugar, however, was the large increase in the area devoted to canegrowing, and also in the number of canegrowers. This was in a great measure due to the opening up of new lands by the North Coast Railway to Cairns. In 1920 the area cultivated amounted to 162,619 acres, the number of canegrowers being 3,930, while in 1925 the area under cane was 269,509 acres, an increase of 106,890 or 65 per cent., and the number of growers of cane of 5 acres and over was 6,730 or 2,800 more than in 1920, an increase of 70 per cent.

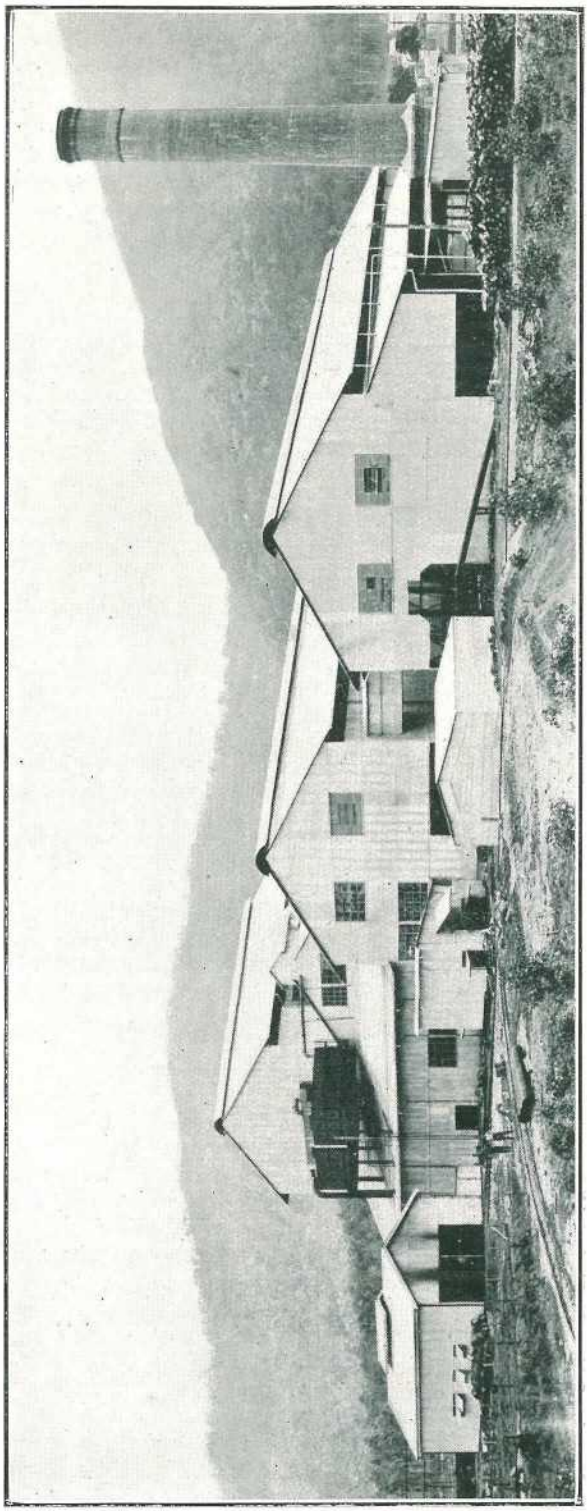


PLATE 106.—CENTRAL SUGAR MILL, TULLY.

The largest sugar-mill in Australia—viz., the Tully—was completed this year with a short crushing, which did not commence till November, so that the operations were more in the nature of a trial run.

By this time much settlement had taken place in the Tully area, due to the opening of the mill and the completion of the railway to Cairns. What had been an inaccessible unpopulated belt of jungle two or three years previously was now carrying an ever-increasing settlement of farmers and business people, who were speedily opening up roads and establishing cane farms and a township with all the modern adjuncts of civilisation.

In the following year, 1926, the crop was considerably affected by dry weather conditions, in those districts south of Townsville more especially. A most unusual occurrence this year was the large amount of damage done by frosts on the Herbert River. Frosts also caused losses in Mackay and in the more southern sugar areas.

The Queensland Cane Growers' Council was created this year by Act of Parliament, entitled "*The Primary Producers' Organisation and Marketing Act of* 1926," which provided that for the sugar industry there should be constituted—

(*a*) Mill Suppliers' Committees,
(*b*) District Canegrowers' Executives,
(*c*) The Queensland Cane Growers' Council.

These bodies were to manage the affairs of the sugar industry generally, and the Cane Growers' Council was authorised to convene an Annual Sugar Industry Conference, while special conferences might be convened by the Council on matters of urgent business as the said Council might deem desirable, also to raise levies to be expended for the benefit of the industry generally or locally.

The power alcohol industry in Queensland was also initiated this year by the erection of a factory and distillation plant at the Plane Creek mill, Mackay. At the outset it was proposed to utilise molasses together with a starch-bearing plant known as cassava, of which about 100 acres had been planted around Plane Creek. The distillation from cassava roots, however, was subsequently abandoned. At the time it was estimated that a ton of molasses would yield some 65 gallons of power alcohol. The factory did not commence operations till the following year. The estimated cost of erection at that time was about £35,000.

The Farleigh mill, which had been owned by a private firm, was taken over by the farmers this season.

The sugar yield in 1926 was almost 100,000 tons below that of 1925, only amounting to 389,272 tons. In consequence the export was much lower—viz., 74,777 tons, as compared with 211,000 tons in 1925.

During the following year (1927) consideration was given by the Central Cane Prices Board to cane assignments, and the secretary visited a number of districts for the purpose of collecting information to enable the Board to determine the areas to be assigned to growers.

This year a co-operative association of farmers took over the South Johnstone Sugar Mill from the Government, and this led to great industrial turmoil at the mill, lasting from May till September. During this strike much bitterness was engendered, a picket was shot, stone-throwing and assaults were common, and finally the railways became

involved, which led to the dismissal of practically the whole staff and their re-engagement a few days later. Finally the strike was settled, though the farmers had to work the mill at first with one shift, and afterwards with two shifts; also volunteer labour was engaged for a time. The mill, however, was unable to crush all the cane due to loss of time, and the tonnage was reduced from about 207,000 to 155,000.

The power alcohol distillery at Plane Creek was opened this year, but met with manufacturing difficulties, and further additions were necessary.

The 1927 season was, on the whole, favourable to growth, though a cyclone at Cairns and disastrous floods at Innisfail and Ingham caused considerable loss. The worst feature of the Ingham floods, however, was the heavy loss of life by drowning fatalities, which tragedies will remain in the memories of many people for years to come. The loss of cane in the northern areas affected by the cyclone and floods was estimated at the time to be about 120,000 tons.

Frosts did considerable damage in the Moreton area this year, and to some extent also at Bundaberg. Mackay had a very fine crop, amounting to upwards of 101,000 tons of 94 net titre sugar.

The yield for the State was 485,745 tons of 94 net titre sugar; this was somewhat higher than in 1925, and constituted the record to date. The export sugar was 152,384 tons.

In 1928 the Agreement between the Commonwealth and State Governments for continuance of sugar prices and the maintenance of the embargo was renewed for another three years, the Federal Government reserving the right to revise Australian prices if increased preference was granted to export sugar from Australia by Great Britain or any Dominion. The subject of this preference has not yet been alluded to, but will be dealt with in the section on prices later on.

The 1928 season was wet in all sugar districts in the earlier part of the year, and excessively wet in the South. The rains were followed by a long period of dry weather, which induced an early arrowing of the crop, more particularly from Mackay north. Serious floods, cyclones, and frosts were not experienced, and labour worked steadily and well throughout the year. Some waterside trouble, however, was present, and difficulties with storage accommodation were in evidence, and many farmers had to come to the rescue and load and even man small sugar vessels in order to get their sugar away.

The commercial cane sugar in the cane was high this year, and the output constituted the largest tonnage of sugar ever manufactured in Queensland—viz., 520,620 tons of 94 net titre sugar. The tons of cane required to make one ton of sugar that season were the lowest up to that time—viz., 7·18. The export of sugar was 186,703 tons.

In 1929 the crop was not so large due to frosts in the southern areas, long continued dry weather in some places, and considerable grub damage in northern sugar localities. The sugar made reached a total of 518,516 tons of 94 net titre sugar, while the tons of cane required to make one ton of sugar was even below that of 1928, being 6·91. The commercial cane sugar in the cane was remarkably high in 1929.

Having brought this history up to 1929 in a general way, it is proposed to deal with mills and mill work in the next article.

[TO BE CONTINUED.]

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS.

Always Select Good Seed Cane for Planting.

The importance of careful seed selection cannot be over-estimated, this being one of those common-sense methods which is bound to yield favourable results. Nature never makes a mistake. Throughout both the animal and vegetable world one finds an unalterable law to the effect that "like produces like"; in other words, we shall always reap the same kind of thing that we sow. What would you think of an orchardist who, when propagating young apples or peaches, was to carelessly take the buds from unhealthy trees or from those which he knew bore fruit of inferior quality?

Do not forget that it is quite possible for any canegrower to thoughtlessly introduce into a clean plantation insects or fungus diseases which in the course of a few years will inevitably reduce his yield of cane very materially. When planting, reject any sets showing tunnels of the weevil borer at the cut ends. Do not obtain same, if you can avoid doing so, from a plantation or even from a locality known to be borer-infested. Such seed often harbours young larvæ of this beetle, which later on may so riddle a set as to make it useless for support of the young cane, thus causing unsightly misses. In the Burdekin district care must be taken to select seed which is free from tunnels of the "Giant Termite." When using top plants of Badila or other soft varieties a lookout should be kept for the presence of moth borers, external indications of which are betrayed by surface tunnels more or less blocked by webbing covered by pellets of excreta.

Entomological Work should Interest Canegrowers.

I would again emphasise the fact that more interest could, with advantage, be shown by our cane farmers in practical nature study in connection with the economy of the various insects occurring in canefields. Unless able to tell friends from foes, certain useful parasitic or predaceous species might easily be mistaken for injurious insects and be promptly destroyed. When uncertain of the habits of wasps, beetles, caterpillars, &c., they should be dropped into a little bottle containing methylated spirits and water (half and half strength) and sent to the Entomologist for identification and advice. We are always pleased to see growers at the Meringa Experiment Station, where an interesting collection of insects is on view, which comprises about 2,200 different species, and considerably over 7,000 specimens. In addition to this general collection, our Museum contains many handsome showcases depicting the life-history of primary cane pests, coloured diagrams, and numerous spirit specimens of insects, &c., of a miscellaneous nature. This Station is one of the rail motor stops, and can be reached from Cairns in about three-quarters of an hour.

Keep a Lookout for the Weevil Borer.

At the present time, during the milling season, growers are advised to look now and then at the cut ends of cane being harvested. In the event of these beetle borers chancing to occur on a plantation, conspicuous evidence of their tunnelling will at once be revealed at those places where the cane knife has severed the basal ends of such infested cane sticks. In cases where this insect appears likely to obtain a footing, the farmer concerned should at once communicate with the Entomologist at Meringa Experiment Station.

VICTORIAN BEET-GROWERS AND THE EMBARGO.

The following extracts, taken from a report in a Gippsland (Victoria) paper, of a meeting of the beet-growers at Maffra recently with the Victorian Minister for Agriculture (Hon. W. Slater), the Hon. T. Patterson, M.H.R., Federal Representative of the district, and Mr. J. W. McLachlan, M.L.A., State member, are interesting at the present juncture, and indicate that the sugar industry of Queensland is likely to have the Victorian beet-growers behind it in connection with the embargo.

Mr. Noble, President of the Beet Growers' League, said:—"The position arising from a review of the sugar agreement by a committee appointed by the Federal Government not only occasioned concern to beet-growers but also to the State Minister for Agriculture, as it may affect the price of beet sugar as well as cane sugar in the near future. There was, therefore, a likelihood of growers being faced with more serious problems than confronted them at present. They would have to await the decision of the Federal Government in regard to the fate of the sugar industry in Australia."

Councillor T. W. Murphy, of Lindenow, said: "The future of the industry is at present in the clouds," and he hoped that "the Federal Government would prevail in regard to the agreement; it would be suicidal to interfere with the development of so great an industry." He hoped the Minister would use his influence to have the Sugar Agreement retained.

The State Minister for Agriculture said: "Possibly the agreement would be subject to modification, and that being the case, it must affect the beet-growing industry in the Maffra district, and also the price. One speaker had suggested that Victoria should be supplied exclusively from the beet factory by the industry being expanded. It was, however, utterly impossible to disregard the sugar industry as a whole. It was too late in the day for one State to put up barriers against another State. The expansion of the cane-sugar industry had been remarkable." He intended to recommend to Cabinet that prices for next season's beets be as follows:—

Up to 15 per cent.	40s. per ton.
Over 15 up to 15½ per cent.	41s. per ton.
Over 15½ up to 16 per cent.	42s. per ton.
Over 16 up to 16½ per cent.	43s. per ton.
Over 16½ per cent.	44s. per ton.

If, however, the retail price of sugar be reduced, the beetgrowers will be paid 1s. a ton less for every £1 a ton reduction. The minimum price paid to growers would be 35s. a ton.

Mr. Foley said: "Drop the price for the Melbourne housewives, and we will give up growing beet."

The Minister: "They will realise the difficulties confronting the beetgrowers."

Mr. Foley: "The Housewives' Association says, 'Shut up the beet factory.' "

The Minister said that some of his own constituents wanted to grow beet, but he could not support their requests, in their own interests. "When the cane-sugar product fell below the requirements of Australia then you could expand your industry to your heart's content, but it would be inadvisable to do at present."

Mr. McLachlan: "What is the Queensland Sugar Agreement?"

The Minister: "The price Australia has to pay for keeping the industry white."

SUGAR INCOMES.

The Director of the Bureau of Sugar Experiment Stations, Mr. Easterby, remarking on a paragraph in the Press of the 30th August, in connection with the report of the Commissioner of Income Tax, said recently that the figures did not indicate a particularly prosperous state of the sugar farmer, seeing that less than 13 per cent. pay income tax, while the remaining 87 per cent., apparently, do not make enough to pay tax. The figures show that 2 per cent. of the cane farmers pay on incomes of from £1,000 to £2,000; 4.2 per cent. on incomes of £500 to £1,000; and 6.6 per cent. on incomes from £250 to £500. For an industry that is continually being represented as being so highly prosperous the fact that 87 per cent. of the farmers engaged therein do not make enough to pay income tax is a rather startling commentary, and bears out the contention that sugar-growing is in the hands of a large number of struggling farmers.

THE BROWN CUTWORM (*Euxoa radians* Guen.).

By G. A. CURRIE, B.Sc.

PART III.

NATURAL ENEMIES.

THESE can be considered under three headings—parasites, diseases, and predators.

The word "parasite" will be used not in the strict zoological sense, but to be applied to enemies living on or in individual cutworms.

No intensive study of the parasitism of *Euxoa radians* has been made, but the following are the deductions from observations of three seasons. Parasites of the egg and larva have been found, and it is probable that the pupa is subject to some of these also.

Egg Parasites.

Small chalcid wasps (Plate VIII., fig. 7) were found to parasitise the eggs of *Euxoa radians*. These chalcids were identified by A. A. Girault as *Schedius euxoæ*. They were noted as being abundant in December, 1926,[1] but have not since been found in great numbers.

Larval Parasites.

A tachinid, *Ballardia pallipes* Curran,[10] first bred out by E. Ballard from the larvæ of *Euxoa radians*, has been found fairly often in cutworms near Brisbane. During the seasons under review, however, it has not been common in any of the areas which have been visited. In October, 1928, out of eighty cutworms three flies of this species emerged.

A large tachinid was bred out from material collected in the Mundubbera district during October, 1927, but the identification has not yet come to hand. It has not been found to be numerous in any area so far.

An unidentified braconid wasp (Plate VIII., fig. 6), probably belonging to genus *Apanteles*, has been bred from material collected at Biloela, Gatton, and from the suburbs of Brisbane. It is a small black wasp about 2 mm. in length and about 4 mm. from tip to tip of the out-spread wings. The adult emerges from a white cocoon by a circular lid at one end. The pupation period in summer is about five to six days.

A cutworm larva may be parasitised by this braconid in any of the last three instars, and sixty larvæ of the parasite have been seen to emerge from a single specimen of *Euxoa radians*. Of eighty cutworms collected at Brisbane in October, 1928, six were parasitised by this braconid. In October, 1926, a collection of cutworms at Gatton showed that out of sixty individuals 78 per cent. were parasitised, but at Biloela in October, 1927, only two out of 1,200 cutworms were found to be parasitised by the braconid.

PLATE VIII.

Parasites and Predators.

Fig. 1. Bombyliid fly (*Villa* sp.) ex pupa of *Euxoa radians* Guen. x 2.

Fig. 2. Tachinid fly ex immature stage of *Remigea frugalis* Fabr. x 2.

Fig. 3. Tachinid fly *Ballardia pallipes* Curr. ex larvæ of *Euxoa radians* Guen. x 2.

Fig. 4. Sphegid wasp *Ammophila suspiciosa* Sm. Adult female collects larvæ of *Euxoa radians* Guen. as food for her own offspring. x 2.

Fig. 5. Ichneuman wasp *Lissopimpla semipunctata* Kirby, ex pupa of *Remigea frugalis* Fabr., x 2.

Fig. 6. Braconid wasps (*Apanteles* sp.) ex larvæ of *Euxoa radians* Guen., x 10.

Fig. 7. *Schedius euxoæ* Girault, ex eggs of *Euxoa radians* Guen., x 35.

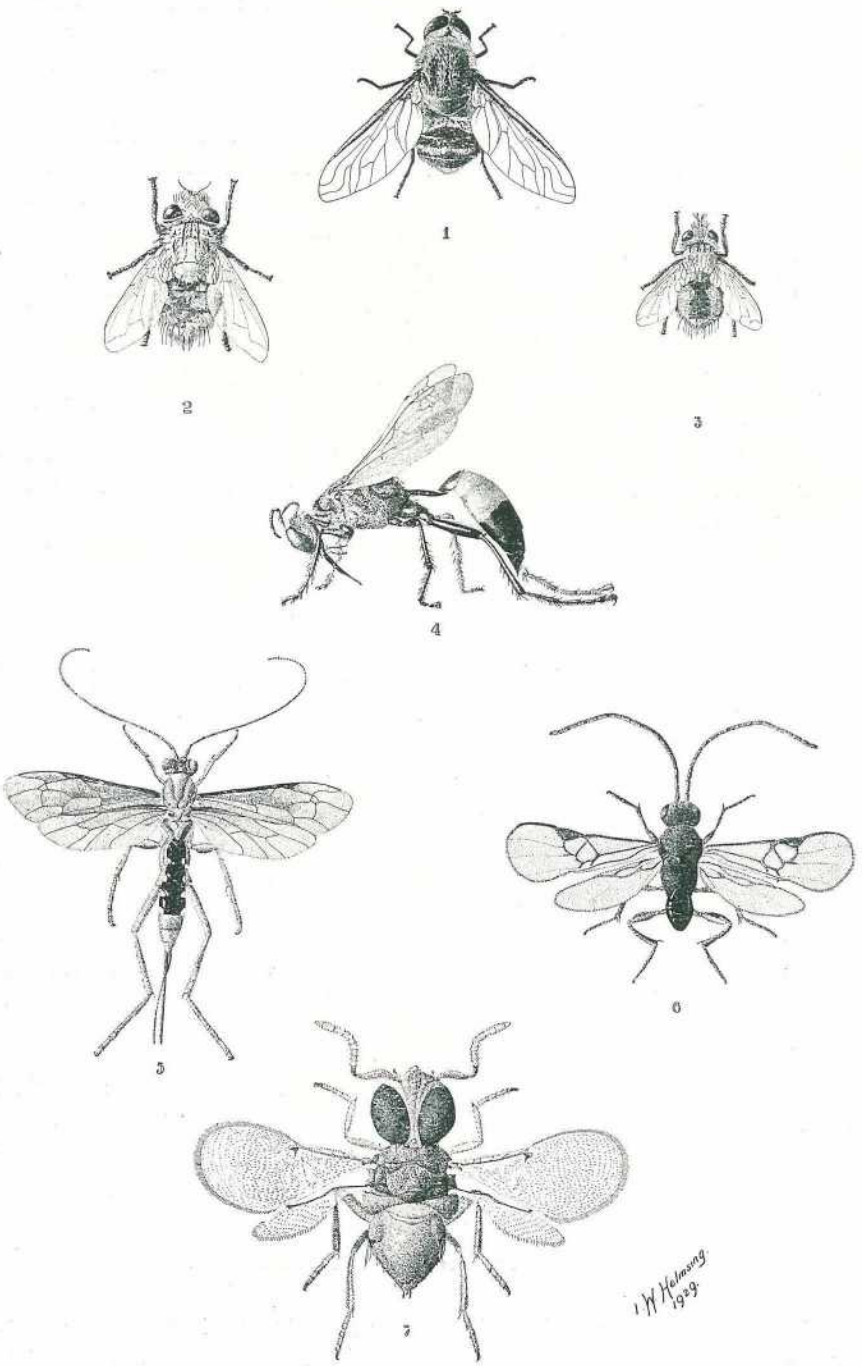


PLATE VIII.

This wide diversity of results shows how impossible it is to form an idea of percentage of parastism without collections of cutworms being made at regular intervals over a long period and in different situations. The application of biometric methods to the interpretation of results is most essential in this connection.

On various occasions dark brown hymenopterous eggs have been found attached to the prothorax of the bigger sizes of *Euxoa radians* larvæ. They have hatched out into ectoparasitic hymenopterous larvæ, but have not yet been bred through for identification.

In connection with parasitism in general, it was observed that certain habitats were more favoured by one parasite than by another, so that the control value of the parasite would vary with the habitat of the cutworm. For example, cutworms working in a field which was well covered with grass and herbage intermingled with such food plants as pigweed were more heavily parasitised by the small braconid wasps than they were in more exposed situations with little cover. On the other hand, the open field with little cover was favoured by the hymenopterous predator to be described later.

It seems clear that if the cutworms were breeding in a habitat favoured by some parasite with a wide catholicity of taste in lepidopterous larvæ, it would be much more subject to attack by that parasite than if it chose some situation not so favoured. This would be particularly true where the cutworm had a wider range of tolerance of natural surroundings than any particular parasite might possess.

Pupal Parasites.

In October, 1928, Mr. L. M. Hodge, manager of the Cotton Research Station, Biloela, bred out a Bombyliid of the genus *Villa* from the pupa of *Euxoa radians*. This is the only observation of this nature recorded. (Plate VIII., fig. 1.)

Newman[11] published a photograph of a dipterous and of a hymenopterous parasite of *Euxoa radians*. The fly belongs to the Tachinidæ, and he considered the hymenopteron to be a member of the genus *Ophion*.

Diseases.

Deaths from causes other than parasites, predators, mechanical injuries, or poisons can be considered under the heading "diseases."

Septicæmia is a well-known cause of cutworm deaths, and in the Queensland experiments now under discussion large numbers of larvæ died showing symptoms of some such ailment.

A recent Russian work[12] on cutworm septicæmia established the following points:—

Cutworms which had died showing symptoms of septicæmia were examined bacteriologically and three organisms were isolated. These were *Bacillus agrotidis typhoides, Micrococcus saccatus* Nugula and *Bacillus subtilis* F. Cohn. All cutworms inoculated with any or all of these organisms developed symptoms of septicæmia after one or two days and

eventually succumbed. Cutworms fed on food infected with these organisms gave a much lower percentage of positive results than those inoculated with the organisms. This held true even when external conditions were most favourable to the development of the disease—i.e., high temperature with high humidity. Under these conditions only 50 per cent. of the larvæ succumbed to feeding on infected material.

Symptoms of the disease in these experiments was a sluggishness and failure to feed on the part of the larvæ, followed by flaccidity of the body and death; subsequently the dead body often became mummified.

In the case of *Euxoa radians*, high temperatures combined with high atmospheric humidity were conditions predisposing to disease. In 1926, at Biloela Research Farm, it was found most difficult to keep cutworms alive in the laboratory during the muggy weather in the latter part of December. In the field, too, the incidence of the pest suddenly decreased with the onset of wet conditions. In the laboratory at Brisbane hundreds of cutworm larvæ died off within a few days of the onset of hot humid weather in February, 1928.

The symptoms of the disease were as follows:—A caterpillar would cease feeding and its fæces would become fluid and muddy. During daylight, instead of resting well buried in soil under cover, it would be positively phototropic and come to the surface to lie there sluggishly. Sometimes it would climb upwards on any object offering a foothold and cling to the top. When the temperature of the air was high, the larva would frequently move restlessly about, obviously ill at ease and losing co-ordination between the different parts of its body. The dorsum became suffused with a pink flush and ventrally a curdy white appearance was seen. Death supervened in an hour or two in high temperature, but took longer at low temperature. The dead body was a loose sack of dirty fluid.

In the Mundubbera area on the Burnett River, a heavy attack of cutworms was experienced in October and November, 1926. A widespread epidemic broke out amongst the cutworms, mostly sixth instar larvæ being affected. Enormous numbers climbed up fence posts, clung there and died, the bodies then shrivelling up. This marked the end of the serious damage for that season.

The pathogenic organisms have not been isolated in the case of *Euxoa radians*, but there seems little doubt that the predisposing causes are high atmospheric humidity and high temperatures.

In the laboratory, conditions which encouraged the survival of cutworm larvæ obtained when temperatures ranged from 62 deg. Fahr. to about 80 deg. Fahr. daily and relative humidities from 40 to about 80 per cent., with an average about 60 per cent. In the field, where maximum temperatures in excess of 90 deg. Fahr. were frequently experienced for short periods during the day, with night temperatures about 10 deg. Fahr. and "medial" relative humidities, conditions were very favourable to cutworm survival and rapid development.

The range of humidities and temperatures experienced during November, when cutworm larvæ were thriving well and had no losses, is given below, contrasted with a week in February when the cutworms were dying off rapidly.

TABLE VII.

Average Temperatures and Humidities for One Week during November, 1927, in which Cutworms were Healthy and no losses occurred.

Date.	Temperature, °F.		Relative Humidities, %.		
November.	Maximum.	Minimum.	9 a.m.	3 p.m.	9 p.m.
1st	79·9	61·7	53	52	77
2nd	81·2	62·1	58	51	74
3rd	80·6	67·0	57	53	76
4th	81·5	66·2	62	57	83
5th	85·1	67·0	86	40	74
6th	80·4	62·1	57	51	74
7th	80·7	67·2	65	51	74

Average Temperatures and Humidities for One Week during February, 1928, when Cutworms were Diseased and Dying off rapidly.

Date.	Temperature, °F.		Relative Humidities, %.		
February.	Maximum.	Minimum.	9 a.m.	3 p.m.	9 p.m.
14th	84·2	72·1	85	71	97
15th	85·2	73·7	87	81	88
16th	87·7	74·9	96	88	90
17th	77·3	74·6	92	99	89
18th	79·3	74·4	95	93	95
19th	83·0	74·4	88	93	93
20th	79·5	72·3	94	99	83

A few cases occurred where cutworms newly dead contained fungus growth, and a white fungus covered the body after a short period.

Some pupæ died having fungus growth protruding through the spiracles, but in no case was this common in the period under review, and no identification was made.

Predators.

Birds are effective enemies of insects in general and lepidopterous larvæ render heavy toll to them. Domestic poultry and more particularly turkeys devour large numbers of larvæ. Once they have found the cutworm larvæ hiding just under the surface, they will most assiduously search for them.

Wild birds of insectivorous orders soon congregate to the feast when very heavy attacks of caterpillars are in progress, although cutworms seem to be more immune from this form of control than the larvæ of *Heliothis obsoleta*, which do not hide in the soil. The pee-wee or Magpie Lark (*Grallina cyanoleuca*), the Grey or Collared Butcher Bird (*Cracticus torquatus*), the Pied Butcher Bird (*Cracticus nigrogularis*), the crow (*Corvus cecilæ*), the Pied Crow Shrike or Pied Currawong (*Strepera graculina*), and the Straw-necked Ibis (*Threskiornis*

spinicollis) have been seen eating cutworms, and the adult moths may be snapped up by these and other birds.

The larvæ of some carabid beetles have been seen to attack and devour cutworm larvæ, while spiders may sometimes catch the adults in their webs. Being general feeders, however, these forms are not likely to act as effective controls.

A most useful predator on *Euxoa radians* larvæ was observed at work in the field at Biloela during the seasons of 1926, 1927, and 1928. This is a predatory wasp *Ammophila suspiciosa*, which is included as a predator in spite of the fact that her larvæ live ectoparasitically on the cutworms. Her own habit of actively searching for cutworms is predatory. The female is about an inch in length and has a slender petiole to the abdomen. (Plate VIII., fig. 4.) The head, thorax, legs, petiole, and caudal half of the abdomen are black, while the rest of the abdomen is a rich yellow brown. The wings are transparent, and of a reddish brown shade. The males are much smaller than the females. The females work during sunny hours and are found in dull weather resting under maize leaves or some other cover of a similar nature. In October, November, and December they are to be seen visiting the flowers for nectar in the sunshine or searching diligently for their prey.

The female, with the urge of the future upon her, first digs a hole almost vertically into the ground, of a width sufficient to allow her easy ingress. The forelegs and mandibles only, seem to be used in digging, the earth being thrown back in a fine shower. Suddenly she stops digging and runs off in search of a cutworm. Her movements are jerky and her bearing alert as she runs rapidly amongst the vegetation like a terrier hot on a scent. She stops, digs in a flurry, and drags forth a squirming larva which is quickly stung into a state of paralysis. She then grips it on the ventral surface between the head and the first pair of thoracic legs, swings it under her, and runs off rapidly astride her victim's motionless body.

When nearing her burrow she ascends some eminence such as a clod, stick, or plant and lays the cutworm carefully thereon, then flies to the hole.

There she digs furiously, carrying a load of earth up to the surface, returning for another, backing out with that, and so on till she feels that the depth is sufficient. She then returns for the cutworm, carries it to the burrow, and herself entering first backwards, pulls it down after her, head first. Almost immediately she reappears and starts scratching the earth back into the hole. When some earth has been sent down she runs down the hole and butts it firm with her head, repeating this at intervals until surface level is reached.

When the hole is almost completely filled she chooses a stone of suitable size, places it on the entrance and then beats the earth round it into position. After patting the surface flat and smooth she flies off.

On being dug up the burrow is found to be about $2\frac{1}{8}$ inches deep, nearly vertical, and at the bottom the larva is coiled up with the large

white sausage-shaped *Ammophila* egg fixed to one of the anterior abdominal segments. Only larvæ in the fifth and sixth instars were chosen by the wasp as food for her offspring.

A small grey fly about the size of a house fly, with yellow bands on its abdomen (probably a bombyliid) often accompanies the female in her search, and sits by on a convenient stone while the burrow is being opened up. Whenever the prey has been pulled into the hole the fly hurls itself down after it, emerges again almost immediately, and would appear to be parasitic on the *Ammophila* larva.

The subterranean and nocturnal habits of cutworms give some immunity from many natural enemies, but the digging wasp has the secret of finding them out in their hiding places.

Photo: J. A. Weddell.

Plate 107.—Display by the the Division of Entomology and Plant Pathology at the recent Cleveland Show.

BRIGHT TOBACCO IN NORTH QUEENSLAND.

Compiled by N. A. R. POLLOCK, H.D.A., Senior Instructor in Agriculture.

In the subjoined notes Mr. Pollock gives some interesting particulars of prospective tobacco producing country in the North, together with an account of tests made on leaf produced in the seasons 1927-28 *and* 1928-29. *They will be welcomed by all concerned with the opening up of new furrows in agricultural development in this State.—Ed.*

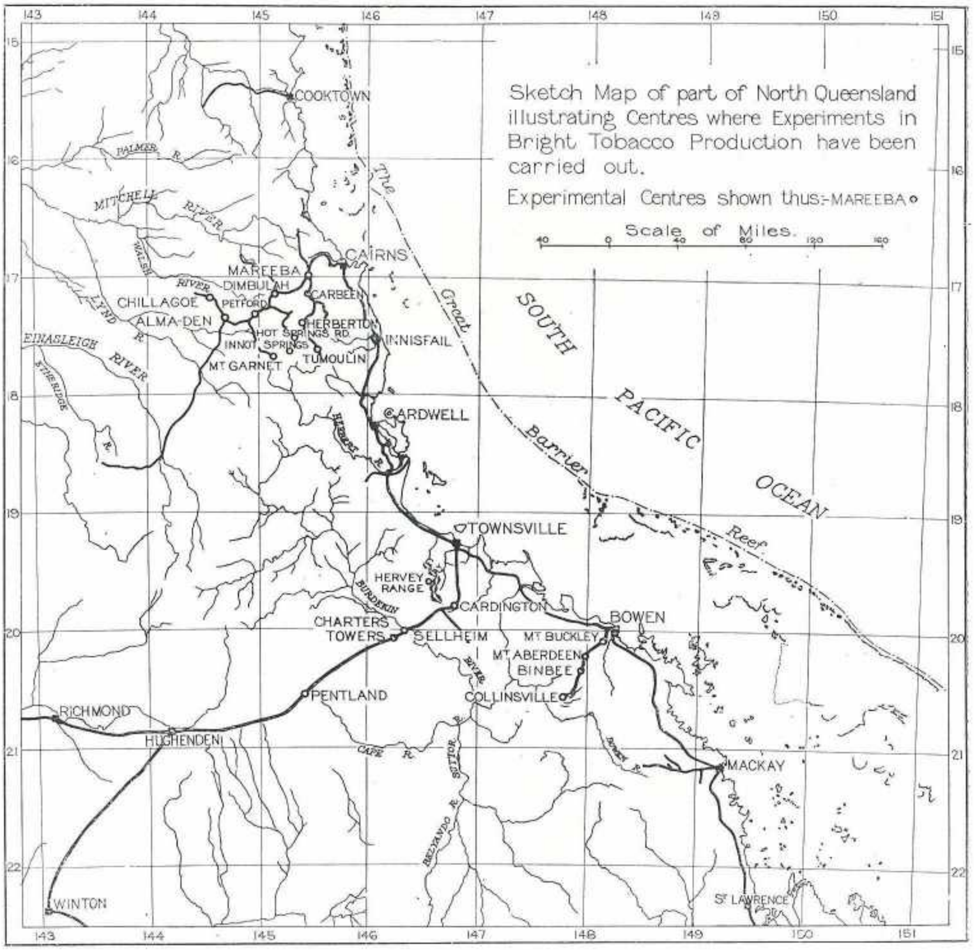
THE initial experiments in the production of bright tobacco for pipe and cigarette smoking carried out by the Queensland Department of Agriculture in collaboration with the Australian Tobacco Investigation, in a series of exploratory plots in the 1927-28 season, tested an area of some 30,000 square miles of country, from the latitude of Mareeba in the north to that of Bowen in the south, a distance directly of 250 miles, and inland to Pentland and Chillagoe, distant respectively 180 and 96 miles due west from the coast.

The localities of these plots are shown on the accompanying map, as at Mount Buckley, Mount Aberdeen, Binbee, and Collinsville on the Bowen to Collinsville Railway; Hervey's Range, some 25 miles from Townsville, on the old Georgetown road; Cardington, Sellheim, Charters Towers, and Pentland on the Great Northern Railway; and Mareeba, Dimbulah, Petford, Alma-den, Chillagoe, Mount Garnet, Innot Springs, Hot Springs road, Tumoulin, Herberton, and Carbeen, which are centres on the highlands west of Cairns; and the volcanic soils of the Atherton Tableland.

These plots, twenty-five in number, were grown on various classes of soil commonly met with that were considered as possibly suited for the production of bright tobacco. The results were uniformly good, giving evidence that a very large proportion of bright leaf could be cured from crops grown in each district, while the qualities of burn, texture, and aroma under test were most encouraging.

Culling from the progress report of the Australian Tobacco Investigation to January, 1930, and Bulletin 2 of that Investigation entitled "The Smoking Qualities of Australian Tobacco," a preliminary report presented to the Executive Committee by C. M. Slagg, M.Sc., Director of the Australian Tobacco Investigation, the following evidence of the superior quality of bright tobacco leaf grown in North Queensland is offered:—

"In general, the texture and colour of the 1928 experimental leaf from North Queensland was quite good. A high percentage of bright colour was obtained, and in addition to a fair quantity of thin cuttery tobacco, the fillers and wrappers showed good elasticity and the quality of retaining pliability and a soft velvety feeling even when exposed to a dry atmosphere for long periods. Smoking tests were made on all samples, and the burn and ash were found excellent. The aroma, while


Sketch Map of part of North Queensland illustrating Centres where Experiments in Bright Tobacco Production have been carried out.
Experimental Centres shown thus:-MAREEBA
Scale of Miles.
COOKTOWN
CAIRNS
MAREEBA
DIMBULAH
CHILLAGOE
PETFORD
ALMA-DEN
CARBEEN
HERBERTON
HOT SPRINGS RD
INNOT SPRINGS
TUMOULIN
MT GARNET
INNISFAIL
CARDWELL
TOWNSVILLE
HERVEY RANGE
CARDINGTON
CHARTERS TOWERS
SELLHEIM
BOWEN
MT BUCKLEY
MT ABERDEEN
BINBEE
COLLINSVILLE
PENTLAND
RICHMOND
HUGHENDEN
MACKAY
ST LAWRENCE
WINTON
SOUTH
PACIFIC
OCEAN
The Great Barrier Reef
PALMER R.
MITCHELL RIVER
WALSH RIVER
LYND R.
EINASLEIGH RIVER
ETHERIDGE R.
HERBERT R.
BURDEKIN RIVER
CAPE R.
SUTTOR R.
BELYANDO R.
BOWEN R.

different from American tobacco, and also different from the aroma of tobacco thus far tested from other parts of Australia, was for the most part mild and not definitely objectionable.

The leaf from all twenty-five plots was graded into 136 lots, which Mr. Slagg tabulated as follows:—

Grades.	Per cent.	Colours.	Per cent.
Lugs	7·10	Lemon	19·44
Cutters	20·93	Orange	45·56
Wrappers	5·49	Bright mahogany	8·29
Fillers	66·48	Mahogany	26·71
	100·00	Dark	0·0
			100·00

TABLE IV.

Summarised Comparative Aroma of some Selected 1928 Australian Tobacco Samples.

State.	Number of Growers Crops Tested.	Number of Lots Tested.	Lots with Mild, Agreeable Aroma.		Lots with Passable Aroma.		Lots with Indifferent to Poor Aroma.		Lots with Bad Aroma.	
			No.	Per Cent.	No.	Per Cent.	No.	Per Cent.	No.	Per Cent.
Victoria	20	48	5	10	14	29	15	31	14	29
New South Wales ..	14	44	5	11	7	16	18	41	14	32
North Queensland ..	25	136	44	32·5	60	44	30	22	2	1·5
South Australia	13	29	2	7	6	21	9	31	12	41
Western Australia ..	19	27	4	15	9	33	9	33	5	18
Tasmania	1	6	0	0	2	33	4	66	0	0
	92	290	60	..	98	..	85	..	47	..

TABLE V.

The Comparative Burn (Combustion) of some Selected 1928 Australian Tobacco Samples.

State.	Number of Growers' Crops Tested.	Number of Lots Tested.	Number of Lots with Good to Excellent Burn.	Number of Lots with Indifferent to Fair Burn.	Number of Lots with Poor to very Poor Burn.
Victoria	20	48	44	3	1
New South Wales ..	14	44	43	1	0
North Queensland ..	25	136	136	0	0
South Australia	13	29	2	24	3
Western Australia ..	19	27	12	12	3
Tasmania	1	6	6	0	0

"All of the North Queensland 1928 lots were retested for smoking qualities after twelve months ageing in a packed condition. The aged samples were compared directly with the samples cut from the freshly-cured leaf in 1928. In nearly every case the aroma was found to be

better in the aged samples. The aroma was mellower and better rounded out, lacking much of the sharpness and pungency exhibited by the samples cut before ageing."

It will be noted from the foregoing that while no comparison of grades and colours is instituted with leaf grown elsewhere, those with aroma and burn are outstandingly in favour of that from North Queensland.

A regrettable feature of tobacco leaf produced in southern latitudes of which complaint has been made is its failure to improve when aged. North Queensland leaf, on the other hand, according to Mr. Slagg, has shown definite improvement with age.

In consequence of the uniform results obtained in all the districts tried, it was decided by the Australian Tobacco Investigation to establish an experimental tobacco farm at Mareeba, since that district, besides offering excellent climatic conditions, provided very large areas carrying the class of soil considered most suitable for production.

Evidence in this connection extracted from the report of the Select Committee on Tobacco Growing in Australia is as follows, Mr. R. W. Howell, Superintendent of the Tobacco Experiment Station at Mareeba, being the witness:—

> Question 4622. *By Mr. Slagg:* Did you take part in the tests made with Queensland leaf in 1927 and 1928?—Yes.
>
> Question 4623. Do you recollect that in those tests we found very little difference in the smoking qualities of the flue-cured tobacco obtained from the 1927-1928 exploratory test plots over a wide range of country extending from Bowen in the south to Mareeba in the north, provided that the soil conditions were approximately similar?—Yes, they were practically identical.
>
> Question 4624. Do you also recollect that it was on that account that we decided to concentrate our experimental work to North Queensland, at Mareeba?—Yes. The area chosen for experimental work was selected because it was representative of a large area of country that possessed soil and climatic conditions conducive to the production of the best tobacco. It thoroughly represented the North.

During the seasons 1928-29 and 1929-30 further trials were conducted at this farm under the supervision of an officer of the Investigation with a wide knowledge and lengthy experience of tobacco culture, while in other districts at Pentland, Charters Towers, Hervey's Range, and Chillagoe, crops on a commercial scale and on experimental areas were supervised by officers of the Department of Agriculture.

The result from these further trials was, in each instance, to repeat the success obtained in the exploratory plots and to establish the fact that bright tobacco possessing good burning qualities, accompanied by a pleasing and agreeable aroma, such as would be acceptable to the smoking public of Australia and which would be readily purchased by the manufacturers, could be produced on the poor sandy soils of the Mareeba and other districts of North Queensland possessing similar climatic conditions.

The prices received for the various grades of leaf purchased by the British Australasian Tobacco Company Pty., Ltd., Sydney, from the

small crops grown at Pentland, Charters Towers, and Hervey's Range, respectively, were, including bonuses:—

PENTLAND.

Grade.	Price per lb. s. d.
Lemon	3 5
Bright mahogany	3 0
Mahogany, lugs	2 2

CHARTERS TOWERS.

Variety: South's Improved Hester—	s. d.
Lemon, long	3 0
Lemon, short	2 2
Bright mahogany A	3 4
Bright mahogany B	3 1
Short bright mahogany A	2 1
Long mahogany A	3 0
Short mahogany A	1 7
Long mahogany B	2 0
Short mahogany B	1 6

Variety: White Stem Orinoco—	s. d.
Lemon	3 6½
Lemon scrap	3 0
Long bright mahogany A	3 3
Long bright mahogany B	3 1½
Short bright mahogany B	2 2
Long mahogany C	2 1
Short mahogany C	1 9

HERVEY'S RANGE (Townsville District).

Variety: South's Improved Hester—	s. d.
Lemon, long, 1A	3 6
Lemon, short, 1A	3 3
Lemon 1B	3 8
Lemon, scrap	3 3
Orange, long	2 2
Orange, short	1 6
Orange, lugs	2 0
Mahogany A	3 1
Mahogany B	3 0

Variety · White Stem Orinoco—	s. d.
Lemon	3 7
Orange A	3 4
Orange B	2 1
Orange, lugs	3 0
Mahogany A	2 1
Mahogany B	1 4

All the crops from which these lots of leaf were marketed had been sown rather late in the season and had experienced frost to such an extent as to disallow the computation of the weight of leaf per acre; they were, however, estimated to yield between 500 and 700 lb. per acre. In the prices obtained, those of 3s. and over included a bonus addition of 1s., those of 2s. and over of 3d., while those under 2s. received no bonus addition.

PLATE 108.—A PORTION OF THIS YEAR'S CROP AT THE EXPERIMENT STATION, MAREEBA. Note the class of soil.

PLATE 109.—ON THE EXPERIMENT STATION AT MAREEBA, SHOWING A PORTION OF THE 1930 CROP AND FLUE-CURING BARN AND BULK STORE.

In forwarding the account sales the purchasers remarked:—

"We need hardly point out to you on the present valuations of these small lots of leaf and assuming a normal season with a normal crop, the resultant yield to the grower would be extremely profitable on our present valuations without any bonus being paid."

Dealing with the grades of leaf from these centres together with a lot grown at Chillagoe and that produced at the Tobacco Experiment Station at Mareeba, Mr. Slagg, in his preliminary report, advises as follows:—

1929 North Queensland Plots.—In addition to leaf grown at Mareeba, a total of five outside plots was also cured and tested. Extremely wet weather during the growing season interfered seriously with the growth of all plots except those at Chillagoe. However, some leaf was secured from most of the areas, and smoking tests made. Due to the unfavourable season, the leaf texture was much heavier than in 1928. The leaf colours, however, were better, due to the fact that there were larger lots of leaf available for curing at one time, and to a new and better curing kiln being built. Two private kilns were also constructed, one at Hervey's Range, near Townsville, and one at Charters Towers. Most of the leaf grown at Hervey's Range, and all of that grown at Charters Towers and Pentland, was cured in these kilns. One small lot of Hervey's Range tobacco was transported to Mareeba and cured there. The summarised data on leaf texture, colour, and aroma follow:—

Texture.—Of seven exploratory test plots in North Queensland in 1928-29, two, or 29 per cent., were rated as possessing a very good texture, and five, or 71 per cent., as having a good texture.

Colour.—Eight per cent. was lemon, 76 per cent. was orange, 10 per cent. was mahogany, and 6·5 per cent. was dark.

Aroma.—Of a total of thirty-three lots tested, 82 per cent. were rated as possessing a mild and agreeable aroma, 15 per cent. were passable or fair, and 3 per cent. possessed an indifferent to poor aroma.

1928-29 Exploratory Test Plot Summary.

The following tables show in summarised form the data for 1928-29 from the exploratory test plots in the different States. It must be pointed out, however, that it is very difficult to assort properly into a small number of classes of texture and colour, leaf produced on different and widely-separated soils. The aromas encountered are also of widely differing character, even when mild and agreeable.

Summary of Leaf Texture in Exploratory Test Plots 1928–29.

State.	No of Plots.	Percentages.					
		Very Good.	Good.	Fairly Good.	Fair.	Poor.	Very Poor.
Victoria	8	..	..	25	..	75	..
North Queensland	7	29	71	..	..	..	..
South Australia	15	..	..	..	7	73	20
Western Australia	20	..	..	20	25	30	25

SUMMARY OF LEAF COLOURS IN EXPLORATORY TEST PLOTS, 1928–29.

State.	Number of Plots.	Percentages.				
		Lemon.	Orange.	Mahogany.	Dark.	Nondescript.
Victoria	8	0·1	15·7	58·4	3·2	22·6
North Queensland	7	7·8	75·9	9·8	6·5	..
South Australia	15	..	..	34·2	59·1	6·7
Western Australia	20	1·1	10·9	62·3	5·0	20·7

SUMMARY OF SMOKING AROMA IN EXPLORATORY TEST PLOTS, 1928–29.

State.	No. of Exploratory Plots.	No. of Lots Tested.	Percentages.			
			Mild and Agreeable Aroma.	Passable or Fair Aroma.	Indifferent to Poor Aroma.	Bad Aroma.
Victoria	8	34	17	21	24	38
North Queensland	7	33	82	15	3	..
South Australia	15	18	..	6	55	39
Western Australia ..	20	35	40	29	28	3

The superiority of North Queensland leaf over that grown elsewhere is again outstanding in the features of colour, texture, and aroma that are considered when purchase is made by manufacturers.

Crops grown in the North during the season 1929-1930 have not yet been reported on by Mr. Slagg, but it is understood equal if not better results will be forthcoming. The result of a small crop grown in the Bowen district during this season, in proportion of bright colour, texture, burn, and aroma, gives promise of comparing very favourably with that produced in other Northern centres.

Further support of the suitability of North Queensland for bright tobacco production will be noted in the following sworn evidence given in the inquiry of the Select Committee on Tobacco Growing recently concluded:—

Evidence given by Mr. C. J. Tregenna, Tobacco Expert, Department of Agriculture, N.S.W.—

> Question 1299. Would you be prepared to smoke cigarettes made half of Australian and half of American leaf?—If the Australian leaf came from Stawell, in Victoria, or North Queensland, a 50-50 mixture with American tobacco would give a satisfactory cigarette. The position would be quite different if tobacco grown in Tamworth, Manilla, or Tumut were used.
>
> Question 1341. Do you think that ultimately almost the whole of our tobacco requirements will be produced in Australia?—Yes.
>
> Question 1342. Do you think that that tobacco will be produced in the existing areas?—I think it will come from North Queensland.
>
> Question 1359. What is your opinion of North Queensland as a tobacco-growing area?—It is the only place in Australia that I

have visited which I think will produce high-grade tobacco. I think that we can grow there tobacco which will displace much of the American product now imported.

Question 1360. To what parts of North Queensland do you refer?—The country around Mareeba. The leaf grown there is the best Australian leaf I have seen.

Evidence given by Mr. N. A. R. Pollock, Senior Instructor in Agriculture, Department of Agriculture, Queensland—

Question 4389. What percentage of bright leaf do you anticipate can be produced from the Mareeba lands?—In normal seasons the most suitable land in the Mareeba district could produce almost 100 per cent. bright tobacco if handled by experienced labour; certainly over 90 per cent.

Evidence of Mr. R. W. Howell, Supervisor, Australian Tobacco Investigation, stationed at Mareeba Experimental Station, North Queensland—

Question 4577. Do you expect a crop of half a ton to the acre?—No; 500 to 750 lb. would be as much as we could expect. Perhaps with very favourable seasons one could expect a half a ton to the acre.

Question 4578. Do you expect to get 100 per cent. bright leaf off the land?—Very nearly. I have seen 100 per cent. bright leaf gathered at Mareeba. At a conservative basis, I would average it from 80 per cent. to 90 per cent. bright leaf.

Question 4579. *By Mr. Jones:* Do you class mahogany as "bright"?—Only bright mahogany.

Question 4580. Do you get much lemon leaf in the Mareeba district?—I have seen crops cured in that district with 100 per cent. lemon leaf. I have never seen a similar result in America. My report gives a coloured percentage for twenty-two plots, some of which were planted in very heavy ground that could not be expected to produce good tobacco.

In the foregoing evidence the reference to Mareeba lands may be taken to refer generally to all districts in which bright tobacco has been produced in North Queensland, for the results tabulated by Mr. Slagg and referred to in his report were the outcome of examination of leaf from all districts without consideration to any specific locality. So it may be understood that leaf of excellent quality may be produced in the Bowen to Collinsville areas and Townsville, Charters Towers to Pentland areas equally with that of the Mareeba and other centres on the highlands west of Cairns and the volcanic areas of the Tableland.

Soils.—The soils in all districts tested for tobacco-leaf production are very similar, being sandy, varying slightly in depth, character of subsoil, texture, and fertility, but all proved as capable of producing leaf of good colour, texture, and smoking quality. Such soils were derived very largely from granitic rocks, as well as from sandstones, of the desert and other series, but, of whatever origin, have proved suitable for tobacco production. It cannot be said that the soil of any one district is superior to that of another, but certain classes considered most suitable will, of course, vary in their extent in different districts. The most favoured soil is that of fine sandy character, light in texture, preferably of a foot or upwards in depth, that is naturally well drained or so situate as to easily be made so.

PLATE 110.—HARVESTING LEAF, HERVEY RANGE, 1930
Note how lower leaves ripen first.

PLATE 111.—TOBACCO CROP, EXPERIMENT STATION, MAREEBA, 1930.

Climates.—While soils as far as character is concerned suggest no great superiority of one district over another, the climates certainly differ. While all are satisfactory for the health and wellbeing of the settler, being more pleasant, perhaps, in those of the highlands than in those of lower altitude, the degree of atmospheric humidity, prevalence or otherwise of direct sunshine, distribution of rainfall, and degree of evaporation are factors in the production of leaf quality which allow of discrimination.

Thus districts contiguous to others of heavier and more persistent rainfall, such as those on the highlands west of Cairns and the volcanic area of the Tableland, enjoy a more suitable degree of atmospheric humidity, a prevalence of passing clouds, allowing intermittent shade, with consequent lower evaporation and a more even temperature, as well as a better distributed rainfall, than do others less favourably situated.

Altitudes.—The altitudes of the districts proved for bright tobacco in North Queensland have had no effect on the quality of leaf produced, that at Mount Buckley, 91 feet above sea level, being equal to that grown at Tumoulin, 3,162 feet above sea level. The following are the altitudes above sea level of the localities where the exploratory plots were grown:—

	Feet.		Feet
Mount Buckley	91	Carbeen	1,988
Mount Aberdeen	336	Herberton	2,890
Binbee	642	Tumoulin	3,162
Collinsville	601	Dimbulah	1,512
Hervey's Range	1,400	Petford	1,577
Cardington	330	Mount Garnet	2,131
Sellheim	835	Innot Springs	2,200
Charters Towers	1,004	Hot Springs road	2,250
Pentland	1,318	Almaden	1,617
Mareeba	1,325	Chillagoe	1,154

Season for Tobacco.—To produce the best quality of tobacco leaf it should be grown in the warmest months of the year when sufficient rainfall is experienced. This, in North Queensland, coincides with the rainy or wet season, which commences usually in December and embraces the following months of January, February, and part of March.

Tobacco plants are raised in seed-beds, sown usually during the second or third week of November, which are watered by hand to allow of plants four to six weeks old being available for setting out in the field shortly after the first falls of rain, opening the wet season, have provided a sufficiency of moisture in the soil.

Growth will then be made through January and February and the leaf ripen for harvest in March and April, when finer weather can be expected to prevail.

Rainfall.—The monthly average rainfall, during the growing season, of recording stations nearest to the localities where exploratory plots were grown are detailed as follows:—

District.	December.	January.	February.	March.	April.
	Inches.	Inches.	Inches.	Inches.	Inches.
Bowen	4·46	10·20	8·97	4·71	2·88
Townsville	5·58	11·29	11·46	7·56	3·54
Charters Towers	3·55	5·54	4·51	3·92	1·63
Pentland	3·62	6·77	4·58	3·68	1·51
Mareeba	4·29	9·32	7·48	7·46	2·87
Mount Garnet	5·32	7·16	5·63	5·58	1·77
Herberton	5·72	9·52	7·67	8·93	5·06
Chillagoe	6·00	8·01	4·10	5·82	1·40

Tobacco Varieties.—While sufficient data has not yet been secured to indicate the most suitable variety for any one district, the uniformly good results obtained with the Hickory Pryor and Warne varieties wherever tried enables them to be recommended.

PROPOSED TOBACCO SETTLEMENT.

In view of the evidence adduced that the production of bright tobacco in suitable districts of North Queensland will prove a profitable industry to the grower, and tend to obviate the necessity of sending huge sums yearly overseas for Australian requirements in that direction, the Queensland Government has decided to make available for immediate settlement, under specially favourable conditions, areas in the Mareeba district, which have been specially selected with due attention to ease of access, soil quality, water supply, &c., as ideally suited for tobacco production on a commercial scale. The designs of these areas into 26 and 10 portions respectively are now available.

Areas.—It will be noted that the maximum area of any portion is 219 acres and the minimum 105 acres, and that the amount of first-class tobacco soil on each farm will range from 65 to 126 acres.

Soil.—The soil suggested for tobacco production on each portion is a sandy soil of fine texture a foot and upwards in depth over a decomposed granitic subsoil or cement, comparing more than favourably with that on the Tobacco Investigation Farm, near Mareeba.

Water.—Most of the portions have frontages to creeks with permanent water, but on five or six portions it will be necessary to sink wells to provide water during the dry months, July to December. These wells, however, will not be very deep and will tap a sufficient supply for all requirements.

Topography.—Level to gentle slopes.

Access.—The portions designed on Granite Creek will be served by a siding 7 miles from Mareeba, on the Chillagoe Railway, which is within the area and from which the furthest farm is less than 3 miles distant, and also by road from Mareeba. The portions designed at Dimbulah will be served by the Dimbulah Railway Station, which is within 3 miles of the furthest farm by an easy road.

Flora.—The natural grasses on each area are mainly Kangaroo (*Themeda* sp.), Bunch and tall Spear (*Heteropogon* sp.), Blady (*Imperata* sp.), and others of little fodder value. The trees and shrubs on the soils suggested for tobacco are largely Bloodwood (*E. corymbosa*), Western Bloodwood (*E. terminalis*), with occasional examples of Grey Box (*E. Leptophleba*), Narrow-leaved Ironbark (*E. crebra*), Poplar Gum (*E. Alba*), Bluegum (*T. tereticornis*), Cabbage Gum (*E. papuana*), Moreton Bay Ash (*E. tesselaris*), and species of Acacia, Grevillea, Alphitonia, Melaleuca, &c.

Clearing Costs.—The trees, while being plentiful, are not large, so that clearing costs will not be heavy. It is not anticipated that a cost of £12 per acre will be exceeded on any portion, an average being estimated at £9 per acre. When the trees have been killed by ringbarking or poisoning for two years, it is expected that clearing costs will be reduced by 50 per cent. when tree pullers are used in the wet season.

General.—The areas exhibit absolutely virgin soil, no occupation in any form having ever taken place. While there are large areas of similar soil in the district of equal quality, preference was given to these areas for immediate occupation owing to their ease of access, which will facilitate the cropping of 5 acres on each farm desired during the coming season.

Descriptive Notes of the Mareeba District as a Suitable Tobacco-growing Area.

Town.—Mareeba is an important town on the railway, 46 miles inland from Cairns, which is connected by rail with Townsville and Brisbane, distant, respectively, 211 and 1,043 miles.

It is a busy railway centre, being the junction of the Tableland and Chillagoe Railways, and also the point of departure for trains on the Mount Molloy line, which junctions with the main line to Cairns at Biboohra, 5 miles distant.

The town is situated at the confluence of Granite Creek and the Barron River, and has a population of approximately 1,500 inhabitants. It is well laid out and possesses an excellent water supply, which is pumped from the Barron River to reservoirs and thence reticulated throughout. Excellent conveniences exist in a general hospital, banks, telegraph and post office with telephone exchange, court house, hotels, stores, &c. The bacon factory of the Atherton Tableland Co-operative Bacon Company is situated at Floreat, within a mile of the town, and an up-to-date meatworks will be found at Biboohra 5 miles on the railway towards Cairns.

District.—The country, presently included, in the Mareeba district, extends for perhaps 8 miles east and southward and for upwards of 40 miles north to south-westward of the town.

Altitude.—The altitude above sea level ranges from 1,325 feet at Mareeba to slightly over 2,000 feet in other parts, the major portion having an average altitude of around 1,500 feet.

Climate.—The climate is an excellent one, extremes of heat and cold being very rare. A maximum shade temperature of 100 degrees is rarely encountered, while frosts in winter seldom occur.

Though situated in the tropical zone and within 17½ degrees of the Equator, the unpleasant steamy heat peculiar to the tropical coast in summer is not experienced, owing to the higher elevation and lighter average annual rainfall, and the nights are invariably cool.

Suitability for Tobacco.—The climate is considered to be ideal for the production of bright tobacco, since the daily temperatures in the growing season rarely exceed 90 degrees in the shade by day or fall below 70 degrees at night. Being contiguous, in addition, to the heavier rainfall area extending from Cairns in the east to the Tableland in the south, a desirable degree of atmospheric humidity is maintained, which with the intermittent shade from passing clouds disallows excessive evaporation, and thus permits that evenness of growth and progress to maturity so desirable in the production of high-class tobacco leaf.

Rainfall Statistics.—The rainfalls recorded at the Mareeba Post Office will apply very generally to the whole of the district. From these records it is noted that the annual average rainfall over a period of

thirty-two years is 34·92 inches, while the monthly average precipitation for the same period is—

	Inches.		Inches
January	9·31	July	0·32
February	7·48	August	0·17
March	7·46	September	0·26
April	2·87	October	0·56
May	0·52	November	1·23
June	0·51	December	4·29

Soils.—The soils, it is understood, compare very favourably, especially in texture, with the best of those occurring in the bright tobacco-producing districts of the United States of America. They are generally derived from the disintegration of granitic rock and characterised by a desirable degree of fineness with a very small proportion of clay.

In the total elements of fertility they must be classed as poor, especially in phosphoric acid and nitrogen content, while that of potash and lime can be classed as but fair.

The amount of humus and decaying organic matter is low, but sufficient for some years before the necessity for a supplement, by ploughing under a growing crop, will arise.

Value for Tobacco.—Generally speaking, the soil is of a character that will allow a ready response to the application of fertiliser, and in this connection is admirably adapted for tobacco production since the growth of the plant can be regulated by the amount of fertiliser applied.

Depth of Soil.—The depth to which these soils occur are from 12 inches to several feet, occasionally over a porous clayey subsoil, but generally bottoming on decomposed granite or a cement.

Drainage.—Tobacco soil areas occur, for the most part, on gently sloping ridges and possess, generally, a good drainage under ordinary falls of rain. Provision, however, is advisable in deep, open drains to carry off the surplus of storm waters and the seepage from higher levels.

The tobacco plant is adversely affected by saturated soil conditions, but in a recent instance tobacco plants growing on an area so drained at the Tobacco Experiment Farm successfully withstood a phenomenal rainfall of 15 inches in a week.

Water Supplies.—The district under review may be described as excellently watered, for though most of the streams are perennial, a number cease to flow during the dry months, from June to December. During this period, however, water can be obtained in sufficient quantity for requirements under the sands in these creeks, or in wells nearby, at no great depth. In the months of heaviest average rainfall—from December to March—water supplies are abundant in all directions.

Topography.—The country varies from comparatively level, through gentle slopes, to hilly, and offers little difficulty in obtaining easy gradients in roadmaking throughout. During heavy rains little or no damage can be expected from flood waters.

Tree growths occur as an open forest and comprise in Eucalypts principally Bloodwoods (most common on tobacco soils), Grey Box, Narrow-leaved Ironbark, Poplar Gum, Cabbage Gum, Blue Gum, and Moreton Bay Ash, with species of Acacia, Grevillea, Alphitonia,

PLATE 112.—TOBACCO CROP AT HERVEY RANGE

PLATE 113.—STRINGING TOBACCO LEAF PREPARATORY TO PLACING IN THE FLUE-CURING BARN, HERVEY RANGE, 1930.

Erythrophlœum (Ironwood), Casuarina, Callitris (Cypress pine), &c. In certain parts Cypress pine is rather plentiful, but most often on country that is somewhat broken.

Clearing Costs.—The cost of clearing the land preparatory to production will not be high in any case, and is not expected to exceed an average of £10 per acre for green timber, and a good deal less if the trees have been killed for a couple of years. During the wet season, when the soils readily yield, economy in this direction will be obtained by the use of tree-pulling machinery.

TOBACCO PRODUCTION.

The combination of an ideal climate, faultless soil with a suitable rainfall, indicates the district of Mareeba as eminently adapted for the production of high-grade tobacco leaf. While seasons of light rainfall occur as in other parts of the State, an insufficiency to secure a crop is regarded as extremely unlikely.

Weight of Crop.—The return of cured leaf per acre can be expected to vary according to season, soil, and the variety grown. Taking a standard variety, such as Hickory Pryor, which has proved eminently adapted, the yields in a normal season may be expected to range from 450 lb. to 750 lb. on soils suggested as most suitable, the average yield of 600 lb. per acre being regarded as probable.

Value of Crop.—When properly grown and cured the lighter crops almost invariably yield larger percentages of the highest grades of leaf. With a present protective tariff of 3s. 6d. per lb., the value of superfine leaf would command a price approaching 5s. per lb., while all leaf graded bright would bring not less than 3s. per lb. As results up to the present have indicated a production of at least 80 per cent. of bright colour within these yields, it might be safe to calculate on an average return of 3s. 6d. per lb.

Assuming, however, that an average crop would be 500 lb. and that the average price was 2s. 6d. per lb., which is a most conservative estimate, the yield would be £62 10s. per acre; at an average of 3s. it would be £75, and at an average of 3s. 6d., the sum of £87 10s. per acre would be obtained.

Cost of Production.—An estimate of the cost of production in the United States published some four years ago was stated to be £27 1s. 8d. per acre.

Allowing for less skilled labour, and making provision for depreciation of buildings, &c., the maximum cost of production in North Queensland should not exceed an amount of £35 per acre, but be somewhat lower.

Profit on Growing.—Allowing cost of production at £35 per acre and gross return at the lowest estimate of £62 10s., the net profit would be £27 10s. per acre, which is very considerably more than the average net return secured with an acre of any other crop at present grown commercially.

Times of Planting.—The most suitable time for transplanting from seed-bed to field is suggested as from mid-December to mid-January, or shortly after the first heavy falls of rain occur in the wet season. This will necessitate the sowing of the seed-beds between the first and third weeks of November.

It takes usually from seven to ten days for tobacco seed to germinate, and it is considered inadvisable to set out in the field plants older than eight weeks, those four to six weeks old being most desirable.

Harvest of Leaf.—The tobacco leaf should ripen through March and April, and, in general, be all cured by May.

Marketing.—Bulking and grading operations may be expected to occupy attention through May, June, and July, allowing market to be completed in the month of August.

Value of Other Crops.—Except with tobacco, commercial success is not considered possible with crops climatically suited to the district, since the cost of fertilisers necessary for growth on the poor soil, coupled with an expected low return and the small prices to be expected, would allow any net profit secured to be insufficient to provide a reasonable living.

As rotative crops, however, from which the tobacco crop will benefit, the growth of sorghum varieties, which includes broom millet, velvet beans and cowpeas for seed, sweet potatoes, and cotton are suggested as practicable.

TOBACCO GROWING IN NORTH QUEENSLAND.

CONDITIONS OF SETTLEMENT.

IN the course of a recent announcement, the Minister for Agriculture and Stock, Mr. Harry F. Walker, said that the scheme adopted by the Government to stimulate the production of bright tobacco leaf in North Queensland provides for the opening up of twenty-five portions of land in the Mareeba district for selection under the group system as agricultural homesteads, the purchase price being 2s. 6d. an acre, payable in annual instalments of 3d. per acre over a period of ten years, when a freehold title will be available; or such may be obtained at the expiration of the first five years (during which personal residence is obligatory) by paying the balance. Under the Act, improvements to the value of a fence around the block must be effected within the first five years.

In order to ensure the cropping of 5 acres this coming season with tobacco, since there would be insufficient time after occupation is effected for the selector to do so, Mr. Walker said he had arranged with the Minister for Labour and Industry, Mr. Sizer, that such an area on each portion should be grubbed, cleared, and ploughed, the work of grubbing and clearing to be carried out by local unemployed under the relief scheme, and the ploughing by contract, after tenders had been invited.

It was also decided that the young tobacco plants necessary to plant up each 5 acres should be raised in community seed beds, under the supervision of an officer of the Department of Agriculture, who would also be deputed to locate the site for the 5 acres of cultivation on each farm, and to see that its preparation was satisfactorily accomplished.

The Main Roads Commission is to provide all equipment, in camp gear, tools, &c., and officers to control the work in co-operation with the representative of the Department of Agriculture. The initial expenditure will be charged to the unemployed relief fund, which will later be recouped by payments from the selectors concerned, spread over a term of years, for the actual cost of the grubbing and clearing, if such does not exceed £12 an acre, and, at the rate of £1 per 1,000, for the plants obtained. It is not thought that an average amount of £12 for grubbing, clearing, and ploughing each acre will be exceeded, but, if it is, any excess will be borne by the unemployed relief fund, and not charged to the selector.

In the contract to be signed, provision is made for the ploughing to closely follow the clearing, so that both operations will be concluded by the middle of November at latest.

Early last month fifty unemployed workers, in local centres, were transported to the job, camps fixed, the necessary tools provided, and the work commenced.

It is understood, from the number of inquiries in hand, that applications in excess of the number required will be made for the portions available, in which case allotment will be made in the usual way by ballot.

As applications will be received up to 14th October, it is expected, allotment and notification of successful applicants being made immediately thereafter, that occupation will take effect about the first week in November.

The first job of the settler will be to make a camp, after which he should go on with fencing and securing necessary tools and implements, as well as horses or other tractive power.

Very shortly after this, the erection of the flue-curing barn and bulk shed should be undertaken. Though harvesting operations will not be commenced until March, it will be a wise plan to have all necessary buildings erected in good time. Plans and specifications of these buildings will shortly be available from the Department of Agriculture.

As most of the settlers will have little or no experience of tobacco, it has been arranged that officers of the Department of Agriculture will be available to supervise all cultural operations and be on hand to give instruction in harvesting, curing, and subsequent operations, until the leaf is sent away for sale.

TOBACCO SEED BEDS.

By N. A. R. POLLOCK, H.D.A., Senior Instructor in Agriculture.

THE production of strong, healthy plants, free from disease and insect infestation, that will most easily bear transplanting to the field and there make satisfactory growth, is a prime factor in successful tobacco-leaf production. Not only will such plants make better growth and reach a more even maturity, but they will, through their unimpaired vigour, offer a greater resistance to attack by disease than would others less well grown.

Soil.

A tobacco seed, being exceedingly small, can provide but a small amount of nourishment for the young seedling, which in consequence is soon forced to draw its food from the soil. A friable fertile soil of fine texture, with a good humus content and capable of easy reduction to a fine tilth, should therefore be selected for the seed beds. A sandy silt loam, or a fine textured alluvial, or other loam, is considered very suitable.

Where such a soil is not available on the holding, the existing soil can be built up by the addition of fine sand or heavy soil, whichever is called for, to improve the texture, and by the addition of well-rotted organic matter, either as leaf mould or animal manure, or both, to improve both texture and fertility. The manure, if used, should be well dug in some time before the seed beds are required in order to become thoroughly incorporated with the soil.

Drainage.

Good drainage is imperative for tobacco seed beds, since the seedling plants will not make a satisfactory growth on wet soil, and will also be liable to damage from fungus diseases so engendered.

Site.

The situation of the seed beds should be as sheltered as possible from strong winds, which are apt to damage the coverings (alluded to later on) and to dry out the soil. It should be such as to allow of easy drainage, if it is not naturally provided, and convenient for ease of access and attention. Proximity to a permanent supply of water is of the utmost importance. Tree growths should not be close enough to cast their shade on the beds or, through their roots, to rob them of food or moisture.

Area.

In calculating the area of seed bed required, though it is usual to allow 100 square feet as sufficient for each of the acres it is intended to plant, a surplus of 50 per cent. is considered advisable to allow for eventualities.

It is also advisable to make two sowings at intervals of two or three weeks in case sufficient rain does not fall to allow of setting out the first raised plants before they are too old. It is considered inadvisable to set out in the field plants that are older than eight weeks; plants four to six weeks old are much to be preferred.

Size.

The seed beds may be formed to any desired length, but they should not be of greater width than will allow ease of weeding or of lifting plants preparatory to transplanting. A satisfactory width for such purpose is 3 feet, with a distance of 2 feet between beds to make provision for pathways. The width of 3 feet corresponds with the width of butter muslin or cheese cloth, which material is regarded as very suitable for covering purposes.

Preparation.

The land, having been first cleared of all surface growth, should be thoroughly pulverised by ploughing or spading to a depth of 5 or 6 inches and brought to a fine tilth. The seed beds should now be marked out by drawing drills at intervals of 5 feet, to make the breadth of beds, and across these again for the lengths desired.

These drills should be the depth of the ploughing and approximately 18 inches wide, the soil therefrom being thrown back and spread over the beds thus formed. A double mould-board plough is very suitable, or an ordinary plough may be used. The beds will thus be 3 feet 6 inches wide, which will allow of the framework, enclosing the 3 feet to be seeded, resting thereon.

Sterilising.

Before further preparing the seed beds for sowing, the soil should be sterilised. There are several methods of doing this—viz: by steaming, applying boiling water, solutions of formalin or similar agents, but the most effective in general estimation, and recommended for Queensland growers, is the application of direct heat from the firing of tree branches, brushwood, or similar heat-giving material piled on the beds to such an extent as will, when fired, produce sufficient heat in the soil to cook a 4-oz. potato buried 3 inches deep or an egg buried 5 inches deep. It is difficult to state the exact amount of material for burning purposes, but the equivalent of poles 3 inches in diameter laid side by side is regarded as likely to prove satisfactory. Successful sterilisation of the soil is most readily accomplished when the amount of moisture therein is what is regarded as satisfactory for cultural operations. Excess of moisture is as undesirable as a deficiency, since in either case the penetration of the desired heat in the soil is less easily permitted.

Properly burnt beds show a more or less reddish tinge of colour, while the soil is rendered more friable and breaks easily to a fine powder. The object of burning the beds as well as the soil for a couple of feet surrounding them is to destroy any fungus spores, weed seeds, insects, or other life that may cause damage to the young plants.

Another effect of burning the soil is to render the nitrogen content more readily available. The addition of the ash from the material burnt also tends to increase fertility.

Time to Burn.

The time to burn the seed beds is preferably a few days or a week before it is desired to sow the seed.

Final Preparation.

After the fire has burnt out and the soil is sufficiently cool, all unburnt pieces of wood and large charcoal should be removed and the beds and paths (disarranged when placing the firing material thereon) trimmed up to proper shape. The fine ashes from the firing should now be thoroughly incorporated with the soil of the seed beds, which at the same time should be reduced to the desired degree of fineness by digging and raking back and forth to a depth of 3 inches and finally levelled off.

Framework.

It is necessary for tobacco seed beds, more especially in North Queensland, to be shaded when the seed is germinating, as the heat from the direct rays of the sun is apt to scorch the young seedlings; it is also advisable for the beds to be protected against the ingress of insects which would be likely to cause damage. To get this effect satisfactorily and to allow of the covering used for shading not interfering with the growth of the plants, a frame or box with sides 6 or 7 inches high should enclose the beds. A suitable frame can be made of boards 6 or 8 inches wide; the ends of these should be squared so as to fit closely at the joins, over which a short piece of board or sheet iron could be nailed at the corners, when the boards should be nailed to each other and further protection afforded by sheet tin, such as a piece of a petrol tin, fixed to enclose the right-angle so formed.

The top of the frame should be even so that the covering will fit closely, and the boards should be sunk an inch or so in the soil and the soil on the outside heaped against them.

Protection against the ingress of insects is regarded as most important, since the setting out of plants in the field free of infestation, either in the form of eggs or larvæ, must be regarded as a distinct advantage. Other types of framework can be considered for use, but the main essential to be observed, while allowing for support of the shading, is to have them so constructed as to allow insufficient space for the entrance of even very small insects when the covering for shade is applied. The breadth of the framework should be commensurate with the width of the covering material used so as to allow ease of attachment. With material a yard in width a breadth of 3 feet overall is suggested as a limit.

Covering.

Provision for sufficient light and the circulation of air in the seed bed is necessary for the successful growth of plants. Choice of material for covering, especially in North Queensland, suggests consideration being given not only to a protection against the direct rays of the sun, which at the time of seeding is vertically overhead, or nearly so, at midday, but against rain storms likely to occur while the plants are being raised, which would tend to damage the young plants or to wash them out. Glass is probably the most effective all-round covering, but would require to be shaded during the hottest part of the day. The initial cost in the first instance would be considerable, but where operations are on an extended scale it will be likely to prove most economical over a period of years.

Cheese cloth or butter muslin, purchasable at small cost, secured across the framework usually makes a very satisfactory covering, but can be further improved by the addition of hessian, calico, or canvas placed tentwise or with sufficient pitch to run off heavy rain a little distance above.

When placing the covering of whatever material on the frames, provision should be made for its easy removal when watering or otherwise attending to the plants. Loops of tape sewn to the edges of the material to slip over nails or hooks on the outside of the frame with wires drawn taut or supported at intervals across or along the beds to prevent sagging will be effective, but perhaps the most satisfactory will be to attach the material to the underside of pieces of lath placed at intervals across the breadth of the frame with one at each end overhanging to keep the material stretched; the covering can thus be conveniently lifted or rolled back and as easily replaced.

Fertilising Seed Beds.

When the soil is of low fertility, or it has not been practicable to enrich it by the previous addition of manure, the application of a little fertiliser is suggested. In this connection it would be advisable to make use of a complete fertiliser, of which a suitable mixture would be 6 parts superphosphate, 3 parts of nitrate of soda or dried blood, and 1 part of sulphate of potash, applied at the rate of 1½ oz. per square yard of seed bed.

Where the beds have been burnt, however, there should be sufficient potash supplied in the ash from the firing, when a satisfactory application will be superphosphate at the rate of 1 oz. or a heaped tablespoonful evenly dusted over every square yard. Nitrate of soda could be added at the rate of ½ an oz. per square yard, or applied in solution by a watering can. Fertiliser should preferably be applied the day before sowing and brushed rather than raked into the surface of the soil.

Rate of Seeding.

Tobacco seeds being so small induce a tendency to sow too heavily. An ounce by weight will contain approximately 300,000 seeds, which quantity will fill a teaspoon to its level twelve times. A level teaspoon will thus contain about 25,000 seeds, which quantity is regarded as ample for 100 square feet of seed bed, unless the seed is known to be of low vitality. A heavy seeding results in a crowding of plants, which consequently make a spindly growth; another bad feature is that such crowding prevents the access of air and light to the soil, thus inducing the production of fungus diseases.

Time to Sow.

The time for sowing the seed beds will be regulated by a knowledge of the seasonal conditions usual in the district, the object being to have plants four or six weeks old when sufficient rain has fallen to ensure growth after transplanting. The best quality of leaf is grown during the warmest months of the year.

In North Queensland, where the rainy season usually commences in December, it is advisable to make sowings in the second and fourth weeks of November. It takes from seven to ten days usually for the seed to germinate; old seed sometimes takes up to fourteen days or longer. Seed thus sown can be expected to provide plants for setting out from mid-December to mid-January.

Sowing.

It is probable that the soil at the time it is desired to sow the seed bed will be rather dry; if this is the case a good watering is indicated a day or so before the seed is sown, since a heavy application immediately afterwards is not desirable.

When the moisture content is satisfactory the surface soil should be broken finely and then slightly compacted, as by the pressure of a board, to present an even and level appearance. To secure an even distribution of the seed over the seed bed will be extremely difficult unless some medium is used. In South Africa success is reported by distributing the seed, suspended in water by agitation, from a watering can with a fine rose. The usual method, however, is to mix the seed very thoroughly with fine dry sifted ashes, using a quart or more to that for each 100 square feet. In mixing, it is advised to take a bucket or similar receptacle and place a layer of ashes in the bottom, then sprinkle a pinch of seed over it, then another layer of ashes followed by a pinch of seed until the desired amount has been used up. The ashes and seed should now be thoroughly mixed by hand, and then poured from one bucket into another several times. By broadcasting this mixture over the bed the colour of the ashes will give an indication of the evenness of distribution. After the seed is thus sown it should be lightly pressed into the soil. This is performed by the use of a board, to the centre of which a handle has been vertically fixed. Some growers prefer to add a mulch after sowing; for this, dried and finely teased horse dung is very suitable, as it forms a mat over the soil which prevents disturbance of the seed when watering and is easily penetrated by the young seedling. It is advisable, however, in preventing the introduction of weed seeds or fungus spores, to sterilise this material by contact with boiling water or steam for ten minutes or so. Tobacco seed should not be covered too deeply, as germination will thereby be retarded if not prohibited; consequently any form of mulch used to cover must be in a very thin layer.

Watering.

Immediately after seeding the beds should be lightly and evenly watered and kept damp, but not wet, whilst under shade. A watering can with a finely perforated rose can be used, but a hose with a nozzle capable of giving a fine spray under pressure such as would be obtained with water laid on from an overhead tank would be more satisfactory.

The frequency of waterings will to an extent be regulated by the evaporation, but a light watering in early morning and late evening is preferable to a heavier watering once a day. When the seed has germinated and the plants have made some growth the watering can be effected more rapidly by using a rose with larger perforations on the watering-can or hose.

Hardening Off.

Plants grown entirely under shade would be too tender to withstand the shock of transplanting to the field, where bright sunshine would prevail; they should, therefore, be gradually hardened off by removing the covering when they are an inch to and inch and a-half high for an hour or two in early morning and late afternoon, gradually extending the period until they will bear the direct sunlight all day. The covering, however, should always be on the beds through the night or between sunset and sunrise, as most predatory insects on tobacco plants are night

fliers. When the plants are half grown the waterings should be lighter, but not enough to allow of the plants wilting.

Added Precautions.

As a preventive against fungus diseases the young plants can be sprayed with Bordeaux or Burgundy mixture, diluted to three-quarters the usual strength, to which might be added arsenate of lead, especially if grasshoppers are in evidence, as a protection also against insect attack. A spraying with arsenate of lead or Paris green the day before the plants are lifted for setting out in the field will afford a further protection, and is recommended.

Should the plants not be making satisfactory progress in the seed bed, or if it be necessary to accelerate their growth, the application of a liquid manure is advisable. This can be prepared by half filling a cask or similar vessel with cow, horse, or fowl dung, the last named being regarded as the best, and then filling up with water. After a few days, during which the contents should be stirred occasionally, the liquid can be used when diluted with nine or ten times its bulk of water to moisten the beds.

POINTS IN FALLOWING.

As the essence of fallowing is the storage in the soil of moisture precipitated before the seed is sown so that it may supplement that which falls during the growth of the plant, the time of the year at which the plough should be put in must be governed largely by the incidence of the rainfall. For the winter or ordinary fallow the initial ploughing or cultivation should be carried out not later than October in the year previous to sowing. Farmers employing this system of fallowing who have not yet performed the initial operation may be reminded of the following points:—

Ploughing should take place when the soil is neither too wet nor too dry. Sufficient moisture should be present to make it crumbly, so that it will not turn over in heavy, dry clods. If, on the other hand, the soil is too wet, ploughing will destroy its physical condition and it will dry out in hard lumps, from which state it will be very difficult to get it back into a good, free condition.

One of the objects of fallowing is the production of a suitable seed-bed, and this must be kept in view throughout the whole of the cultural operations that precede sowing if success in this direction is to be obtained. Even in connection with the first ploughing it must be considered. Though over the major portion of the wheat-growing area it is desirable to invert completely the top 4 to 5 inches of soil when ploughing the fallow to bury weed growth and admit air and moisture to the soil, the depth of ploughing should be regulated according to the nature of the soil, the rainfall of the district, and the time of ploughing. Turning up of sour subsoil should be avoided. On some types of soil it is very difficult to secure consolidation if the ploughing is deep because of the impossibility of obtaining compactness except in seasons of ample rainfall, and excellent fallows can be prepared on these by not ploughing more often than every two or three years. As rain is the most effective agent in compacting the soil, it follows that the less rain that is likely to fall on the fallow the more shallow should be the ploughing; therefore, in the case of districts of limited rainfall it is advisable to plough shallow; so, too, when the fallow is not ploughed sufficiently early. Farmers should be careful not to plough too many years at the same depth, as such a procedure is liable to result in the formation of a hard-pan. An occasional variation of, say, half an inch in depth will prevent this.

If the ploughing in one season is from north to south, it is advisable that the following year it should be from east to west, in order that the formation of deep furrows may be prevented. Many farmers for convenience plough the paddock round and round, but it is certainly a better method to plough in lands.

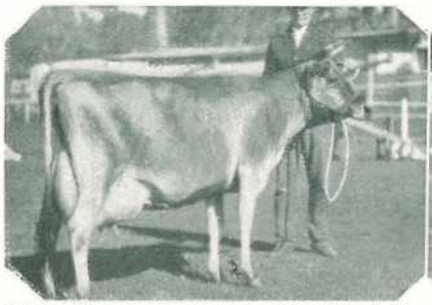
Much controversy exists among farmers as to whether the mouldboard or the disc plough is the better implement for the purpose. No hard-and-fast rule can be laid down, and the farmer must be guided to a large extent by the class of soil he has to handle and the condition it is in when making a choice between the two implements.

The mouldboard plough may be said to do better work in land that is likely to break up too fine, and is certainly superior to the disc on land covered heavily with weeds or other rubbish. On the other hand, the disc plough on fairly clean land has many advantages, chief of which is that from 400 to 500 acres can be ploughed with the one set of discs without renewing them. However, a great deal less depends upon whether the land has been ploughed with a disc or mouldboard plough than upon the choice of the right time, and the thoroughness with which the work is done.

DAIRY CATTLE AT THE BRISBANE SHOW.

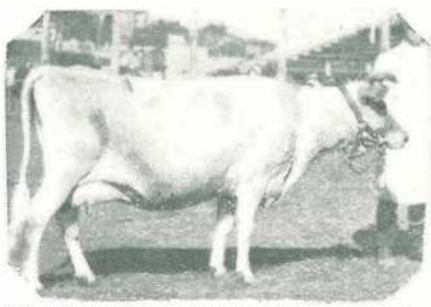
The high standards attained by Queensland dairy cattle breeders were manifested impressively at the recent Brisbane Show, as may be judged from the accompanying camera record.

This interesting collection of Show ring favourites is presented through the courtesy of "The Queensland Dairy Farmer."



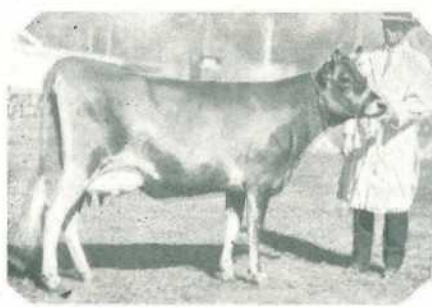
CARNATION LUCY'S LOCKET (4531), by Carnation Prince (1055); dam, Carnation Lucy (2277). First aged Jersey cow, in milk, and Reserve Champion. Bred and owned by W. Spresser and Son, Brassall, Ipswich.

TRINITY HAZELETTE (3841), by Ginger Duke (1276); dam, Oxford Hazel (2120). One of the fine team bred and exhibited by Mr. J. Sinnamon, Trinity, Goodna, Q.

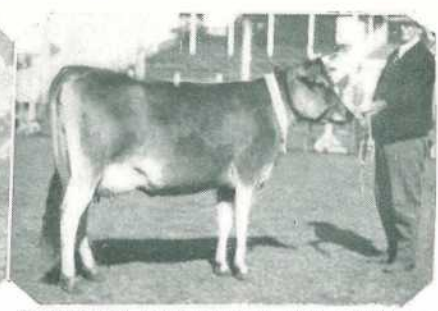


DUCHESS OF CALTON (2080), by Clair Val Hero (imp., 695); dam, Trinity Montrose (App). First in Jersey butterfat test with 59.75 lb. milk and 2.660 fat in 24 hours. Bred and owned by John Collins, Tingoora.

BELLEFAIRE SATISFACTION'S BELLE APPIN, by Werribee Prince Twylish; dam, Werribee Master's Satisfaction 2nd. A recent purchase from the South exhibited by Mr. A. S. Markwell, Beaudesert. She was just out of a place in the 18 months class.



QUEENIE OF CHELSFORD (7290), by Zenobia's Mascot of Woodstock (2653); dam, Sweet Clare of Chelsford (4426). Exhibited in yearling class by G. A. Ferguson, Woodhill. She was Champion at Beaudesert, 1930.

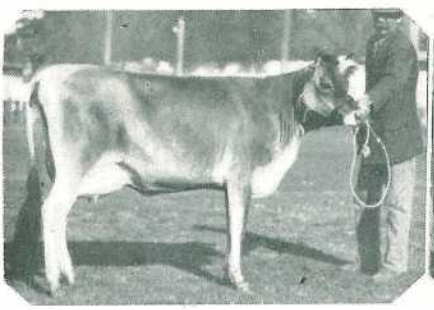


CARLYLE LARKSPUR 14th (7220), by Carlyle Woodside Flores (2869); dam, Carlyle Larkspur (1994). Fourth in the yearling heifer class. Bred and owned by W. and D. Carr, Indooroopilly.

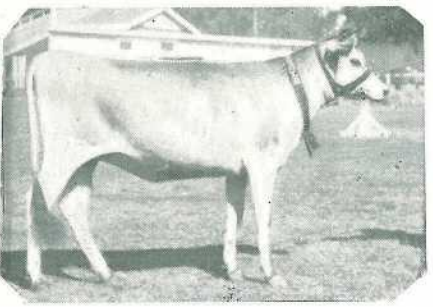
Plate 114.

TRINITY MEADOWSWEET (7063), by Ginger Duke (1276); dam, Trinity Sunset (3845). Third in yearling heifer class. Bred and owned by J. Sinnamon, Goodna, Queensland.

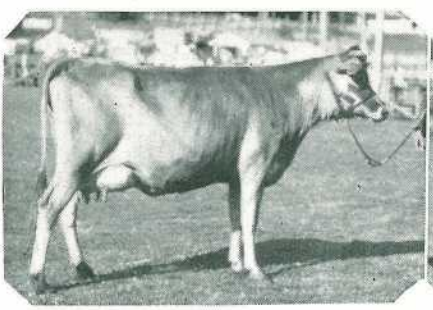
BELLEVUE AILSA (8230), by Goldfinder (imp., 765); dam, Violet Angler of Bellevue (10881). A two-year-old heifer exhibited by Mr. W. E. O. Meiers, Rosevale, Rosewood.



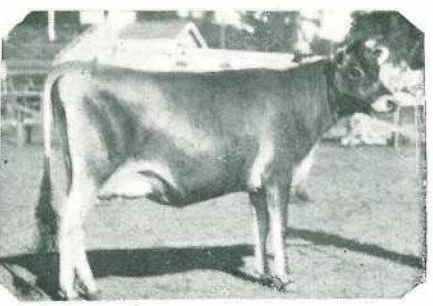
PRIDE'S CRYSTAL OF BURNLEIGH (7810), by Trinity Darby (1720); dam, Sultane's Pride of Burnleigh (3135). Exhibited in yearling, in milk class, by W. W. Mallett, Nambour.



GLENVIEW HOLLY, by Carlyle Larkspur 2nd's Empire (1590); dam, Dolly 2nd of Sunnymeade (3263). Second for heifer, twelve and under eighteen months, dry. Bred and owned by F. P. Fowler and Son, Biggenden.

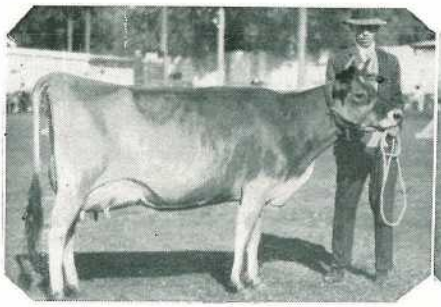


PINEVIEW JEWEL (8173), by Oxford Buttercup's Noble (2899); dam, Pineview Princess (4654). Bred and exhibited in the yearling, in milk, class by Messrs. J. Hunter and Sons, Borallon, Q.

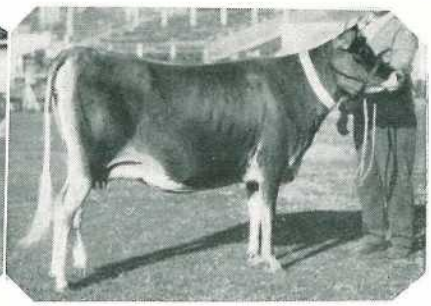


OXFORD DIANTHUS (8506), by Oxford Renown (2257); dam, Oxford Daffodil (6497). First for heifer, 18 months and under two years, dry. Bred and owned by E. Burton and Sons, Wanora, Q.

Plate 115.

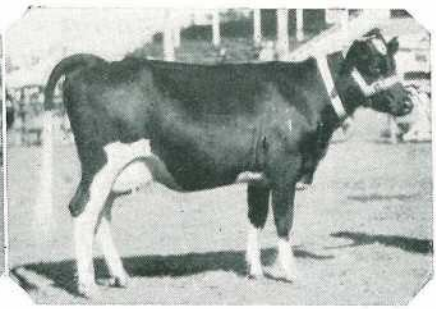


CARNATION FAIRY FLY (6488), by Carnation Bright Star (2734); dam, Carnation Butterfly (3598). First prize heifer, two years old, in milk. Bred and owned by W. Spresser and Sons, Brassall, Ipswich.

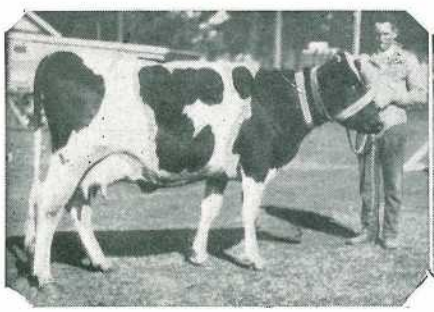


PRINCESS OF ARRANMORE (7166), by Trinity Prince of Wales (2262); dam, Hope 969). Fourth for two-year-old heifer, dry. Bred and owned by A. S. Markwell, Beaudesert.

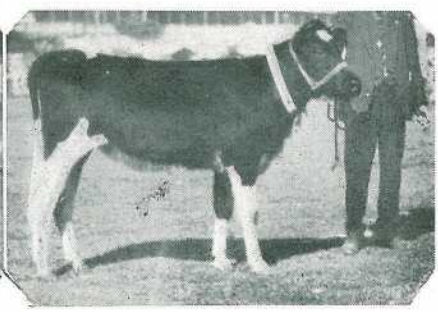
COLLEGE PRINCESS PONTIAC (1839), by Pabst Pontiac Blue Star (imp., 254349); dam, College Prima Donna (736). First and Champion Friesian cow (1929 and 1930), and first in Friesian butterfat with 80 lb. milk and 2.843 lb. fat in 24 hours. Owned by Hickey and Sons, Wilston.



INAVALE LADY 2nd, by Anama Dirkje's Pride (549); dam, Inavale Lady (2486). First prize Friesian two-year-old, dry. Bred and owned by C. Behrendorff, Boonah, Q.

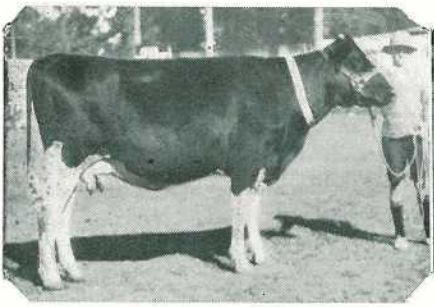


ST. ATHAN ALMOND 3rd (3224), by Colossus of St. Athan (458); dam, St. Athan Almond (2304). First for Friesian cow, three years and under four, dry. Owned by D. Young and Sons, Kingaroy.

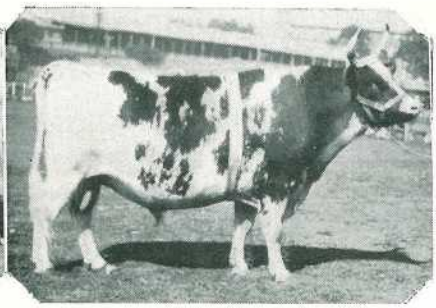


BURNBRAE GELSCHI FOBES, by St. Alban's North Star (1087); dam, Geneva of St. Athan (1267). Third in heifer, 18 months to two years, dry. Bred and owned by R. S. Alexander, Toogoolawah.

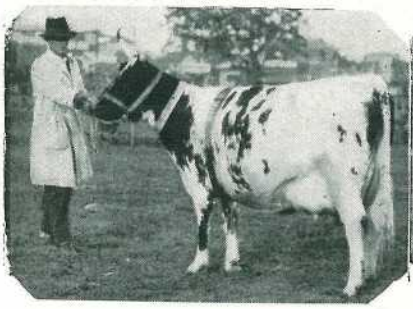
Plate 116.



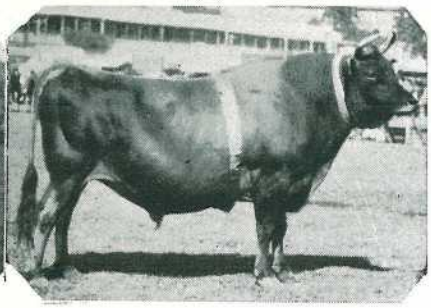
SHIELD 2nd of INAVALE (3125), by Duke of Brussels of Berry (63); dam, Shield of Inavale (229). First prize aged dry cow. Owned by D. Young and Sons, Kingaroy, Q.



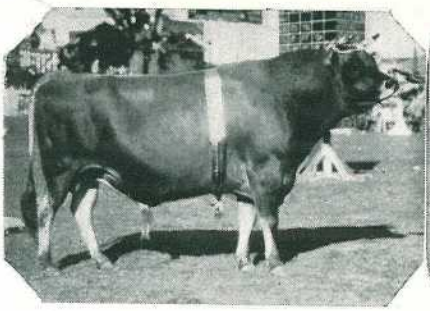
BONNIE WILLIE 2nd OF LONGLANDS (6874), by Longlands Bonnie Willie (6873); dam, Longlands Tina 5th (18542). First and Champion Ayrshire bull. Owned by J. H. and R. M. Anderson, Southbrook, Q.



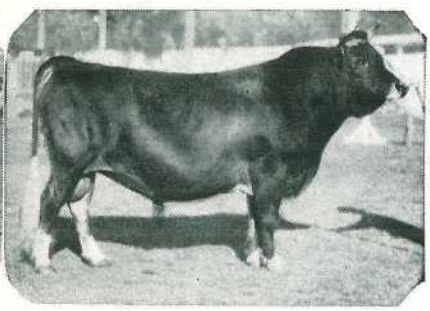
FAIRVIEW LADY JEAN (17888), by Crescent Farm Beryl's Jock (6629); dam, Fairview Jean 2nd (17878). First for three-year-old, in milk, and Champion Ayrshire cow. Bred and owned by J. H. and R. M. Anderson, Southbrook, Q.



TRINITY DARBY (1720), by Lord Ettrey of Banyule (1277); dam, Fern's Crystal (imp., 1332). First and Champion for the third time at Brisbane. Owned by W. W. Mallett, Nambour, Q.

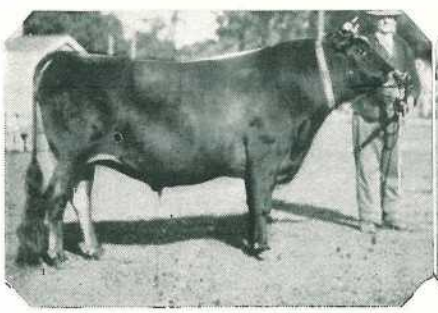


TRECARNE GOLDEN KING (3030), by Carnation Royal Scot (1890); dam, Trecarne Duchess (5266). First prize three-year-old and Reserve Champion Jersey bull. Bred and owned by T. A. Petherick, Lockyer.

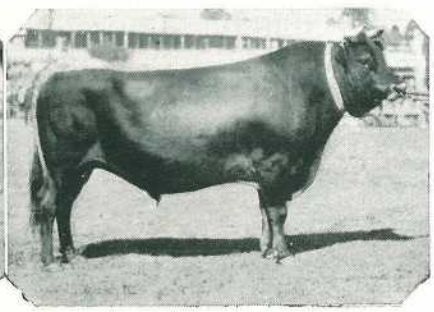


TRINITY PRINCE OF WALES (2262), by Ginger Duke (1276); dam, Oxford Hazel (2120). Second in aged bull class. Owned by Mr. A. S. Markwell, Beaudesert.

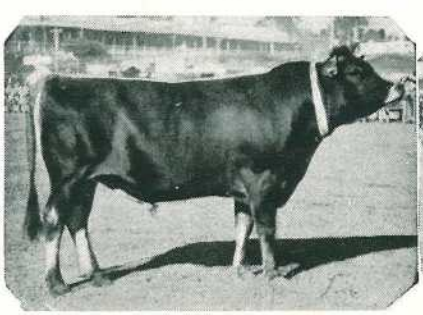
Plate 117.



WOODSIDE VASILIKA'S VOLUNTEER (3628), by Speedwell's Volunteer (imp., 3625); dam, Vasilika 7th of Woodside (20131). Second in three-year-old class. Owned by W. and D. Carr, Indooroopilly.



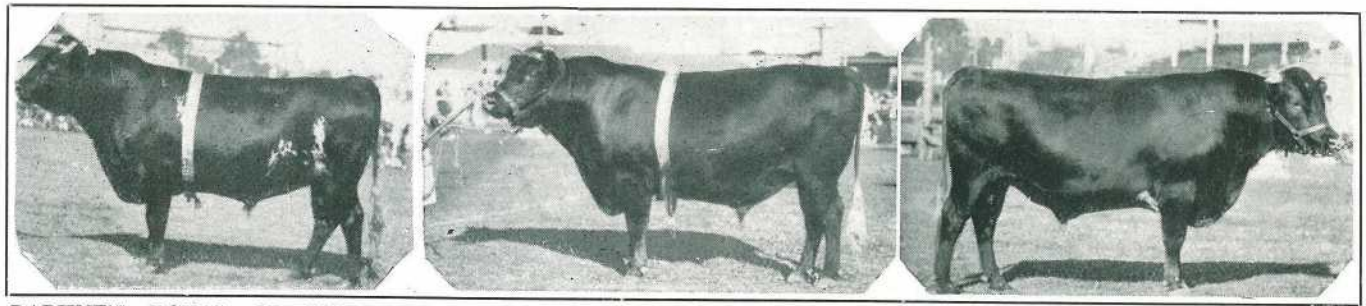
MONTROSE GIPSY OF GLEN IRIS (2227), by Montrose Sultan (imp., 2624); dam, Gipsy Love of Woodside (11257). Exhibited in aged class and sold by V. Goodger to R. J. Crawford, Inverlaw, Kingaroy, Q.



TRECARNE FERN LAD (3674), by Trecarne Sultan (2887); dam, Ginger's Fern of Brooklands (2470). Third in class for bull, two years old and under three years. Owned by W. H. Baulch, Forest Hill.

TRINITY OFFICER (1513), by Ginger Duke (1276); dam, Oxford Hazel (2120). Third in class for Jersey bull, four years old and over. Owned by F. P. Fowler and Sons, Biggenden, Q.

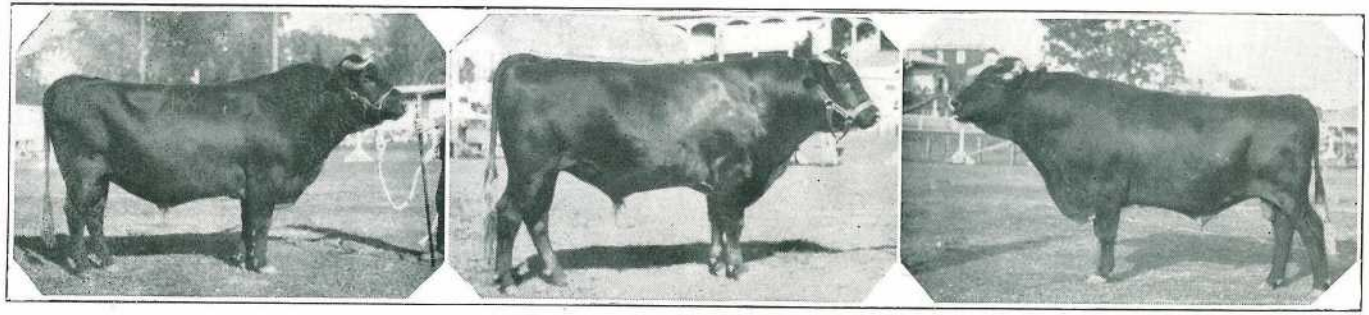
Plate 118.



DAPHNE'S ROYAL OF HILLVIEW (1129), by Gay Lad 2nd of Burradale (533); dam, Daphne 2nd of Hillview (3423). First and Champion A.I.S. bull. Owned by F. O. Hayter, Pomona, Q.

LIMELIGHT OF GULVALLIS (1254), by Royal Oak 3rd of Nestles (54); dam, Red Duchess 3rd of Nestles (901). Second and Reserve Champion A.I.S. bull. Owned by C. F. Francis, Merton Hall, Biarra, Q.

RENOWN OF MOUNTAIN HOME (1641), by Goldstream of Greyleigh (515); dam, Countess 4th of The Cedars (3872). First prize A.I.S. bull, two and under three years. Owned by J. A. Montgomery, Laidley, Q.

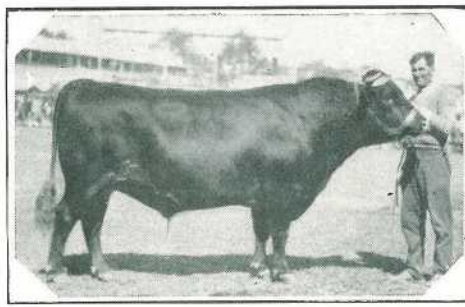


LORNA'S GENERAL OF ARLEY (271), by Cinderella's Recruit of Greyleigh (348); dam, Lorna of Arley (50). Fourth prize aged A.I.S. bull. Owned by A. C. Stewart, Wolvi, via Kin Kin.

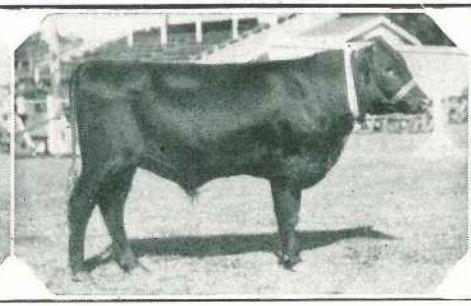
LIMELIGHT OF RALEIGH (2120), by Royal Standard of Darbalara (2908); dam, Ethel 5th of Raleigh (13583). Second for A.I.S. bull, two and under three years. Owned by Messrs. Caswell and Franklin, Wangalpong, Q.

GUARDSMAN OF DARBALARA (1644), by Climax of Darbalara (899); dam, Melba 25th of Darbalara (10068). Purchased by Macfarlane Bros., Radford, from D. Dunn, Beaudesert, at 65 guineas.

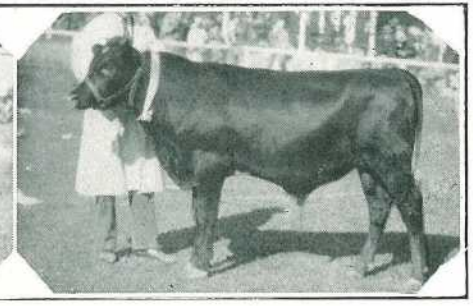
PLATE 119.



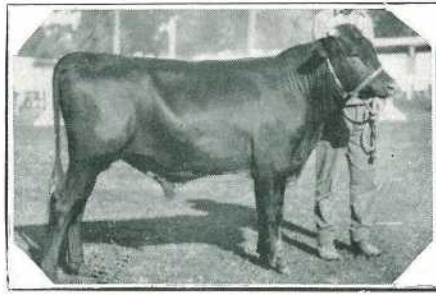
YOUNG COMMODORE OF SPRINGDALE (1218), by Lovely's Commodore of Burradale (495); dam, Princess of Springdale (533). Head of winning sire's progeny stakes group. Owned by Hickey and Sons, Wilston.



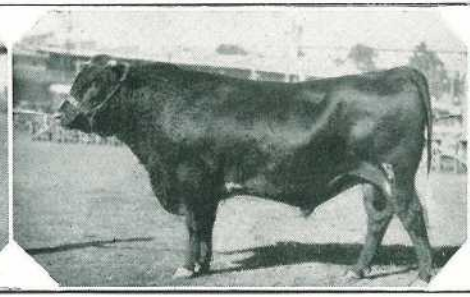
MAJOR OF BLACKLANDS, by Red Prince of Blacklands (1064); dam, Jean 6th of Blacklands (239). First for A.I.S. bull, 18 months to two years. Bred and owned by A. Pickels, Blacklands, Wondai.



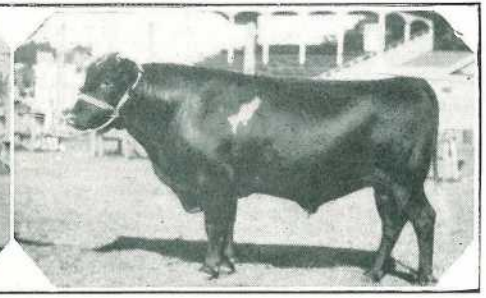
KIA-ORA OF SUNNYVIEW, by Jellicoe of Headlands (1315); dam, Scarlet of Forest Grove (12102). First prize A.I.S. bull calf, and sold by Mr. J. Phillips to Mr. B. C. Tuckett, of Brookfield, at the record price of 175 guineas.



HEADLIGHT OF FAIRFIELD, by Jellicoe of Fairfield (1136); dam, Linda 3rd of Fairfield (9420). Second prize A.I.S. bull, 18 months to two years old. Owned by V. Dunstan, Wolvi, Kin Kin, Q.

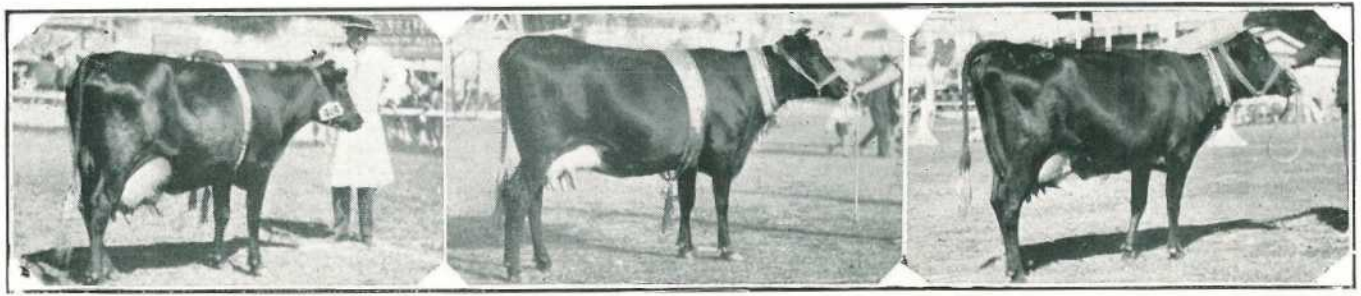


MIDGET SHIEK OF WESTBROOK (1511), by Shiek of Upton (934); dam, Midget of Westbrook (821). Fourth prize A.I.S. bull, two and under three years. Owned by Con. O'Sullivan, Greenmount.



JOHN BULL OF GREYLEIGH (1428), by Bosca of Greyleigh (205); dam, Linda 4th of Greyleigh (7999). Second prize A.I.S. bull three and under four years, and sold for 50 guineas by A. I. Titmarsh to W. A. Buchanan, Morayfield, Q.

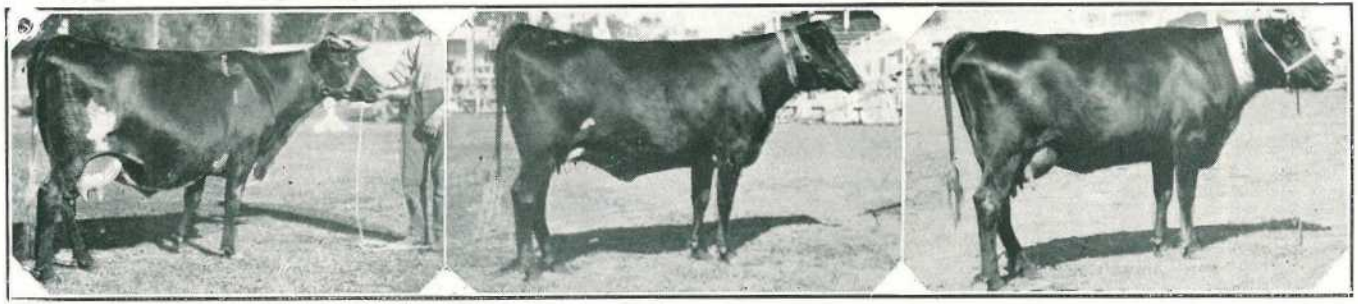
PLATE 120.



MYRTLE 4th OF LEMON GROVE (8042), by Dan of Greyleigh (97); dam, Myrtle 3rd of Lemon Grove (6489). First and Champion A.I.S. cow, and second in butterfat class with 73.1 lb. milk and 2.532 lb. fat in 24 hours. Owned by J. Phillips, Wondai, Q.

DIANA 11th OF KELSTON (8365), by First Warrior of The Cedars (279); dam, Diana 7th of Jinbiggaree (273). First in A.I.S. butterfat class with 67.5 lb. milk and 3.007 lb. fat in 24 hours. Owned by A. Frank, Boonah.

SUSIE 4th OF HILLFIELD (11895), by Robin of Brooklyn Terrace (1354); dam, Susie of Hillfield (8367). First A.I.S. cow, three and under four, in milk, and second in three-year-old butterfat class with 109.8 lb. milk and 4.3480 lb. fat in 48 hours. Owned by S. J. Lester, Laidley.

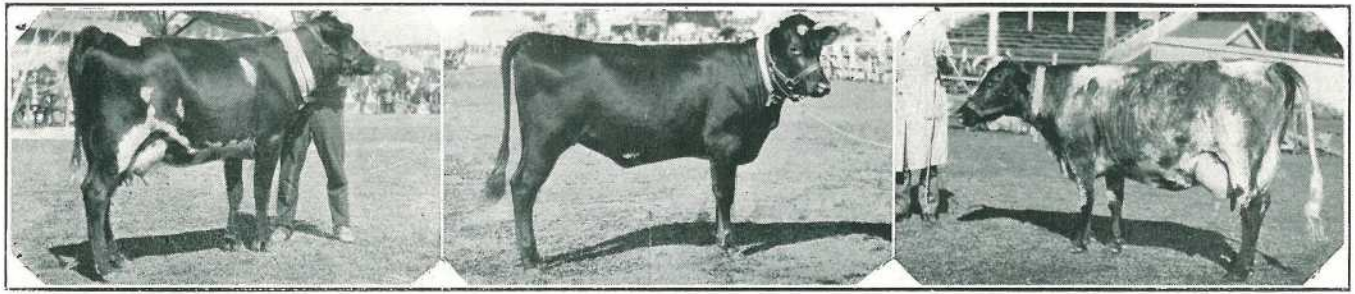


POLLY 5th OF SPRINGDALE (2986), by Plum's Boy of Greyleigh (480); dam, Polly 4th of Springdale (3414). Second in aged dry A.I.S. cow class. Owned by V. Dunstan, Wolvi, Q.

DAHLIA 7th OF SPRINGDALE, by Emperor of Springdale (811); dam, Dahlia 3rd of Springdale (853). Second A.I.S. heifer, two and under three, dry. Owned by A. J. Caswell, Wangalpong, Q.

DIANA 17th OF KELSTON (14244), by First Warrior of The Cedars (279); dam, Diana 7th of Jinbiggaree (273). Fifth prize A.I.S. three-year-old, and present holder of Australian two-year-old production record. Owned by A. Frank, Boonah.

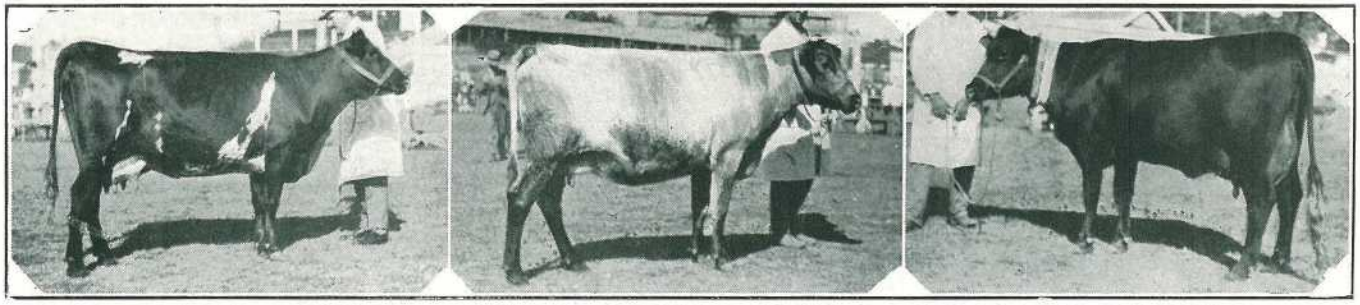
PLATE 121.



QUEENIE 3rd OF GLENDALOUGH, by Don of Springdale (971); dam, Queenie 3rd of Pine View (2199). First A.I.S. heifer, 18 months to two years, in milk. Bred and owned by Hickey and Sons, Wilston.

DNALWON LUCKY STAR, by Limelight of Raleigh (2120); dam, Whinflower's Lucky of Dnalwon (5136). First A.I.S. heifer calf under 12 months. Bred and owned by A. J. Caswell, Wangalpong.

RUBY OF CORUNNA (5070), by Victor 2nd of Balmoral (237); dam, Champion 2nd of Corunna. Fifth A.I.S. cow, five years and over, in milk. Owned by Mrs. J. Handley, Murphy's Creek, Q.

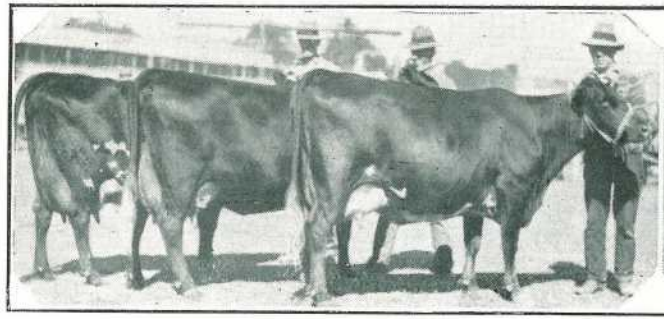


MODESTY 2nd OF SUNNYMEADE, by Masterpiece of Oakdale; dam, Modesty 3rd of Dunmore. First prize A.I.S. cow, five years and over, dry. Bred and owned by Cowen Keys, Wondai.

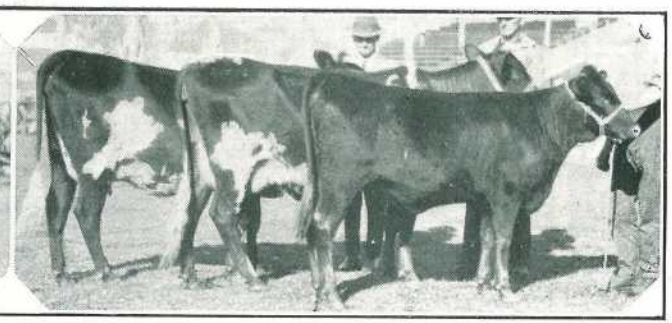
TILLY 8th OF CEDAR GROVE, by Charmer of Cedar Grove; dam, Tilly of Cedar Grove (4240). First prize A.I.S. cow, three and under four, dry. Owned by Guppy Bros., Esk, Q.

STELLA OF BLACKLANDS, by Sultan of Blacklands (775); dam, Lady Primrose of Blacklands (7446). First A.I.S. heifer, two and under three, in milk, and third in heifer butterfat class with 102.3 lb. milk and 3.4334 lb. fat in 48 hours. Bred and owned by A. Pickels, Wondai.

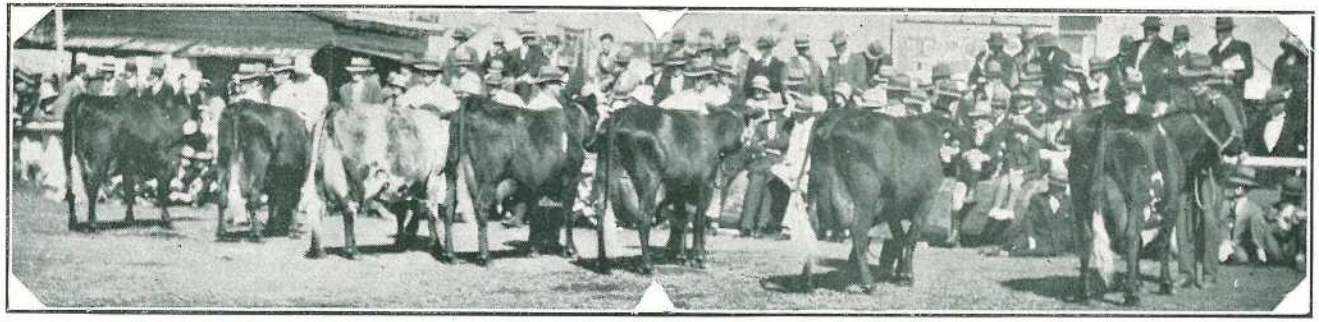
PLATE 122.



Mr. Ben. O'Connor's fine pen of A.I.S. cows shown in the class for group of cows, three years old and over. On the extreme left is Rosette of Wilga Vale, champion butter-fat cow of Queensland.

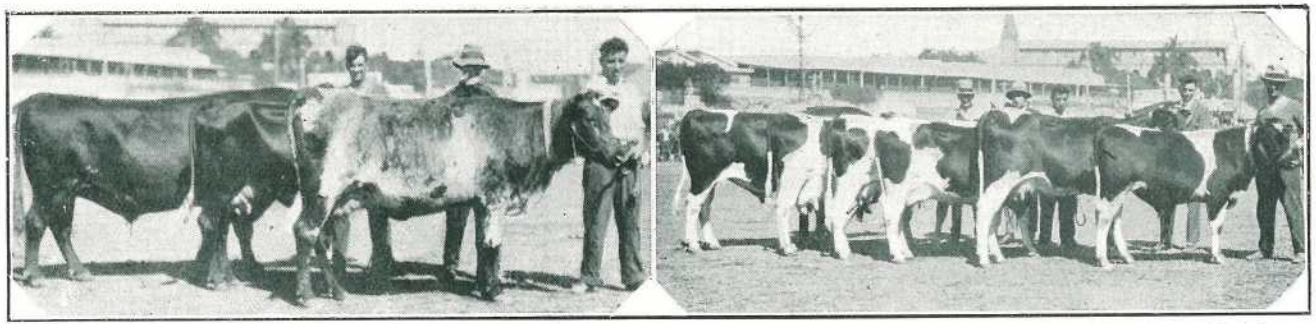


Three of the females exhibited at the Brisbane Royal by Mr. V. Dunstan, of Wolvi, via Kin Kin. Although a comparatively new exhibitor at Brisbane, Mr. Dunstan was well among the ribbons with his fine team.



The preliminary line-up of the aged, in milk, class for A.I.S. On the extreme right is Rosette of Wilga Vale, one of the first cows stood up by Mr. Wills. The ultimate winner of the championship, Mr. J. Phillips' Myrtle 4th of Lemon Grove is third from the right, and in between the two of them is Mr. A. Pickels' Jean 6th of Blacklands.

PLATE 123.



Messrs. Hickey and Sons, of Wilston, Brisbane, put up a great display of Friesian and A.I.S. at the Brisbane Royal and took away their biggest collection of ribbons to date. On the left is Young Commodore of Springdale and two heifers which won the blue in the Sire's Progeny Stakes group, and on the right is the big group which won for them the Friesian Exhibitor's Group.

PLATE 124.

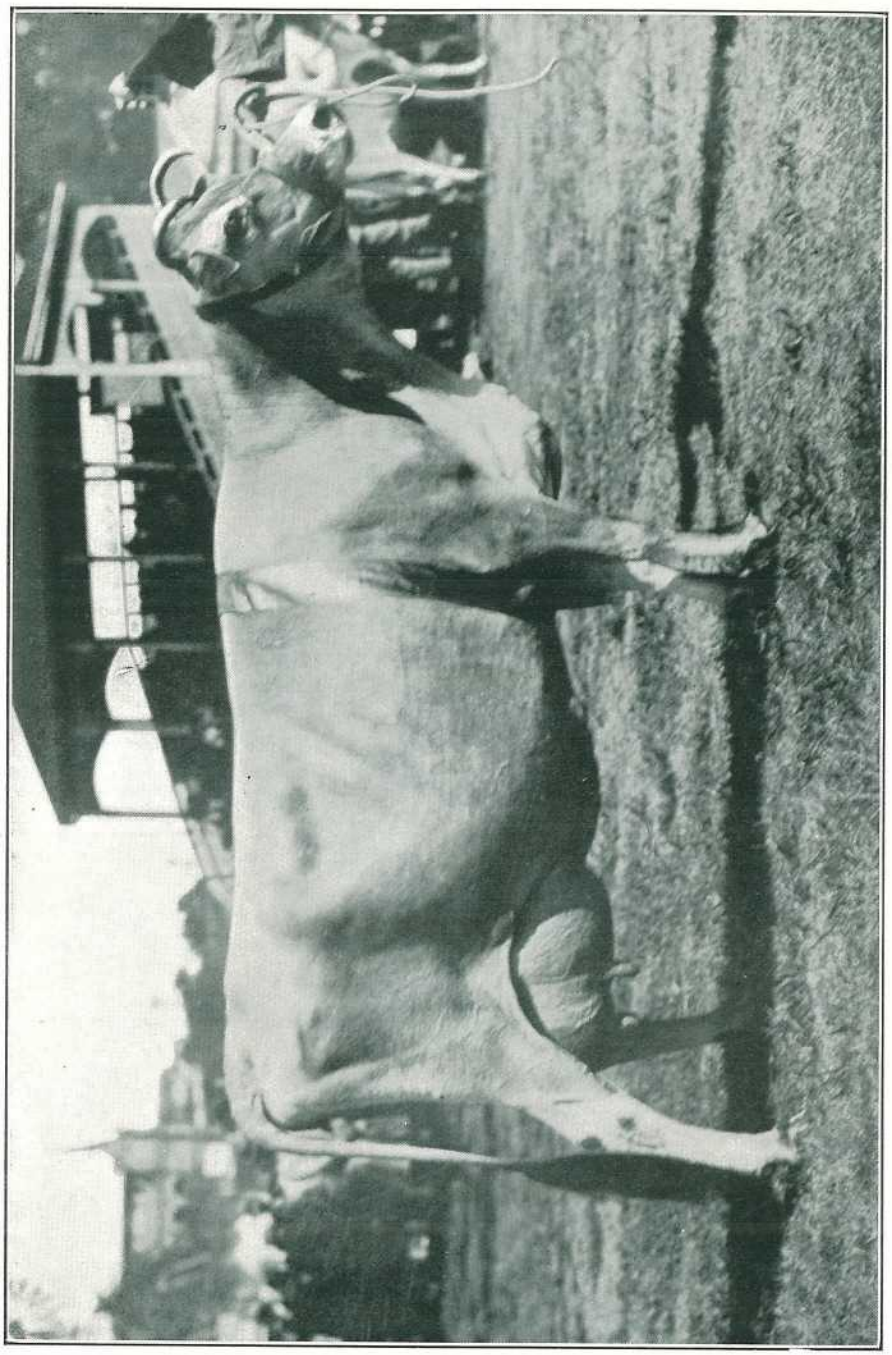


Plate 125.—"Oxford Golden Buttercup" (Burton & Sons) Champion Jersey Cow, Brisbane Show, 1930.

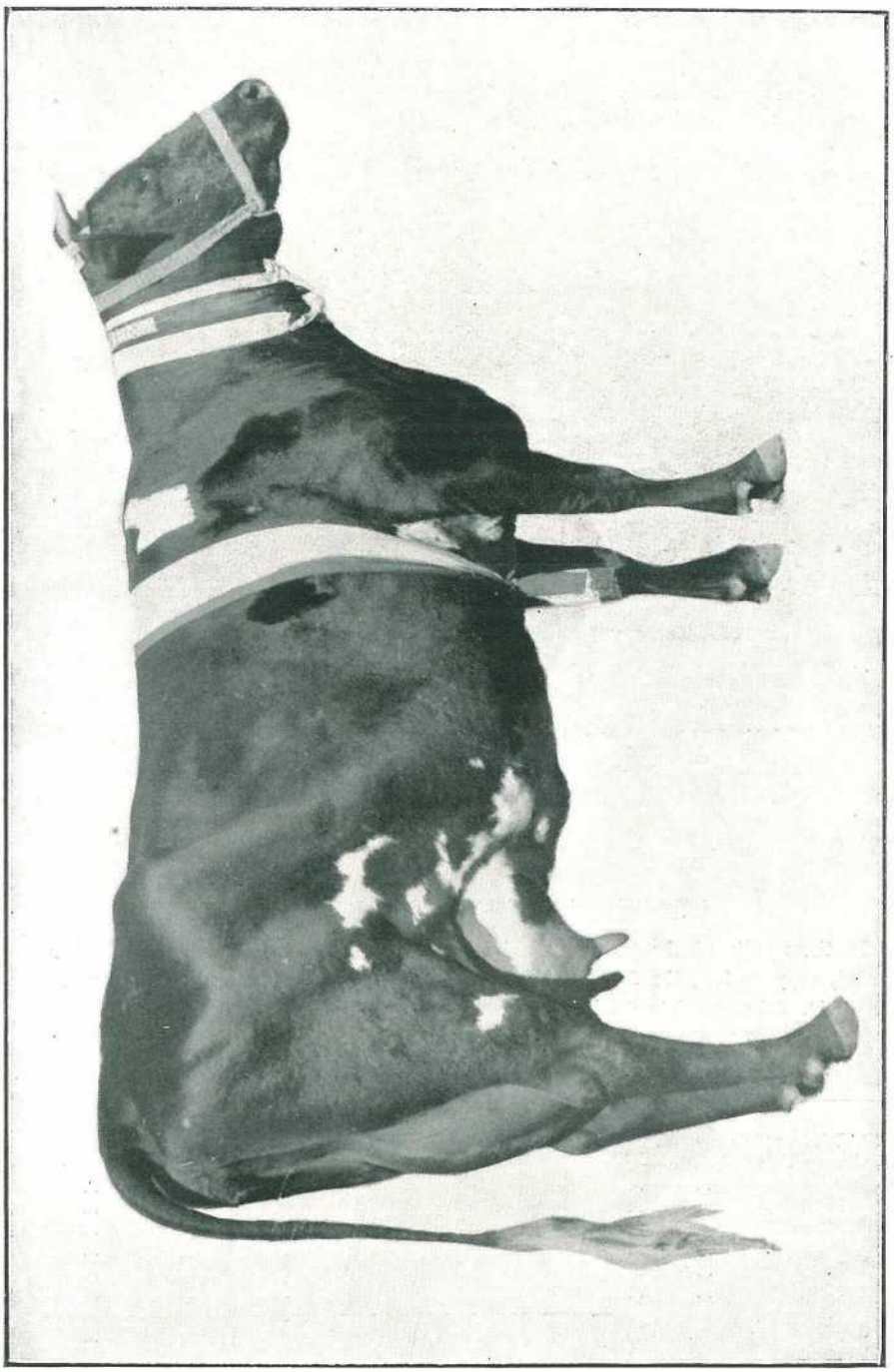


Plate 126.—B. O'Connor's "Rosette of Wilga Vale," Champion Butter Fat Test Cow, Royal National Association Show, Brisbane, 1930.

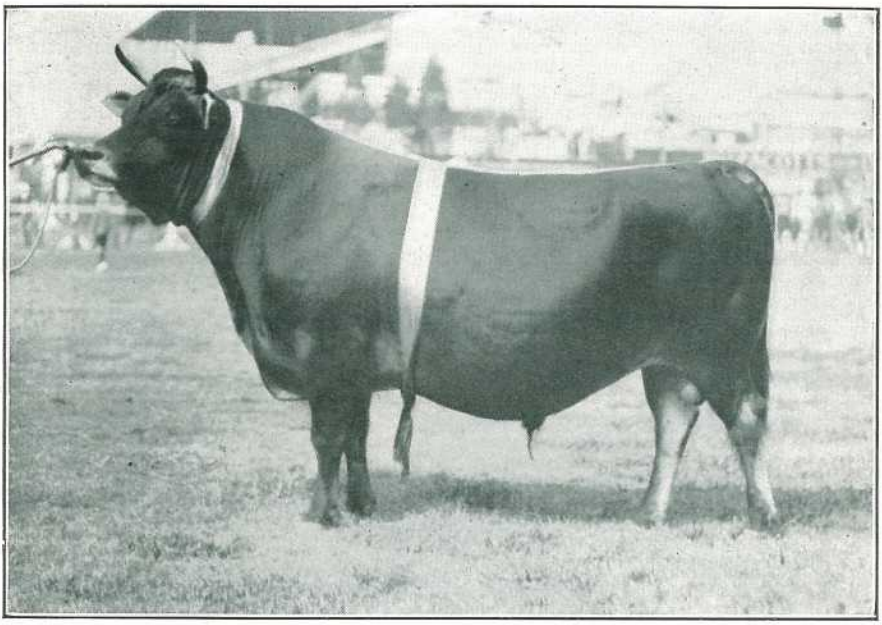


PLATE 127.—TRINITY DARBY, CHAMPION JERSEY BULL. BRISBANE SHOW, 1930.

GROUND MILKING COMPETITION.

In the results of the Ground Milking Competition published in the September Journal, on page 293, the figures published of "Fussy 5th of Railway View" were incomplete. The complete official figures are as follows:—

——	Milk.	Fat.	Butter Fat.	Points.	Lact. Points.	Total.
	Lb.	Percent.	Lb.			
A. T. Waters' Fussy V. of Railway View (A.I.S.)—						
Night	23·2	3·5	·812	..	..	..
Morning	24·6	3·4	·8364	..	..	..
Noon	21·0	5·1	1·071	..	..	..
Night	21·3	3·5	.7455	..	..	..
Morning	25·1	3·5	·8785	..	..	..
Noon	18·3	4·4	·8052	..	..	..
Total, 48 hours; average, 24 hours	133·5	..	5·1486 2·5743	.. 41·19	.. 4·9	.. 46·09

THE ANGORA RABBIT.

Compiled by J. W. MUNRO, Department of Agriculture and Stock.

ANYONE intending to engage in fur and wool producing rabbit farming must bear in mind the conditions incidental to the issue of a license. Every keeper of rabbits must be licensed. Before a license will be issued enclosures must be erected, within which all rabbits must be maintained in accordance with the specifications as set down by the Department of Agriculture and Stock. Modifications of these specifications may be allowed where it is established that the materials necessary are unprocurable in the locality where the enclosures are to be erected; but in each instance the sanction of the Department must be first obtained. The license fees vary according to the number of rabbits to be kept, and the fees stipulated in the regulations cover the cost of inspection of the enclosures. Where negligence has been proved, and more than one inspection is necessary to ensure compliance with the official requirements, the extra cost involved in such additional inspections must be borne by the applicant. When the enclosures have been erected, an application, together with the necessary fee, should be lodged with the Department. An inspection will follow, and if the enclosures have been constructed to the satisfaction of the inspector a license will be issued.

Licensees must in each year, not later than the second week in January, make application for a renewal of their license, unless in the meantime they have, with the sanction of the Department, disposed of their rabbits.

Under no circumstances whatsoever must a rabbit be removed from an enclosure, either by way of gift or sale, without first obtaining the permission of the Department. Should a holder of these animals desire to sell any of the produce (stock) he must first make application for a dealer's license, the fee for which is £1 per annum or such other sum as may from time to time be declared by the Department.

Before a dealer delivers a rabbit to a prospective purchaser, he should impress upon the purchaser that he must erect the necessary enclosures and present his license to keep rabbits. Every sale effected must be immediately reported to the Department by the dealer.

Any contravention of the regulations renders the person or persons committing such breach liable to a penalty of £10.

Specifications and approved plans of suitable enclosures are appended.

Foundation of Hutchery.

Prospective purchasers should procure the very best stock obtainable for the foundation of their hutcheries.

Only recognised studs should be approached. Beware of speculators. The industry has suffered in other countries through speculators demanding exorbitant prices for inferior animals, and persons entering the industry with the erroneous assumption that a first-grade wool can be produced from such stock. By first consulting officers of the Department before purchasing, a good deal of trouble and worry may be obviated.

Housing.

By the time the rabbits are available for delivery, hygienic conditions should have been provided for their confinement. The hutches should be so constructed as to provide for easy removal of the droppings. The floor should be of ½-inch mesh netting wire stretched in such a way as to prevent sagging. Provision should be made immediately under the netting floor for a galvanised iron tray, easily removable for cleansing purposes. Wooden floors are out of the question, for they cannot be sufficiently cleansed to obviate unhealthy and objectionable odours.

Racks should be provided in the hutches for the holding of the greenstuffs, as well as a small box for the grain supply.

The construction of the hutch must permit of locking to ensure security of confinement of the animals.

As rabbits are purely hutch animals, the hutch is its home, and consequently hygienic conditions and comfort should be provided. Each hutch or compartment should be not less than 3 feet x 2 feet x 2 feet, and should be rat and mouse proof.

Feeding.

Rabbits are by nature vegetarians, consequently it must be remembered that their natural food is greenstuffs. If there is an abundance of this available it can be fed with safety in large quantities, thereby saving in the cost of grain. This is

an important factor in successful wool production for profit. Rabbits enjoy almost any green foods, and no other food compares with it for the development of the stock. The greenstuffs most relished by rabbits are thistle, lucerne, clover, chicory, pea vines, occasional sweet potatoe vines, and any grass that cattle will eat.

Hay being a bone-forming food should be available at all times, especially in the case of growing animals. Dry crusts of bread are invaluable to the breeding doe. During the winter months care should be exercised in seeing that frosted foods are not provided, thereby avoiding a considerable amount of trouble. In wet weather do not feed wet greenstuff, but lay it aside for drying without allowing it to become heated. In feeding, it is considered advisable to vary the class of feed supplied at each meal, thereby permitting the rabbit to balance its own ration. Roots suitable for winter feeding are artichokes in conjunction with hay, carrots, kohl rabbi, turnips, swede turnips, or an occasional beetroot.

The use of iodine is highly recommended and should be made up as follows:—Dissolve half an ounce of iodide of potassium in one and a-half pints of water. One teaspoon to a gallon of water is the recognised dose, or the same proportion in the water used to mix mash when mashes are fed to the animals. Iodine greatly improves the wool yield and is a deterrent to all forms of rabbit ailments.

A small handful of rolled oats is an excellent substitute for grain. The grains most suitable as a feed are crushed oats, rolled oats, flaked maize, dried brewer's grains, bran, and a few peas occasionally. A piece of rock salt should always be available as a lick. A plentiful supply of fresh drinking water should also be available.

Mating the Does.

Always place the doe in the buck's hutch—it is inadvisable to remove the buck from his own hutch for the purpose of mating. When the doe is ready for mating she generally lets you know by plucking herself and making a nest. Should the buck chase the doe around the hutch it is a certain indication that the doe is not in season and should be returned to her hutch until she is ready. A proper service is recognised by the doe raising her hindquarters and the buck falling over on his side. Watch for this, for if it does not happen it is sufficient proof that the doe is not in kindle. After the mating has been successful, the doe should be replaced in her hutch and left undisturbed.

Breeding.

Rabbits should never be mated until eight to nine months old, preferably at the latter age, when they have reached maturity. The gestation period is approximately thirty days. The actions of the doe vary according to temperament when the time for kindling arrives. Some does will prepare their nest two or three days before they are due, others perhaps only an hour or two. She should be assisted in her nest-building by making available ample supplies of soft hay. Should the doe fail to pluck herself, and kindle down with only the hay nest, cotton wool should be provided and a nest made for her. When the young arrive the nest should be examined, and if any stillborn or dead are found they should be removed immediately, otherwise the doe will eat them, and the probability is that she will kill the rest of her family and eat them also. On examining the nest it should be done very gently so as to avoid exciting the doe. Another point to be considered is in seeing that the doe is not overfat when kindling. For some unknown reason, in such cases the doe has eaten her young and left no trace behind her. The young when born are naked, blind, and deaf, and warmth is provided by the doe, who plucks herself and covers the young with her own wool. Ample supplies of water and green foods should be provided for the doe at this stage. The number in a litter varies, but a fair average is six. When this number is exceeded the surplus should be taken away, for it is generally considered that a doe can only satisfactorily nourish that number. Four litters per year are possible, but three is the number preferred by breeders who desire to give the doe every consideration. Avoid handling the kittens wherever possible.

Weaning.

At the age of five weeks the young are able to fend for themselves, and at this stage ample supplies of fresh green food should be available. During the first five weeks following birth they should be allowed to remain undisturbed with the doe. For the next three days the young should be separated from the doe for a period of two hours daily. For the following three days they should be removed from the doe during the whole of the day and only placed back with her at night. At this

stage they should be weaned and a definite separation effected. At the end of a further week, if the doe's condition is considered satisfactory, she may be again placed with the buck.

Diseases.

The provision of hygienic conditions in the maintenance of rabbits reduces to a minimum the possibility of contraction of disease. Cleanliness in feeding a variety of foods at regular intervals is essential to the health of the animals. Provide scope for as much exercise as the rabbit cares to take. Abundant supplies of drinking water should always be available.

Snuffles.—A serious and highly infectious cold, with sneezing and an offensive discharge from the nostrils. Isolate and disinfect the suffering animals. If not a valuable animal it should be destroyed. Oil of eucalyptus is sometimes beneficial, but it is only in rare cases that a cure can be effected.

Coccidiosis.—This is the worst disease known to affect young stock. It is highly infectious, and the source of infection is the droppings and dirty floors. It causes a very severe form of diarrhœa and plays havoc in the hutchery. Destroy all but valuable animals that become affected. Thoroughly disinfect the hutch from top to bottom with boiling water and carbolic acid. The parasite (coccidia) must be outside the host for a period of five days before reinfection can take place. Hutches should therefore be disinfected at intervals of five days.

Diarrhœa.—For this ailment, change the diet. If green food has been provided substitute it for hay and mash or boiled rice and milk. If green food has not been provided, do so. Charcoal often affords relief, and in most cases bread and milk is very helpful.

Constipation.—Lack of vivacity and loss of appetite are certain indications of this ailment. Vary the food and add a small quantity, say half an ounce, of cod liver oil to the mash. A teaspoon of castor oil will produce results.

Mange.—This is recognised by bare patches and scabs on the nose, lips, forehead, ears, and legs. Smear affected parts daily with equal parts of benzine and olive oil for a period of ten days. The result should be satisfactory.

Vaginal Catarrh.—In this ailment the vagina is swollen, showing a watery discharge. Thoroughly bathe the parts with a half per cent. solution of alum and water until trouble disappears.

Vent Disease.—This is discernible by inflammation and sores. Bathe with 2 to 3 per cent. lysol; wash daily and, after drying, smear with carbolised vaseline.

Sore Mouth.—This is generally the result of overgrown teeth. Place a fair-sized piece of wood in the hutch for the rabbit to nibble; this should remove the trouble. Pay particular attention to the mouth, as wool is apt to gather and mat around the teeth. When this occurs an extreme soreness of the mouth is created, and the resultant loss of appetite seriously impairs the condition of the animal.

Sore Eyes.—This ailment is generally caused by vapour of urine, which should be located and precaution taken against its possibility of remaining in the hutch on any future occasion. Dissolve boracic acid in water and drop into the eyes at frequent intervals during the day and wipe dry.

Sore Feet.—Sore feet are caused by rough or dirty floors. Supply soft hay for resting on, when the trouble will eventually disappear.

Grooming.

Where rabbits are satisfactorily housed grooming will be only necessary periodically, but where several animals are hutched together repeated grooming is essential to obviate matting of the wool. A long sharp-toothed comb is the best utensil, but care should be exercised in seeing that the skin is not lacerated whilst grooming. Any wool that is removed in grooming should not be destroyed, for in many cases it is of the best grade.

Shearing.

Round-pointed scissors are recommended for shearing, and where care has been exercised in grooming there should be no possibility of injury. This work should commence along the back, starting from the tail and shearing approximately a half inch from the body as far as the head. Proceed along the sides, but never remove the wool from the belly, breast, or legs in the case of breeding does. Avoid unnecessary crossing of the fibres when storing, and see that all particles of foodstuffs and hay are removed. For manufacturing purposes wool of 3-inch to 4-inch staple is best. Shorter lengths should be removed and kept separate. Plucking,

though satisfactory, is a much longer operation and does not increase the value of the wool. Grooming should be done immediately after shearing, as it is helpful in enabling the new growth to emerge. A first-class Angora is capable of producing 10 to 12 ounces of wool per annum. Never shear until the wool is at least 3½ inches long.

Features of the Angora.

Size and shape.—Round (snowball effect), not under 6 lb. in weight.

Front.—Full and prominent.

Head.—Short, broad at forehead, well tufted, with noble appearance. Wedge-shaped head with long ears signifies lack of type and should be discarded.

Ears.—Short and tufted.

Eyes.—Pink, with no discolouration of the whites.

Legs.—Straight with long furnishings of wool.

Condition.—Clean, healthy, and well groomed.

Wool.—Texture as silky as possible, evenly thick all over, and contour wavy. Straight, coarse wool of hair-like appearance should not show on good class stock. Such wool will not be accepted by manufacturers, notwithstanding any statement made to the contrary by salesmen.

APPENDICES.

1.—SPECIFICATIONS.

Specification "A."

The outer rabbit-proof enclosure shall consist of 60-inch rabbit-proof netting (6 inches in the ground and 4 feet 6 inches above the ground), the netting to be No. 17 gauge, 1¼-inch mesh, and to be attached to three plain galvanised No. 10 wires, one 18 inches, one 3 feet, and one 4 feet 6 inches above the ground respectively.

Two barbed wires to be provided, the first 3 inches above the netting and the second 3 inches above the first.

Sketches showing construction of enclosures as laid down in conditions governing the keeping of Angora, Chinchilla, and other approved types of hutch fur-bearing rabbits for the purposes of fur farming.

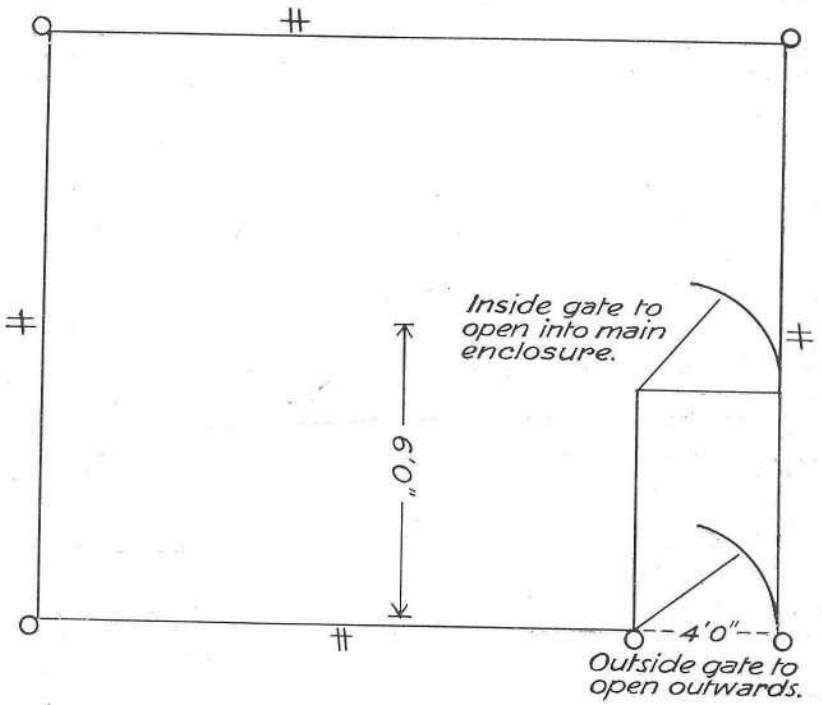


PLATE 128 (Fig. 1).—WHEN RABBITS ARE KEPT IN HUTCHES

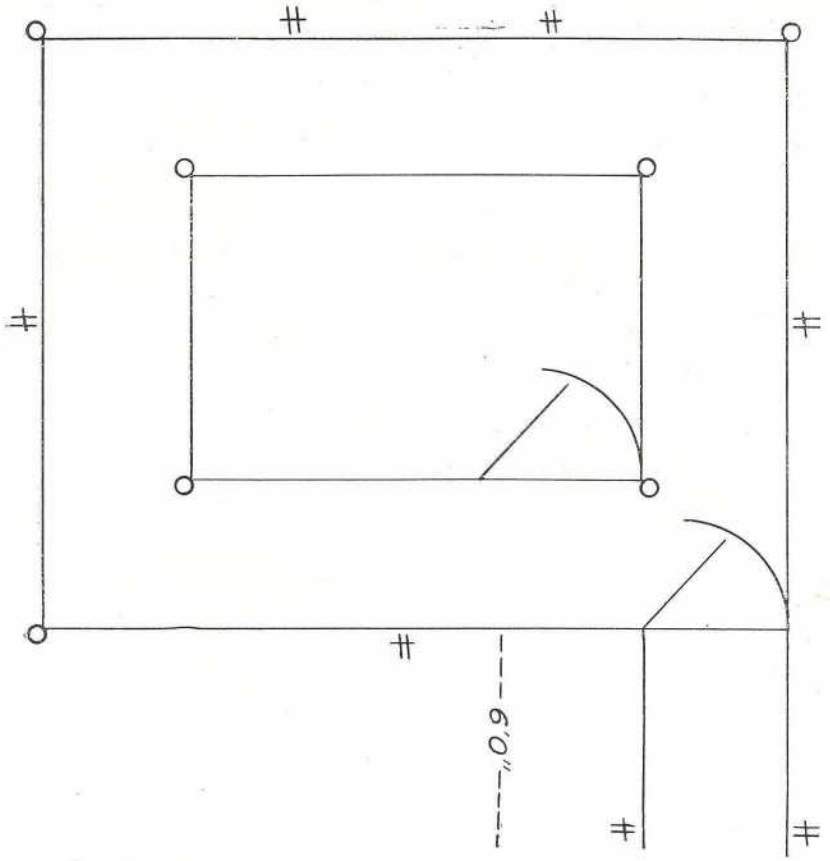


Plate 129 (Fig. 2).—When Rabbits are not kept in Hutches or only partly in Hutches.

Note.—Although the enclosed yard, 6 feet x 4 feet, is shown in Fig. 1 within the large enclosure to save material, it may be erected outside the large enclosure, as shown in Fig. 2, if the owner so desires, in either case. In Fig. 2 the distance between the fence of the outside enclosure and the inside enclosure is not to be taken as drawn to scale—that is to say, the distance between the two fences is a matter for decision by the owner.

The netting to be affixed to the inside of the posts, and any struts or other supports to be placed on the exterior of the enclosure.

Fencing posts to be of hardwood 7 feet 6 inches long (2 feet in the ground and 5 feet 6 inches above the ground), not more than 12 feet apart, and to measure 6 inches by 2 inches if of sawn timber, 6 inches by 3 inches at the small end in the case of split posts, and 5 inches in diameter at the small end if round posts are used. Strainer and corner posts to be 8 feet 6 inches long (3 feet in the ground and 5 feet 6 inches above the ground) and to measure 7 inches in diameter at the small end.

At the entrance to the enclosure an enclosed yard 6 feet long by 4 feet wide to be constructed either within or without the enclosure, the fencing for this purpose to consist of 60-inch rabbit-proof netting, No. 17 gauge, 1½-inch mesh, 6 inches in the ground and 4 feet 6 inches above the ground, affixed to three No. 10 plain galvanised wires; one plain wire to be fixed 9 inches above the top of the wire-netting.

The posts to be erected within the main enclosure for supporting this fence to be of hardwood 7 feet 6 inches long (2 feet in the ground and 5 feet 6 inches above the ground), not more than 12 feet apart, and to measure 6 inches by 2 inches if of

sawn timber, 6 inches by 3 inches at the small end in the case of split posts, and 5 inches in diameter at the small end if round posts are used.

In addition to the entrance gate into the enclosure another gate shall be constructed in the yard. Each gate shall be covered with rabbit-proof netting and to be fitted with strong springs to ensure that they shall be kept closed, or be so constructed as will prevent more than one gate being open at the same time. The inner gate to open inwards into the closure and the outer gate to open outwards.

Specification "B."

The inner enclosure shall consist of 42-inch rabbit-proof wire-netting (6 inches in the ground and 3 feet above ground), such netting to be No. 17 gauge, 1¼-inch mesh, and to be affixed to two No. 10 plain galvanised wires (one 18 inches above the ground and the other 3 feet about the ground), one plain wire to be fixed 9 inches above the top of the wire-netting.

The fencing posts for the inner enclosure shall be of hardwood 5 feet 9 inches long (2 feet in the ground and 3 feet 9 inches above the ground), not more than 12 feet apart, and to measure 6 inches by 2 inches if of sawn timber, 6 inches by 3 inches at the small end in the case of split posts, and 5 inches in diameter at the small end if round posts are used.

A gate opening inwards may be provided.

2.—REGULATIONS.

REGULATIONS UNDER "THE ANIMALS AND BIRDS ACTS, 1921 TO 1924."

Department of Agriculture and Stock,
Brisbane, 23rd January, 1930.

THE Deputy Governor, acting for and on behalf of His Excellency the Governor, and by and with the advice of the Executive Council, has, in pursuance of "*The Animals and Birds Acts, 1921 to 1924*," been pleased to amend Regulation 50 of the above-mentioned Acts, and to make the following additional Regulations.

W. H. BARNES.

PART I.

Amendment of Regulation.

Regulation 50 is hereby amended by the addition, after the word "Rabbit" in the Schedule thereto, of the words "other than the Angora Rabbit, Chinchilla Rabbit, or other approved hutch fur-bearing rabbit."

PART III.

Licenses to keep fur-bearing rabbits.

51. Every person who desires to keep Angora rabbits, Chinchilla rabbits, or any approved fur-bearing rabbits shall make application to the Under Secretary for a license, accompanied by the prescribed fee payable in that behalf. The Under Secretary may, at his discretion, grant a license to the applicant in accordance with Form P hereto. Licenses shall not be transferable, and shall be applicable only to the area specifically mentioned therein, and may be withdrawn and cancelled at any time without notice. The number of rabbits specified in the license shall not be exceeded.

Maintenance in enclosures.

52. Such rabbits shall at all times be maintained by such licensee within a rabbit-proof enclosure, constructed to the satisfaction of the Minister or any officer authorised by him, and no rabbit shall be removed by the licensee or any other person or persons from a licensee's holding, or by him or them permitted to escape therefrom, except under a permit issued by the Under Secretary. The Minister or any other officer authorised by him shall have the right of inspection at any time.

53. In the event of failure to renew or withdrawal or cancellation of the license, all rabbits in respect of which the license is issued shall be destroyed by the licensee, or in default of him by any person authorised by the Minister, who shall have power for that purpose to enter upon premises to which such license applies, or the premises where such rabbits may be held for the time being.

Inspection and license fees.

54. The following fees shall be payable:—

	Per Annum. £	s.	d.
For license to keep up to 25 rabbits	0	10	0
For license to keep from 26 to 50 rabbits	0	15	0
For license to keep from 51 to 100 rabbits	1	0	0
For license to keep from 101 to 200 rabbits	1	10	0
For license to keep from 201 to 400 rabbits	2	0	0
For license to keep each additional 100 or portion thereof ..	0	10	0

The above fees cover inspection and license fees, but where the requisite structures have not been erected in accordance with the conditions mentioned, and a further inspection is subsequently necessary, the applicant will be required to pay the extra expense involved before a license will be issued. Licenses will expire on 31st December in each year.

Limitation of licenses.

55. Licenses will only be issued for rabbits to be kept in the following pastoral districts:—

Darling Downs, Moreton, Wide Bay, Burnett, Port Curtis, South Kennedy east of 148th meridian, North Kennedy, that portion of Cook comprising the Petty Sessions districts of Atherton, Cairns, Innisfail, and Herberton.

Penalty.

56. Any person committing a breach of these Regulations shall be liable to a penalty of fifty pounds.

[Form P.]

"The Animals and Birds Acts, 1921 to 1924."

LICENSE.

To Keep Approved Fur-bearing Rabbits.

Subject to the conditions hereinafter specified, , of , is hereby licensed under the abovementioned Acts to keep rabbits at for the period beginning the day of , 19 , and ending the thirty-first day of December, 19 .

Conditions.

1. That the number of rabbits kept shall not exceed the number for which this license is granted.

2. That the rabbits shall be kept in an enclosure constructed in accordance with specification prescribed by the Under Secretary.

3. That the enclosure shall be kept padlocked during the night and during the absence of supervision.

4. That the rabbits shall be kept in hutches within the enclosure or in an inner enclosure constructed in accordance with specification prescribed by the Under Secretary.

5. The hutches shall be provided with doors, which shall be kept padlocked.

6. That the rabbits and the enclosures and hutches in which they are kept may at all times be inspected by any officer authorised for that purpose by the Minister of Agriculture.

7. That the carcasses of all rabbits that die from disease, and all excreta, shall be destroyed by fire.

8. That the rabbits shall not be kept at any place other than the address above stated.

9. That the rabbits shall not be removed or permitted to escape from the above-stated address unless a permit for the removal has been issued by the Under Secretary, Department of Agriculture and Stock, Brisbane.

10. That this license is not transferable, and may be cancelled by the Minister of Agriculture at any time without prior notice to the holder thereof.

Given under my hand, at Brisbane, Queensland, this day of , 19 .

Under Secretary for Agriculture and Stock.

CLIMATOLOGICAL TABLE—AUGUST, 1930.

SUPPLIED BY THE COMMONWEALTH OF AUSTRALIA METEOROLOGICAL BUREAU, BRISBANE.

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	30·06	80	64	85	26	54	2, 3	14	1
Herberton	..	73	48	79	8, 9, 26	34	15	5	1
Rockhampton	30·12	77	53	84	21	40	13	141	5
Brisbane	30·11	72	51	82	30	42	14	176	8
Darling Downs.									
Dalby	30·14	69	42	78	29	29	16	250	5
Stanthorpe	..	61	36	72	29	22	13,16	249	12
Toowoomba	..	63	42	76	29	27	16	173	6
Mid-interior.									
Georgetown	30·04	85	54	93	20	39	14	66	2
Longreach	30·10	79	47	92	29	36	4	0	0
Mitchell	30·13	70	39	87	29	26	13	132	4
Western.									
Burketown	30·05	84	58	91	19	48	5	9	1
Boulia	30·09	79	47	93	29,30	39	5	0	0
Thargomindah	30·10	70	46	85	29	37	4,12	34	1

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING AUGUST, 1930 AND 1929, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of Years' Records.	Aug, 1930.	Aug, 1929.		Aug.	No. of Years' Records.	Aug. 1930.	Aug. 1929.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·82	29	0·05	0·26	Nambour	1·86	34	2·15	1·07
Cairns	1·72	48	0·97	0 84	Nanango	1·36	48	1.19	1·32
Cardwell	1·28	58	0·20	0·24	Rockhampton ..	0·96	43	1·41	0·05
Cooktown	1·28	54	0·14	0·43	Woodford	1·73	43	1·77	1·06
Herberton	0·63	43	0·05	0·06					
Ingham	1·48	38	0·18	0·47					
Innisfail	5·03	49	1·93	1·85	*Darling Downs.*				
Mossman	1·23	17	0·89	0·33					
Townsville	0·52	59	0·05	0	Dalby	1·21	60	2·50	0·29
					Emu Vale	1·17	34	1·36	0·77
Central Coast.					Jimbour	1·20	42	1·38	0·64
					Miles	1·15	45	1·54	0·44
Ayr	0·59	43	0·11	0	Stanthorpe	1·81	57	2.49	1·13
Bowen	0·67	59	0	0·27	Toowoomba ..	1·69	58	1·73	0·69
Charters Towers ..	0·57	48	0	0	Warwick	1·51	65	1·13	0·68
Mackay	1·06	59	0·89	0·19					
Proserpine	1·36	27	0·30	0·74					
St. Lawrence.. ..	0·86	59	0·13	0	*Maranoa.*				
					Roma	0·96	56	0·81	0·21
South Coast.									
Biggenden	1·08	31	1·87	1·42					
Bundaberg	1·28	47	2·64	0·39	*State Farms, &c.*				
Brisbane .. .	2·05	79	1·76	0·95					
Caboolture	1·55	43	2·59	1·00	Bungeworgorai ..	0·86	16	0.53	0·19
Childers	1·22	35	2·28	0·82	Gatton College ..	1·18	31	0.92	1 02
Crohamhurst ..	2·19	37	2·96	1·25	Gindie	0·69	31	0	0·15
Esk	1·54	43	1·65	1·43	Hermitage	1·29	24	1·63	0·55
Gayndah	1·17	59	1·79	0·69	Kairi	0·89	16	0	..
Gympie	1·75	60	1·93	1·21	Mackay Sugar Experiment Station ..	0·94	33	0·60	0 24
Kilkivan	1·46	51	3·00	1·80	Warren	0·85	15	..	0
Maryborou ..	1·66	58	3·43	0·70					

GEORGE. G BOND, Divisonal Meteorologist.

Plate 130.—Mr. J. A Rudd's "Hafrod Sensation," Champion Harness Pony, Brisbane Show, 1930.

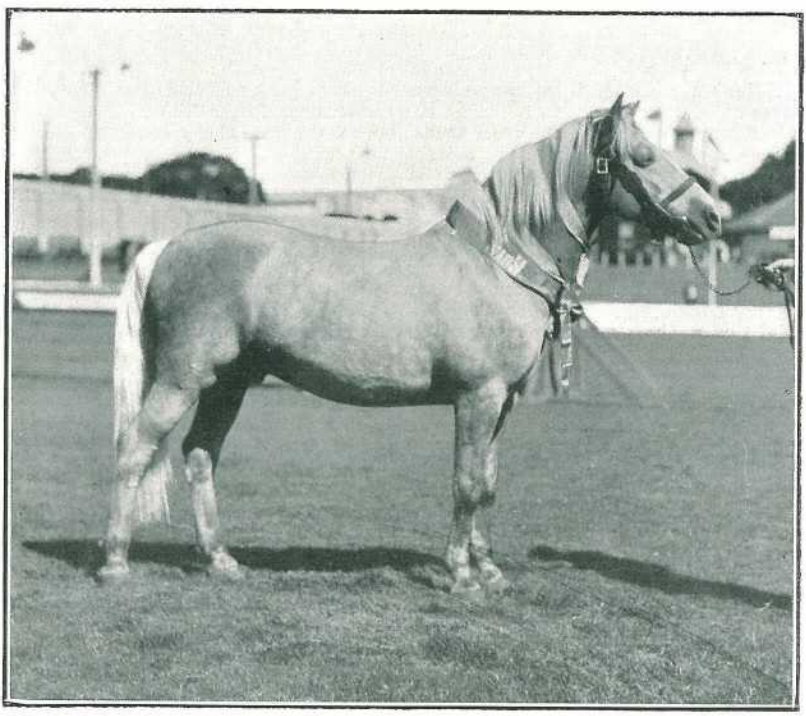


Plate 131.—"Byrons Pride," Champion Saddle Pony Stallion, Brisbane Show, 1930—the Property of Mr. W. T. Mulroney.

FARMERS' SHEEP AND WOOL.

By J. CAREW, Senior Instructor in Sheep and Wool.

PART I.

This is the first article of a series planned for the purpose of supplying some of the information sought from time to time by readers interested in sheep and wool; and also with the hope of stimulating interest in sheep raising on comparatively small holdings

SHEEP COUNTRY IN QUEENSLAND.

WITH an area of over 430,000,000 acres, it is impossible to lay down any hard-and-fast rule in connection with sheep farming in Queensland, but still there are certain areas where both soil and climate are deciding factors in favour of this branch of animal husbandry.

The merino is the dominant breed in Queensland, and it may be regarded as the most suitable throughout the central and western portions of the State; whether they are serving the best purpose over the remainder of our territory has still to be decided.

The area embracing the country from the South Australian border, along the New South Wales border to Goondiwindi, thence westward to Camooweal may be described as being suitable to the merino. Some local influences hamper sheep farming in parts of this area, chiefly lack of sufficient improvements and the dingo pest.

In this division there are distinct areas suitable for cultivation, but on account of its more or less restricted rainfall it is mostly grazing country. Cultivation would mean the destruction of native pastures to the extent to which it is practised. With no certainty of sufficient rain during a crop-growing period, the wisdom of cultivation for fodder would be open to question.

The Treeless Plains.

In this western area there are wide variations of both soil and vegetation. Large stretches of country carry grass, but no trees or shrubs. Mitchell and Flinders are the two chief indigenous grasses on these areas; both make good sheep feed, and during the greater period of their growth are suitable for fattening and for wool-growing. In normal to good years the carrying capacity of this country is high, but in the summer the want of shade is seriously felt. This is intensified in dry years when the sun and wind have full play on the open plains.

Comparatively small areas in this class of country cannot be regarded as suitable for breeding purposes, but the type of wether most suitable for producing wool can be conveniently secured by the new settler. The systematic planting of shade trees would alter existing conditions considerably; and the erection of shelter sheds, especially near the watering-places, could well be brought within the scope of good management.

The Rolling Downs.

The downs country, interspersed with trees and shrubs, is ideal sheep country, with usually a good covering of Mitchell and other grasses; and in many places edible herbage, including some varieties of salt bush. Many of the shrubs and trees are also edible, making a good standby in times of drought. It is in this class of country that sheep breeding can be carried on most successfully. The strong-wooled type of merino has been found to be most suitable for the conditions, and from these areas large numbers of breeding ewes are distributed to areas less suitable for breeding purposes, while wethers, chiefly, form the wool-producing flocks on the treeless plains. The great work of the old pioneers in these western areas in establishing flocks successfully under difficult conditions redounds to their credit; but the chief factor in later success was the raising of the standard of the breed to a type best fitted to withstand hard conditions and still give a greater weight of wool.

Western Queensland merinos are singularly healthy, so that, notwithstanding the ravages of the dingo, blowfly, and drought, we still look to the western country to keep the breed intact. The runs in this area are to a great extent fairly large, but changes are looming high, and many of the large leaseholds, as their term expires, are reverting to the Crown, when they are likely to be made available in smaller

holdings. Whether the change will be to the detriment of the industry or not remains to be determined. Where small runs are established their owners are usually more closely associated with their own property management.

Heavily Timbered Downs Country.

This class of country is usually regarded as light carrying country, but safe, owing to the presence, besides grass, of many edible trees and shrubs.

To get the best results out of this class of country, systematic ringbarking should be carried out in order to kill out all useless trees, thus giving grass and edible herbage a better chance to develop, while still retaining sufficient trees to provide necessary shade and a reserve of fodder for dry times besides affording a windbreak for the protection of the pasture.

Scrubby Country

This class of country carries little or no grass and can be greatly improved by ringbarking the major portion, but allowing shelter belts to remain.

The amount of dry timber after ringbarking would be excessive, and difficult for sheep to go through, therefore it may be beneficial to run a fire over the first growth of grass when dry.

To clean the surface of all timber, however, may be inadvisable, and not of benefit to the pasture, for otherwise the land surface would be subject to the direct rays of the sun and to the drying or scorching effect of hot winds.

The Plateau Divisions.

These may be described as the south and central plateaux and lie between the contour of the coastal areas and the western divisions, taking in the Darling Downs, part of the Burnett and Clermont, and the Springsure districts, where we meet a variety of changes in soil, climate, and rainfall.

On the Darling Downs many owners run small flocks in conjunction with mixed farming. Both the merino and Corriedale breeds are successful as well as the progeny of the British long wool and merino crosses.

The Burnett has few sheep, but with closer settlement on suitable areas mixed farming practice should warrant the introduction of many small flocks. The central plateaux, including the Springsure and Peak Downs areas, run large flocks of sheep, chiefly merino.

Much further improvement and general development is necessary in this class of country. In large areas the advantage of judicious ringbarking of useless timbers has yet to be experienced. Cattle and sheep, to be run successfully, must have their respective paddocks, though they may be allowed to run together at times, especially in good seasons. The sheep should have a secure paddock in which they can be kept when necessary.

If a dairy herd is greater than can be conveniently worked the farmer's income can be greatly augmented, at little labour outlay, by running a flock of sheep sufficiently large to stock up the spare pasture. In a dry season when little or no return is obtained from the dairy herd the sheep will usually maintain their share of the earnings; therefore, the economic value of sheep as income-producers should be recognised when considering mixed farming. Working from north to south, we find large areas suitable for mixed farming, including much of the Clermont, Peak Downs, Springsure, Burnett, Darling Downs, and Maranoa districts. Many places are to some extent isolated from the railway, and where holdings of a fair area are made available grazing only can be followed with success. Still, cultivated crops should be grown in order that the quantity of fodder to tide over times of scarcity shall be held in reserve, thus getting over the difficulty and expense of freight and cartage.

In this plateau division there are large areas thickly timbered. Where green timber is in abundance sheep will not thrive owing to the grass being usually sour. The varieties of trees it carries indicate to some extent the nature of the country. Brigalow and belah scrub lands are practically useless for sheep until the timber is killed, after which it gradually improves, becoming first class for sheep breeding and wool growing. Ringbarking is recommended as against falling and burning, chiefly to avoid suckering.

Box and sandalwood country in this area is suitable for wool growing. It is light carrying country, but by judicious ringbarking it can be improved wonderfully. Patches of shelter belts should be left in suitable places and odd trees left in regular stands as breakwinds. Speargrass occurs heavily, as a rule, in bloodwood and ridgy country. Although in other respects of good fodder value, it is to be avoided for

sheep growing, particularly from the time it matures until it sheds its seeds. By bringing this class of country under cultivation, if possible, for a season or two the speargrass may be eradicated, and useful crops secured. On reverting to grass this land usually becomes first class for sheep.

Much of the country in the plateau area, now devoted to carrying wethers for wool production, could be put to much more profitable use by running a ewe flock properly cared for. A ewe flock could not be expected to produce as much wool as wethers, but with the addition of the quantity of wool produced from, say, a 60 per cent. lambing, the difference would be but slight. However, it is in the natural increase where the advantage is secured, and in country where the rainfall is from 20 to 30 inches, and where part of the run is suitable for cultivation, the aim should be to produce crops either for grazing the ewes and young lambs or for conserving it for fodder against times of scarcity. In this connection, there is a big opening for further development, and should the fodder secured in good seasons be held as a reserve against lean periods the sheep industry would not be subjected to such heavy losses as have recurred from time to time. To carry the number of sheep now depastured on most of the holdings in Queensland at the present time is, under existing conditions, certainly running a risk. Experience has taught us that, even when comparatively small numbers of sheep had large areas to roam over, heavy losses occurred for want of sufficient nourishment.

That country varies considerably will be quite understood, and large areas will be found altogether unsuited for breeding purposes owing to want of quality in the pasture even during normal years. Where wethers are run for wool production only, this want of special quality in the pasture is not so seriously regarded, for if they do lose condition during the off season after frosts it is only what can be expected, and unless sudden changes occur the growth of wool will not be seriously affected.

By a regular, but not an over-abundant, supply of food wool will improve in both quality and condition. In country too poor for breeding purposes, or where an excessive growth of green timber is found, wethers are the most suitable to run; but on holdings favourably situated a breeding flock should be established and maintained. To do this in some districts is not difficult, but usually precautions regarding over-stocking are taken into consideration. However, all calculations will at times be upset, unless some provision is made to guard against a tendency to over-stock.

Unfortunately, many of our richer districts with a rainfall averaging 25 to 30 inches per annum are regarded as unsuited for breeding purposes. It is to these areas that the work of combined effort on the part of the stockowner, the agriculturist, and the scientist should be directed in order to secure the successful breeding of sheep of suitable breeds.

The Coastal Area.

This area embraces all the country between the Dividing Range and the sea, of which a considerable extent is useless for sheep, being either badly drained naturally or carrying coarse and unpalatable grasses. The areas with a good annual rainfall of from 35 to 60 inches, suitable and carrying good pastures, are, as a rule, used for dairying. Other areas embrace rich alluvial soils suitable for the production of a variety of crops. The holdings in this region are usually small as compared with those on the plateuax and in the Western Division, and dairying in combination with agriculture is the chief industry. I look upon the dairy cow as the most useful and profitable animal that can be run on the farm where climate and rainfall are suitable. With cows, pigs and fowls may be associated. Sheep farming should, however, be an added profitable line in mixed farming, and, if worked on right lines, should be the means of greatly increasing the wealth of this coastal country without in any way detracting from the value of any other payable enterprise.

Apart from wool production, the output of lamb and mutton would be increased. Through a system of a quick turnover in live stock, it would pay better to market many crops as mutton than to sell them as fodder. My contention is that some form of industry should be established that would act as a balance between over-production at low prices and stagnation. That this is possible with sheep in the coastal areas of Queensland I feel certain. Thousands of acres in this area could be put to much better use than is the case at the present time, and sheep farming under suitable conditions and with proper management is worthy of serious consideration.

The Northern Tablelands.

In conisdering this area the matter of local environment must be taken into account. We must concede the fact that sheep are very adaptable animals, but that adaptability may not be possessed by all breeds to fit all conditions.

Where the conditions are wettest the Romney Marsh should be selected. This breed will feed and hold condition when other breeds will shelter and suffer. As the demand for mutton is not supplied to the same extent in this part of the State as compared with others, higher local prices rule, and this should made the undertaking more profitable. Wool production in this area should be of secondary consideration. Where breeding can be carried on successfully the ewes should be sold as fats after rearing three or four lambs.

The breed possessing the strongest constitution and suitable to wet conditions and resistance to parasitical infestation should be chosen.

[TO BE CONTINUED.]

A GROWING QUEENSLAND ENTERPRISE.

The showrooms of the Queensland Pastoral Supplies, Ltd., in their new warehouse Bowen street, Brisbane, are fitted up on modern lines, a complete range of everything stocked being shown and clearly marked in plain selling figures for the convenience and information of patrons. The main showroom measures 100 ft. by 80 ft., and the actual warehouse floor space of this firm, since acquiring Perry Bros.' workshops, now exceeds 2 acres. The vast array of goods includes all groceries, fencing material, windmills, troughing, engines, gates, wireless, stoves and ranges, tools, kitchenware, furniture, and agricultural machinery. In addition, a display

PLATE 132.—BRISBANE SHOWROOMS, QUEENSLAND PASTORAL SUPPLIES.

of their valuable agency lines includes Hibiscus wire, Venus motor spirit and kerosene, Coleman lamps and lanterns, Hibiscus stock lick and auto-screw droppers, Beeman tractors, &c. A novel feature is a revolving summer-house, actually built up with all the various building material this firm supplies, including fibro-cement sheets, Wunderlich ceilings, cement tiles, rubber roofing and flooring, ten-test, and three-ply wood; inside are enamelled bath, cement tubs, wire gauze screens, stove recesses, and window shades. This enables those intending to build to see exactly the method that appeals to them—together with a comparison in cost.

Reading and rest rooms and a flat recreation roof are placed at the disposal of clients, together with free garaging of their cars.

This firm secured first prize at the recent Brisbane Exhibition for Hibiscus fencing wire, New Era separators, Astor wireless, and Hibiscus stock lick. Our readers can secure their large illustrated catalogue free of charge.

IODINE TO PREVENT DISEASE.

The part played by correct mineral feeding in keeping at bay such scourges of the dairy industry as mastitis, contagious abortion, and Johne's disease was emphasised by Lt.-Col. H. A. Reid, F.R.C.V.S., in an address on these diseases, which he characterised as "three foes of the dairy industry," before the South-Eastern Jersey Club, in London, under the chairmanship of Sir William Wayland. Col. Reid reviewed the very latest advances of modern science in dealing with these diseases, and pointed out that as no effective cure was yet known it behoved every farmer to increase the resistance of his cattle by ensuring an adequate mineral diet to them. The high light of interest in the speaker's address lay in his advocacy of a dosage of iodine. Iodine has been proved to be an agent of great value in conserving the mineral constituents of the body, and Col. Reid went so far as to say that the feeding of a small quantity of iodine daily by stock farmers would greatly lower the incidence of infection by the costly diseases mentioned above.*

Col Reid's address was as follows:—

I AM not going to refer to tuberculosis, because it would take me the whole afternoon to deal adequately with the subject. My address will therefore cover three diseases of almost equal importance—Johne's disease, an affection which is of almost equal importance with tuberculosis and is increasing in this country; mastitis, a disease of the very greatest economic importance; and lastly, contagious abortion. Abortion is one of the greatest curses of all countries where cattle breeding and dairying are carried on. The various conditions attendant on the infection render abortion one of the worst afflictions cattle owners have to contend with.

Mastitis.

Of these three diseases I propose to deal with mastitis first. Mastitis is often called mamitis or inflammation of the udder, and by herdsmen garget or weed. This affection constitutes one of the most troublesome and costly enemies the cattle breeder has, and, from the point of view of treatment, one of the most unsatisfactory diseases with which we have to deal. Its sudden onset and its liability to affect cows at their most profitable period makes the disease very formidable. The cause of this trouble is an infection due to the entrance of a variety of micro-organisms—the streptococcus called *mastidis*. This is the common causative agent, though many others may be implicated. It gains entrance to the udder by way of the teat canal, and also through sores and abrasions on the skin of the udder and the teat, which is a frequent source of mastitis in cattle.

Predisposing Causes.

The predisposing causes I consider are: First, an abnormal development of the udder due to selective breeding for milk production, which has resulted in the production of large udders. There is obviously a wider field for infection to take place, and also there is a greater liability to injury. There, again, in these high-yielding cows you have an abnormal pressure of milk, causing dilation of the teat sphincter. The presence of flies which occurs in summer helps to convey the organism from cow to cow. Again, insanitary conditions help towards infection. Colds and draught also render the cow susceptible to infection. The trouble used to be always attributed to chill in the old days, but that was only a predisposing cause, the effect of chill being, of course, to lower resistance. Herdsmen still attribute enormous importance to chill, draughts, and fresh air. You must, of course, be careful to have fresh air, and the herdsmen do not like it.

Mastitis must always be regarded as contagious, and the appearance of one case is liable to be followed by further outbreaks, especially where sanitary measures are neglected. A case of mastitis should immediately be isolated. Then the practice resorted to by commercial milk producers in allowing the first few drops of milk to fall on the floor; failure to wash before milking; failure to observe general cleanliness in the byre and disinfect milking machines properly—all these might contribute to bringing about the disease.

Danger to Public Negligible.

As to the danger to public health from this disease, I think this has been greatly exaggerated. To begin with, milk from an inflamed quarter must not and would not be mixed with other milk. I do not think, therefore, that this is often the case, except occasionally by accident. In the course of my experience I have cultivated

* From a report in the "Livestock Journal" (England).

pure cultures of streptococci in milk I have consumed, and have persuaded my assistants to do likewise, and nothing has happened to us at all. That does not, of course, necessarily go very far. We were adults, and it does not necessarily mean that infants or delicate people might not be affected. At the same time, I do not think it is fair to try to sheet home to the cow all outbreaks of disease among humans. Infection depends on the length of the lactation. If the dry period of the cow be a short one, the organism may persist in the udder and recur after the next calving. Mastitis is more common among easy milkers, i.e., those cows with an easy sphincter. The use of a teat siphon for hard milkers is another frequent source of infection.

As regards prevention of infection, first of all cleanliness comes first, and then the intelligent use of disinfectants. Don't use them too strong, nor yet too weak. Every cowshed should be disinfected twice a year or more often. Milk should never be stripped on to the ground, but into a receptacle containing a little disinfectant. The cleanliness of the floor should be attended to, and an effort should be made to get rid of flies. Before milking, the hindquarters and the udder should be washed with a damp cloth dipped in some weak solution of disinfectant. After milking, the udder should be wiped dry. Cleanliness of the milkers is very important. Milkers should not be allowed to attend to septic cases, and then carry on their duties afterwards. The udders of overstocked cows should be eased.

With regard to treatment, very little progress has been made, and treatment remains palliative. The older the case the greater the difficulty of securing recovery. Vaccine treatment is being pushed somewhat at the present time, but I have come to the conclusion that it is of very little use at all. It will not prevent animals contracting mastitis, and it will not cure them. Moreover, in many cases, vaccine treatment may be attended with great danger. The use of antiseptic injections is also a method which has been in vogue for some time, but as a matter of fact you cannot disinfect the udder in this way when the cow is standing. We are thus reduced to palliative measures, such as fomentation, &c., and attention to the general health.

Contagious Abortion.

Abortion is a term which includes the conditions known as metritis, sterility, and difficulty of getting the cow in calf. The cause is infection of the womb by a specific bacillus—an organism which is easily destroyed by disinfection.

The method of infection is generally by swallowing contaminated food or water, or by licking the parts of other cows soiled by infected passages. The role played by the bull in conveying infection is now considered of secondary importance. Although there is some danger, perhaps, it is a remote one. It is important to realise that the udder acts as a reservoir of infection in these cases, and on pregnancy the infection proceeds to the womb. Abortion usually takes place between the fifth and sixth month, but this is liable to wide variations.

Acquired Tolerance.

It is important to realise that tolerance to infection may be acquired, and possibly an immunity established. Calves reared in infected herds possess a degree of tolerance to the disease, but they may constitute carriers.

Methods of diagnosis employed are—(1) the agglutination test, and (2) the *abortin* test. The latter is a preparation similar to tuberculin. In aiming at control of the disease the herd must be divided into two—the infected and free animals—and separation must be complete. The clean herd must be tested periodically and all reactors transferred. All discharges must be burned, and douching must be gone on with until after all discharges have ceased.

As regards curative treatment, there is none worthy of notice. Is it possible to vaccinate cattle against the disease? Well, with the use of dead vaccines the results are considered to be more or less worthless, but the results from live vaccines are more promising. There are, however, a good many dangers attendant on the use of live vaccine. You run the risk of converting the hitherto clean cow into a carrier.

Undulant Fever.

Another danger is the relationship between bacillus of abortion and undulant fever of humans. The medical people say that if the organism you introduce into the cow is a living one it will be shed in the milk and find its way into the public milk supply, and may give rise to the symptoms of undulant fever. Quite a number of cases in this country and America have been alleged to be due to infection from this source. For my part, however, I think the chances of danger are remote.

Johne's Disease.

Johne's disease affects both bovines and sheep. It is a serious and steadily increasing disease, comparable in its ravages with tuberculosis. The disease may be present in cattle for months before symptoms become evident, and during that time such cattle act as potential centres of infection for others. The symptoms are unthriftiness, wasting, and diarrhœa.

No recognised cure exists. Early diagnosis and the slaughter of infected stock is at present the most economical method of control. In certain cases it may be worth while to attempt treatment to check the diarrhœa, as, say, in the case of valuable cows, until after the birth of the progeny. An injection of formalin and dilute sulphuric acid has led to good results.

As regards diagnosis, the preparation *Johnin* inoculated intra-dermally has proved of value in revealing the presence of the disease. The employment of tuberculin made from avian tubercle bacilli was also used. Another method of diagnosis was the microscopic examination of scrapings of the bowel wall. Various forms of vaccines have been tried in an endeavour to find a preventive, but none so far can claim great success. Early diagnosis and elimination of the infected cattle is the most prudent course. As to infected pastures, one observer (Dunkin) recommends chain harrowing in two directions until all cow pads have been broken up. After this the fields should be dressed with one ton of fresh quick lime per acre, or on clay soils one and a-half tons to the acre.

Minerals Essential.

It will be gathered from what I have said that no specific treatment for any one of these diseases exists. The modern tendency, however, is to aim at prevention, and in this connection it is immensely important to realise that in cattle feeding an adequate mineral supply must be provided in the ration. The feeding of the concentrated foods used for high yielders tends to cause a still further loss of lime salts to the tissues. Recent work on animal nutrition suggests that many health troubles are due to the comparative lack of minerals in the artificials.

It has been shown by various workers that iodine acts as a conserving force to the mineral elements of the tissues. I should like to read a formula of a typical mineral diet which is advocated by Major Wall, a stock breeder in Natal:—

Bone meal, 40 lb.; finely ground limestone, 40 lb.; common salt, 20 lb.; flowers of sulphur, 5 lb.; oxide of iron, 1½ lb.; and iodine of potash, 3 oz.

This is suitable for all classes of stock. The value of iodine lies in the fact that the thyroid gland, which plays a prominent part in defending the body from disease, must be fed with this substance. Heavy manuring of pastures has been shown to exhaust the iodine content.

I would suggest that, in relation to the diseases I have mentioned, if this system were adopted of giving susceptible animals iodine in very small doses, then we should see a distinct decline in the incidence of these infections.

The Discussion.

Mr. E. Corrie, who opened the discussion, said that Col. Reid had mentioned three particular diseases which affected dairy cows, and which were incurable, but he thought there was probably a much longer list. It was time that the farmer appreciated that he himself was the primary cause of a great deal of the trouble which was occurring among live stock in this country. He was absolutely certain that a great deal could be done to prevent disease among live stock and humans if care was taken that they absorbed sufficient of all the elements essential to reproduction and so forth. Mineral feeding had come to stay, and was going to be accepted as a necessary part of the feeding of live stock. These facts were significant:—

Mastitis and other diseases attacked the cow just at the time of greatest drainage on the system.

The iodine content of colostrom or first milk was greater than of any other milk.

Iodine deficiency was, he thought, at the root of a great many of the troubles which occurred among young animals. He instanced a case of a farm in West Sussex where Johne's disease had taken a heavy toll for many years. He persuaded the owner to try feeding iodine, and he had a letter from him recently, saying that he felt satisfied that the disease had been cleared from the stock.

The Young Farmer.

CARE OF THE CREAM SEPARATOR.

At the Annual Conference of the Tweed and Brunswick Sub-district Councils of the Agricultural Bureau of New South Wales, held at Mullumbimby recently, Mr. J. C. McKenzie (Manager, Norco Ltd.) read an interesting paper on "The Manipulation and Care of the Cream Separator," which we reprint hereunder:—*

To start with I would explain that the old saying, "Familiarity breeds contempt," might well be applied to the separator, for quite a few of us have almost, one might say, been reared either on or close beside it; at least, it has been on every farm in this district for many years.

A separator is built to separate cream from milk, at a given correct speed, with a correct flow (or feed) of milk, and at a correct temperature (blood heat), yet we find if we put a watch on the revolutions that very often we are turning too fast or too slow and immediately try to remedy the wrong. It is only after quite a long period of trying that we are able to keep it near enough to the correct speed. We turn the milk on; and here I might say that quite a lot of our troubles are due to the fact that, while the maker of the separator, who should know something about the mechanism, has provided a vat and tap of certain dimensions to feed the machine, we imagine the vat too small and hard to keep filled, &c., and consequently get a bigger vat built by a tinsmith, who perhaps puts a tap and connection on the vat which in most cases varies the rate of intake intended by the maker. The consequence is that the machine is expected to do more than was intended—a 100-gallon machine is perhaps expected to separate 120 gallons per hour. If we look at the thing reasonably we have to admit that we are asking it to do more than it can, and we must not forget that if we put the milk into the machine it must come out of one or other of the outlets or overflow, so it is very necessary to see that the feed is regulated correctly.

Early Separation Advised.

Sometimes we find (in cooler weather especially) that by the time milking is finished and separating nearly, the cream has risen to the top of the milk yet to go through the machine. The natural tendency is for the operator to stir up the milk (with a metal, not a wooden stirrer, we hope) in order to break the cream and then put it through the separator. This again is asking the machine to do something it was not built to do—i.e., to take a large accumulation of cream out of a small amount of milk. It is therefore advisable to separate the milk while still as warm as possible after milking, and to prevent the cream from rising to the top of the milk in the vat by keeping it stirred during separating.

After the milk has been put through the machine, clean warm water should be used to flush the cream remaining in the machine. Water is preferable to milk for this purpose, as milk will sour, and thus affect the keeping quality of the cream, so it is not advisable to put milk into your cream if you wish it to be of the best quality. After separating, it is very essential that the machine be taken down immediately and the parts put into warm water. Wash the parts carefully with a good stiff brush, and rinse in plenty of warm water. Each part should be plunged into boiling (actually bubbling) water and allowed to remain for at least three minutes, then taken out and hung up in an airy place to drain. The dishes need special care after scalding, and they should be spaced sufficiently apart to prevent drops of water clinging to them.

When Cash is Lost.

Quite a number of farmers consider farm work more important than the running and cleaning of the separator, and consequently leave it to someone else, probably a hired youth or man, and forget, temporarily at any rate, that the separator is one of the principal factors determining their incomes. If it is not separating all the cream, they are losing cash, and if it is not kept thoroughly clean it will be the cause of second-grade cream, which means a loss of 2d. per lb. on their returns.

* From the New South Wales Agricultural Bureau Record, New South Wales Department of Agriculture, 18th July, 1930.

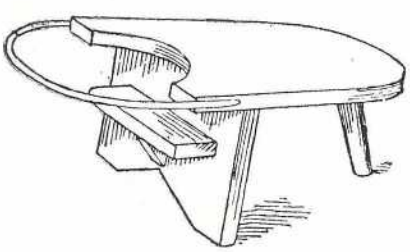
The Cream Screw.

Here is another matter which has a bearing on variations in cream tests. It is not an uncommon belief that, provided the cream (or regulating) screw of the separator remains unaltered and the rate of inflow and speed of the bowl are the same, the test of the cream will be the same, irrespective of the test of milk put through the separator. That is to say, if we had one lot of milk testing 4 per cent. butter-fat and a similar quantity of milk testing 3 per cent. butter-fat, and if these were put through the same separator under the same conditions as to temperature, rate of inflow, speed, &c., the test of the cream from each lot would be the same. This idea is not correct, as we will see if we follow it out. First of all, the function of the cream screw is definitely to proportion the milk or cream which flows through each outlet. When we alter the cream screw we alter the proportion coming from each spout, resulting in either more separated milk and less cream, or less separated milk and more cream. The test of the cream is altered indirectly in this manner, by increasing or reducing the amount of separated milk flowing through the cream spout. The alteration of the cream screw does not influence the amount of butter-fat which flows through the cream spout, but it results in a greater or smaller amount of separated milk passing through with the cream, which in turn gives the cream a higher or lower test. The average cream screw is set so that about one-tenth of the bulk will be delivered through the cream spout and nine-tenths through the separated-milk outlet. These proportions will vary slightly from time to time according to the set of the cream screw, but they will always remain the same in any one separator, provided there is no material difference in the temperature and rate of inflow of the milk, the speed of the bowl, &c.

While the butterfat test of the milk in the vat is the same, the test of cream will be the same under similar separating conditions, but as the test of the milk varies with weather conditions or seasons, the test of the cream will vary accordingly, unless the cream screw is adjusted to make up for the variation. To illustrate this point, let us take 100 gallons of milk testing 4 per cent. butter-fat and another 100 gallons of milk testing 3 per cent. butter-fat and put them through the same separator under exactly the same conditions. Let us assume that the cream screw has been set to deliver one-tenth through the cream spout and nine-tenths through the separated-milk spout. (For the purpose of this illustration the loss of fat in the separated milk can be neglected, as it would be the same in each case.) We would find that in each instance we had 10 gallons of cream. The lot from the 4 per cent. milk would test 40 per cent. in the cream, and the lot from the 3 per cent. milk would test 30 per cent. in the cream. We will thus see that though we put the two lots of milk through the same separator, under the same conditions, there is a difference of 10 points in the cream test. It will thus be seen that any variation in the test of the milk in the vat, from day to day, or month to month, will cause a corresponding variation in the cream test. If this point is properly understood, it will explain many variations in cream tests which at first sight may seem difficult to understand.

MILK STOOL.

The stool is made of three pieces of board and a piece of round iron. The appearance and manner of construction are clearly shown in the illustration. The seat board is sawn out to fit the circumference of the bucket to be used, and the



iron is also bent to this curve and fastened to the board as shown. The little shelf on the front support holds the bucket at the right height, and keeps it clean and out of the way of the cow's foot while milking.

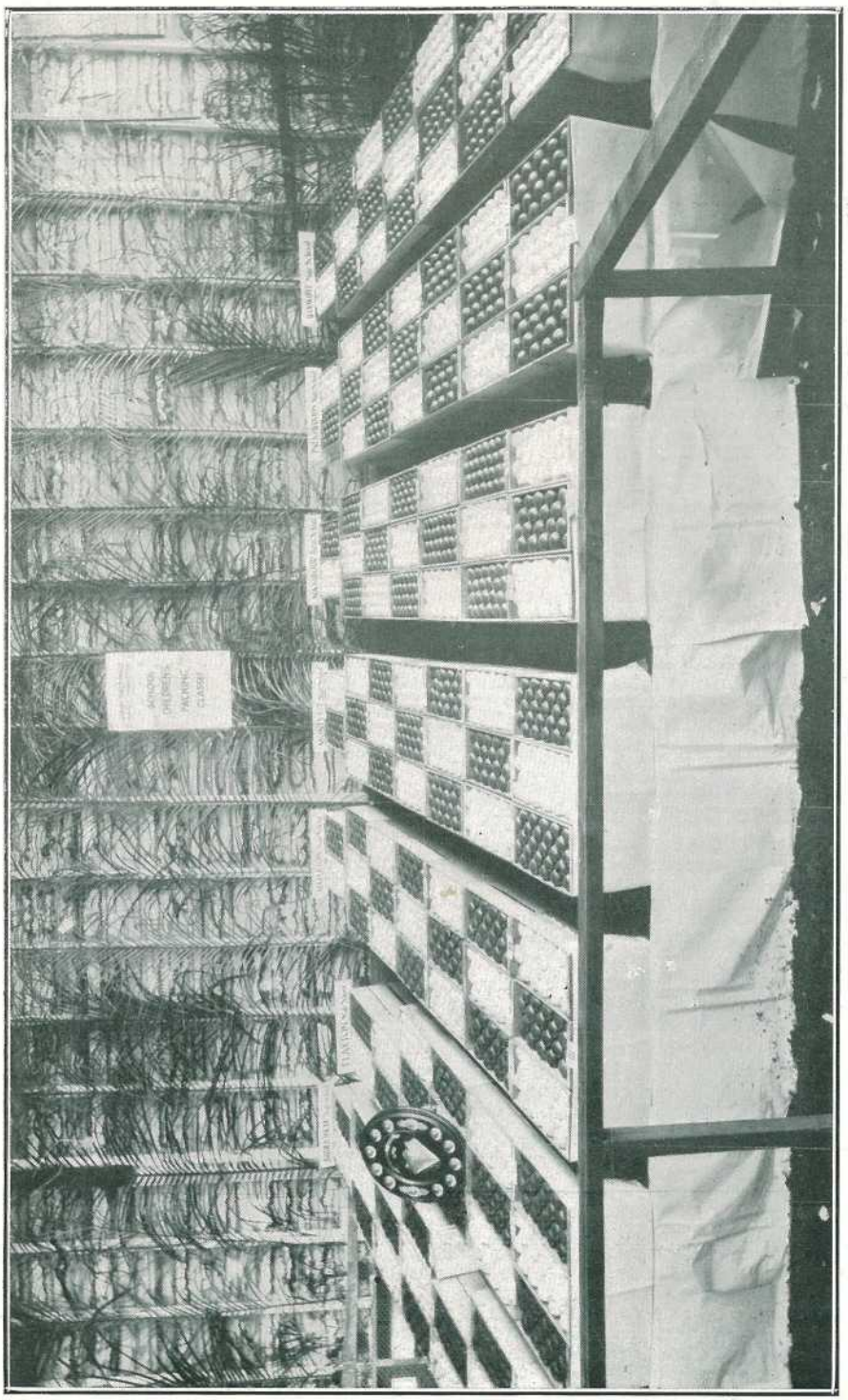


Plate 133.—John MacDonald Shield Competition for School Children's Packing Classes, Royal National Association Show, 1930.

This exhibit illustrated the value of the instruction arranged by the Education Department, in co-operation with the Department of Agriculture and Stock. The first award was won by the Flaxton State School.

Answers to Correspondents.

BOTANY.

The following answers have been selected from the outgoing mail of the Government Botanist, Mr. C. T. White, F.L.S.:—

Weeds Indentified.

"INQUIRER" (Mount Larcom)—The specimens have been determined as follows:—

(1) *Verbena bonariensis*, Purple Top, a common weed in Queensland, a native of South America but now widely spread in most warm countries.

(2) *Verbena macrostachya*, a native species of Vervain.

(3) *Malvastrum spicatum*, a weed of the Mallow family (Malvaceæ), very common in Queensland but for which I have not heard a common name.

All the foregoing are common weeds in Queensland and are not known to taint milk particularly more than the general weedy taste one gets in milk of cows fed largely on such fodder.

(4) *Carissa ovata*, a very common shrub and the only local name we have heard for it is Burr Vine, a rather ridiculous name as the plant is really a shrub, not a vine. In spite of its prickly nature, the plant has some reputation as a fodder in the district in which it grows. It extends some little way inland to the Brigalow and Bellah country. We do not think it would taint milk particularly.

Western Wonga Vine.

C.W. (Cooladdi, Western Line)—

The specimen is *Tecoma Oxleyi*, the Western Wonga Vine. It is not common in Queensland; in fact, the only other authentic specimen we have of it in our herbarium is from near Adavale; hence I was rather glad to obtain the specimen from you. It also grows in Western New South Wales and Central Australia. The broader leafed species *Tecoma australis* is fairly common on the coast and middle west.

Wild Passion Vine.

D.S. (Dululu, Dawson Valley Line)—

The specimen is the White Passion Vine or Wild Passion Vine (*Passiflora alba*), a native of South America, now naturalised and a very common weed on scrub farms in coastal Queensland. It is particularly abundant after a scrub burn. Feeding experiments carried out some years ago by the Department of Agriculture and Stock showed the plant to be poisonous. One feature brought out by the experiments was that the poisonous property of the vine is of a cumulative nature and that evidently a certain amount of the material must be eaten before symptoms of poisoning are made manifest. Regarding treatment the late Dr. Sydney Dodd, who carried out the feeding tests, made the following recommendations:—

"With regard to treatment of affected animals, first remove them to fresh quarters so that they are unable to obtain any more vines. If there is no difficulty in swallowing they should be given a drench of 1½ pints of linseed oil, by the mouth, in order to loosen the bowels. Epsom salts are not advisable, as in some cases there is inflammation of the bowels present. Working bullocks should be spelled until recovered. With animals in what may be termed the first stages of the disease, that is, those showing drowsiness and stupor, loss of appetite, and condition, &c., the best remedy is the injection of 18 drops or 1 c.c. of 1 per cent. solution of strychnine under the skin behind the shoulder, once a day for a few days (four or five) by means of a hypodermic syringe. For animals in the latter stages, that is, where convulsions are appearing, a sedative in the form of 6 drachms of bromide of potassium in a pint of water should be given as a drench, providing the animal is able to swallow, but it appears that in some cases this ability is lost. In such cases no drenches should be given at all, owing to the danger of the liquid 'going the wrong way' and so setting up inflammation of the lungs. The strychnine should be recommenced when the convulsions have disappeared."

Wild Millet. Louisiana Carpet Grass.

G.G. (Boonjie, Peeramon)—

The grass with seed head (a) is *Panicum crus-galli*, the Wild Millet. This grass is generally looked upon as one of the wild parents of such well-known cultivated fodders as Japanese Millet, White Panicum, &c. There are numerous forms of it scattered throughout the world of which several occur in Queensland, and the one you send seems to represent the common annual form which occurs in Queensland mostly as a weed in cultivation. It has, however, considerable forage value.

The other grass was not in seed but we should say it is *Axonopus compressus* or *Paspalum compressum*, the Louisiana Carpet Grass. This grass has come into prominence in the last few years in the Northern Rivers of New South Wales and Southern Queensland as a useful species for growing on the poorer classes of soils where the other grasses such as common Paspalum and Rhodes grass will not do.

"Chain Fruit" (*Alyxia ruscifolia*).

H.G. (Nanango)—

The specimen is *Alyxia ruscifolia*, sometimes known as Chain Fruit on account of the peculiar habit of the berries being apparently borne one on top of the other. It is a handsome shrub, either in flower or fruit. It can be propogated from seeds, or young plants may be readily transplanted from the scrub. The root wood has a pleasant smell, something like Orris Root. We do not quite know the plant you refer to with red berries growing in Tasmania, but we should not think it would be an ally of the present species.

Kikuyu Grass.

W.J.A., (Kin Kin, N.C. Line)—

The sample forwarded bears no seed heads, but there appears to be no doubt that it is Kikuyu Grass—*Pennisetum clandestinum*. There are certainly no specimens of *Axonopus compressus* (*Paspalum compressum*) mixed with it.

Kikuyu Grass is most readily distinguished by its flowers from all other grasses grown in Queensland. These are partially or almost entirely enclosed by the sheaths of the leaves at the tip of the shoots, and the anthers (male organs) are produced on conspicuous hair-like white stalks up to two inches long. Unfortunately, it does not flower freely, so that this means of distinguishing Kikuyu is not always available. The majority of grasses cultivated in Queensland, however, produce flowers in abundance. Carpet Grass, with which Kikuyu might be confused, has minute flowers arranged in two to four slender spikes at the apex of fine stems which are exserted from the sheaths of the leaves. Vegetatively, Kikuyu differs from Carpet Grass in several ways. The sheaths of the leaves are very loose and rounded, the leaves under cultivation are longer, narrower, and more pointed, whereas in Carpet Grass the sheaths are very strongly compressed, the leaves short, broad and blunt, and their margins fringed with minute hairs.

Stagger Weed or Wild Mint. *Phaseolus semierectus.*

W.A.A. (Esk)—

The smaller of the two weeds is *Stachys arvensis*, the Stagger Weed or Wild Mint, a very common winter and spring weed in cultivation paddocks in Southern Queensland and New South Wales. It causes staggers in working stock, but apparently is practically harmless to resting cattle. The question of the plant's being poisonous or not was rather a vexed one, but its power to produce staggers in working horses was definitely proved by feeding tests.

The larger growing plant is *Phaseolus semierectus*, a common tropical and sub-tropical leguminous plant, introduced into Queensland many years ago as a fodder. It is now moderately common as a naturalised weed in many places, but our experience with it in general is that stock do not take to it very much.

Chickweed.

G.P. (Rockhampton)—

The specimen is *Stellaria glauca*, a species of Chickweed. It is moderately common in some of the cooler parts of the State, such as the Darling Downs and the Granite Belt, but, so far as we know, has not previously been collected about Rockhampton. On that account we were rather glad to get the specimen.

Plants Identified.

H.F.M. (Waterford)—The specimens have been determined as follows:—

Aristida ramosa, a three-pronged spear-grass.

Panicum foliosum, Leafy Panic Grass.

1. *Salvia coccinea*, a native of South America, now naturalised as a common weed in many parts of coastal Queensland. Family *Labiatæ*.
2. *Diuris punctata*, a species of Ground Orchid. Family *Orchidæ*.
3. *Spermacoce brachystema*, a small plant of the family *Rubiaceæ*, very common in grassland in Queensland, but for which we have not heard a common name.
4. *Bowolia elata*, a native of South America, common in garden culture. It belongs to the family *Solanaceae*.
5. *Solanum nigrum*, a cosmopolitan weed, commonly known in Queensland as Deadly Nightshade, Blackberry, Black Currant, and other names.
6. *Solanum pseudocapsicum*, the Jerusalem Cherry. A plant moderately common in gardens and here and there met with as a stray. The native country is not certain, but is generally believed to be Madeira.

Burr Trefoil.

S.S. (Glen Aplin)—

The specimen is *Medicago denticulata*, the Burr Trefoil, a very common legume or trefoil in Queensland and New South Wales. It grows rapidly during the winter months but dies away on the approach of hot weather. It is generally regarded as a very useful fodder, and when the leaves die off, a number of little burr-like pods are left. These latter are quite greedily eaten by sheep. The plant would be valuable as a cover crop and for ploughing in for green manure, but seed, as a general rule, is not stocked by nurserymen. Once it obtains a footing on a property, however, it generally multiplies itself fairly well.

Cape Chestnut.

J.J.L. (Toowoomba)—

Your specimen is *Calodendron capense*, the Cape Chestnut, a native of South Africa belonging to the family Rutaceæ. It is a very handsome flowering tree, much cultivated about Brisbane on account of its showy character. We do not remember seeing the plant about Toowoomba, and the tree may be a bit tender with you.

PIG RAISING.

Tuberculosis in Pigs.

F.B.K. (Franklyn Vale, Grandchester)—

We are referring your letter on to the Chief Inspector of Stock for attention, and he will write you further re tuberculosis. However, it is quite apparent the young pigs to which you referred did not die as a result of tuberculosis. They probably died of constipation and as a result of the development of a form of pneumonia. This trouble developing rapidly would be responsible for the discoloured condition of the lungs. It is unlikely that tuberculosis would affect pigs two weeks old, nor is it to be assumed that because young pigs' tails drop off they are suffering from a contagious disease. This latter trouble may be due to sun scald or to some accidental cause, but though it seems a coincidence that the tailless pigs were condemned while those with tails were free of disease, this is not an indication of tuberculosis, but the fact that some of the pigs were condemned indicates that there is infection on the property, and this needs to be cleaned up.

To Rid Pigs of Lice.

H.C. (O'Bil Bil, Gayndah Line)—

To rid pigs of lice prepare a mixture of ½ pint of benzine, ½ pint kerosene, and 7 pints of waste oil. Mix well, and after washing the pigs to free them of accumulations of mud, &c., apply freely, either per hand or with a soft cloth or brush. Be careful to apply the oil inside the ears and around the head and neck, and in the wrinkles along the side. Otherwise a number of lice will escape and go on breeding. The very small white nits seen around the neck and shoulder of the pig are the eggs from which the young lice hatch out. Repeat the application of oil about ten days after the first treatment, and then periodically. Meantime clean up all old rubbish and cleanse pens thoroughly of all harbouring places, such as under bark and splinters of wood, old pig crates, &c.

Your system of growing plenty of green food and grain is the ideal one in profitable pig-keeping, and we feel you are on the right track in so doing.

It pays to provide oiling posts in the pig runs; a good stout post with a piece of sacking tacked about 12 to 18 inches from the ground is used. Keep the sacking or a piece of short woolled sheep pelt saturated with oil and the pigs will soon learn to oil themselves and keep themselves free from parasites.

Yes, it is an advantage to provide a mineral mixture, and several references to suitable mixtures are made in the pamphlets. Corn, sweet potatoes, and milk, plus greenstuff like rape and barley, lucerne, succulent grasses and herbage, plus minerals and drinking water will provide ample material for a balanced ration.

Top dressing the pastures will prove a distinct advantage and be well worth the expense incurred.

It is good to know you so much appreciate the various articles that have appeared in the Journal; the objective is to make the publication as informative and interesting as is possible.

Pig Food a Profitable Investment.

T.A.C. (Wamuran)—

We suggest you grow as much of the food as is possible, for only in this way can pigs be made a profitable investment on Queensland farms.

The articles that appear regularly in the "Queensland Agricultural Journal" on Farm and Garden crops are well worth close study, while the Agricultural Instructors will send along specialised information, on request, re any particular crop.

Pig Management.

R.R. (Kin Kin)—

We would suggest getting rid of unsatisfactory strains of pigs and replacing them with healthy well-developed stock, for good stock can be procured at reasonable rates and they would give you a good start again, but they would need to be kept in good grazing paddocks and be fed liberally, and carefully attended to. Possibly the trouble you refer to may also be due to the pigs suffering from constipation or bowel disorders or to bush tick poisoning; these diseases producing symptoms similar to those to which you refer. These troubles are all referred to in the pamphlets. We suggest you should give your pigs a complete change of food, turn them out into grassy runs, and be sure they have a warm dry bed at night. Feed milk and similar foods in a warm condition until the animals recover, and keep plenty of succulent greenstuff before them. Give charcoal and other mineral matters like bone meal, and follow advice given in the pamphlets re the regular use of mineral matters. Pigs of all ages require ample supplies of drinking water at all seasons of the year. Examine the pigs for lice and ticks, and if they are infected follow advice given re the use of oil, &c., for freeing the body of lice. The trouble is entirely constitutional and dietetic and must be handled carefully. We feel sure if you take this matter up in earnest and give it close attention you will have good results.

FRUIT CULTURE.

Citrus Pruning.

G.D. asks:—When pruning and cutting big limbs from orange trees, what would you advise to put on the cuts to prevent dry rot? I have heard that cold tar meets the case, but would like to have an opinion on it.

The Director of Fruit Culture, Mr. George Williams, advises:—Where big limbs are cut out of orange trees, provided the cut is made as nearly parallel to the stem or limb from which it is detached, there is no occasion to apply any preservative to the wood. The cut surface should be evenly pared, particularly around the edges, with a sharp paring chisel.

Lameness in Cattle.

"INQUIRER"—

Lameness in cattle is caused by overgrowth of the horn of the hoof, mud-balling, or other irritation caused by foreign bodies in the hoof cleft. Do not allow the toes to become excessively long or turn inwards or outwards. Remove excessive horn growth with a rasp or sharp-cutting pair of pinchers.

Foul foot of cattle is caused by a specific bacillus, and the predisposing factor for this condition is muddy yards, waterholes, and around drinking troughs. Recovered cases are carriers of this trouble, and care should be taken to pave all likely places and keep carriers out of muddy yards. The bacilli gain access to the feet through cuts or bruises between the clefts of the feet.

A proper foot bath should be constructed in one of the bails, 6 feet long, 3 feet wide, and 6 inches deep, sloping in on all sides, and the cows bailed up in this bath for a few hours daily, fed and watered and kept out of the mud.

The solution for the bath consists of 1 oz. of phenyle to 1½ gallons of water, preferably rainwater.

In the case of one or two quiet animals being affected, a foot bath, made out of a kerosene tin cut and the edge turned over, would suit the purpose.

The following solution may be used for soaking the foot:—Phenyle, 1 oz. to 2 gallons of rainwater. Soak for one hour morning and evening, and keep the animal in a dry paddock out of the mud.

Poisoning Weeds on Earth Tennis Court.

C.C.R. (Jondaryan)—The Director of Agriculture, Mr. H. C. Quodling, advises:—With reference to the poisoning of weeds on an earth tennis court, and also on a garden path, the use of Sodium Chlorate is recommended for both purposes. You are advised to communicate with the A.C.F. and Shirleys Fertilizer Company, Roma street, Brisbane, for particulars of this poison and for information in respect to the methods of application. Arsenical compounds are not recommended for use on tennis courts or garden paths for killing weeds.

AN ENGLISH PIG BREEDER'S APPRECIATION.

The Manager of the Baydon Herd of Large Black Pigs, Marlborough, Wiltshire, England, writes:—

"Many thanks for the pamphlets and leaflets on the subject of Pig Raising and for the Agricultural Journal; they are all very interesting, and I like the way you have placed your suggestions in the various breeds, ailments, and systems of management before your farmers.

"You are in front of us in England in the practical way you try to induce your farmers to keep the best in the best manner. I think your pamphlet on 'Paralysis of the Hindquarters in Pigs' is exceptionally good. The illustrations convince the most 'pig-headed' people."

General Notes.

Amendment to Honey Board Levy Regulations.

On the 21st August, 1930, Regulations were passed empowering the Honey Board to make a levy on honey growers to provide for the administrative purposes of the Honey Board. This levy is at the rate of 1½ per cent. on the proceeds of all honey sold from the 23rd August, 1930, to the 22nd August, 1931. As the Board applies also to beeswax, these Regulations have now been amended to apply also to all sales of beeswax in Queensland during that period. Thus the levy will now be at the rate of 1½ per cent. on the proceeds of the sales of all honey and beeswax in Queensland.

Staff Changes and Appointments.

Mr. W. E. C. Smith has been appointed Canegrowers' Representative on the Invicta Local Sugar Cane Prices Board, vice Mr. P. Hayes, resigned. Mr. G. R. Bush, of Maroochydore, has been appointed an Honorary Ranger under and for the purposes of the Animals and Birds Acts.

The transfer of Mr. M. Custance, Inspector of Slaughter-houses, Townsville, has been cancelled, and Mr. M. Flanagan, Inspector of Slaughter-houses, Bundaberg, has been transferred to Warwick instead of to Townsville. Mr. J. Bishop, Inspector of Stock, Nanango, has been transferred to Kingaroy, and Mr. T. Douglas, Inspector of Stock, Kingaroy, has been transferred to Nanango. The headquarters of Mr. L. D. Carey, District Inspector of Stock, have been transferred from Emerald to Springsure. The Officer in Charge of Police at Mungana has been appointed an Acting Inspector of Stock, and the appointment of the Officer in Charge of Police at Alma-den as an Acting Inspector of Stock has been cancelled.

The appointments of Messrs. L. L. S. Barr and A. J. Browne as Agents under the Banana Industry Protection Act have been cancelled, and, in lieu thereof, Messrs. J. C. Wilson and B. Funnell have been appointed Agents for the Banana Board.

Mr. J. T. Tod has been appointed Chairman of the State Wheat Board for a period of two years from the 1st September, 1930, to the 31st August, 1932.

Mr. Harry Hayward, of Maroochydore, has been appointed an Honorary Ranger under the Animals and Birds Acts.

The Officers in Charge of Police at Forsayth, Georgetown, and Mount Surprise, in North Queensland, have been appointed Acting Inspectors of Stock as from the 30th August, 2930.

The following persons, all resident in the Innisfail and Tully districts, have been appointed Honorary Rangers under the Animals and Birds Acts as from the 30th August, 1930, for the purpose of protecting bird life in the canefields in those districts:—

Messrs. W. D. Davies, R. C. Lacaze, J. F. McCutcheon, S. Pagano, J. Valmadre, F. H. Gilmore, G. Myers, S. J. French, P. White, P. Volp, H. G. Knust, J. B. Skardon, T. O'Loughlen, H. H. Allison, P. F. Tierney, W. J. Burke, E. R. Campbell, A. F. Marty, J. T. McNamee, W. A. McRobbie, D. V. Woods, S. Theodore, H. Henry, G. Wilson, J. C. Proctor, H. Brannigan, G. F. Brett, and W. Moran.

Levies on Banana Growers.

On the 21st August two Orders in Council were issued providing for levies on growers of bananas to provide for the administrative expenses of the Banana Board and of the Banana Experiment Stations at Kin Kin East and Bartle Frere. The levy for the Banana Board was made at the rate of 1½d. per case containing 1½ bushels or less, and at the rate of 1½d. per three bunches of cavendish, five bunches of lady's finger, or six bunches of sugar bananas marketed by the growers, according to the method of marketing employed. The levy for the Experimental Stations was made at half the above rates.

The levies on bananas marketed in the bunch have been found to be unfair to the growers owing to the great differences in size and quality of the bunches marketed, and hence to the great differences in prices obtained for single bunches. These original Orders in Council have, therefore, been amended in so far as the levy on bananas marketed in the bunch is concerned. Therefore, from now on, the levy on bananas marketed in the bunch will be at the rate of twopence (2d.) in the £1 sterling on the proceeds of all sales as regards the Banana Board, and at the rate of one penny (1d.) in the £1 sterling as regards the levy for the Experimental Stations. The levies of 1½d. and ¾d. per case for bananas sold in the case still remain.

Barley Board Hail Insurance Regulations.

Regulations have been passed under the Primary Producers' Organisation and Marketing Acts to provide for a hail insurance scheme for the Barley Board. This scheme is almost identical with that operated by the State Wheat Board.

Two funds are to be established—a Hail Insurance Fund and a Hail Insurance Reserve Fund. The first, the Hail Insurance Fund, will be created by a levy in the form of a pro rata premium charge against all growers calculated on the basis of the quantity of barley harvested, and that on which Hail Insurance Compensation is payable each year. The levy will be a charge against the grower, and may be a deduction from advances, but the sum chargeable in any one year shall not exceed 7½ per cent. of the total value of the barley insured during the same year.

The Hail Insurance Reserve Fund will be created by a levy by the Barley Board on all growers of barley at the rate of one halfpenny (½d.) per bushel on all barley harvested in Queensland. This Reserve Fund will be limited to £2,000, and when that amount is reached no further levies will be made, except to recoup the fund when payments have been made therefrom.

Each of these levies is open to a poll as to whether they shall be made or not. If no petition is received the levies will automatically come into operation. If a petition is received a ballot will be held, and if the majority of those voting is against the levies such levy shall not be made. "Growers" for the purposes of these ballots will be persons who, at any time during the last twelve months, harvested for sale barley produced in any part of the State of Queensland.

Pineapple Levy Regulations.

The Pineapple Levy Regulations which have been in force since 1926, and which were to apply until the 24th January, 1931, have been rescinded, and new ones inserted in lieu thereof. These new Regulations will apply only for a period of one year from the 20th September, 1930—that is to say, until the 19th September, 1931. The means of collection of the levies remain unchanged, the only differences being in the amount of the levies and the methods in which they are to be expended. The old levy was at the rate of one halfpenny (½d.) per case of pineapples in containers, per forty-two rough or Ripley pineapples or per twenty-four smooth pineapples in instances where they were sold loose. From now on the levy will be at the rate of twopence (2d.) per case of pineapples sold in containers, or, in instances where pineapples are sold loose, at the rate of 2d. per forty-two rough or Ripley pineapples or per twenty-four smooth pineapples. This applies only to pineapples sent for ordinary domestic consumption. In the case of pineapples sent to any canner or fruit preserver, the levy will be at the rate of twopence halfpenny (2½d.) per case for every case of pineapples with "tops on," and three and one-third pence (3⅓d.) per case for every case with "tops off."

Approximately three-quarters of these levies will be expended to meet any possible losses incurred in sending overseas any processed pineapple products processed by or with the authority of the Committee of Direction. The balance of the levy will be expended only in the interests of the pineapple section of the fruitgrowing industry of Queensland.

The amended levies have the approval of the majority of the pineapple-growing districts of the State.

The Public Curator Office—Another Record Year.

The Balance-sheet and Profit and Loss Account of the Public Curator Office as at 30th June, 1930, shows a net profit of £8,491 0s. 11d. This constitutes a record profit since the inauguration of the Office on the 1st January, 1916. The accumulated surpluses now amount to £59,125 10s. 2d. As the Office is guaranteed by the Government, it will be noted that this reserve is available to make good any losses before the Government would be asked to honour its guarantee. The total cash receipts for the financial year amounted to a little over a million and a-quarter pounds sterling. In the year 1916 the cash receipts totalled slightly over a-quarter of a million pounds sterling only. These figures speak in concrete terms of the great growth of the Office over a period of fourteen years. This rapid increase may be accepted by the people of Queensland as genuine evidence of their appreciation of the benefits offered to them by the Public Curator Office.

The phrase "The People's Executor and Trustee" is an appropriate slogan used by the Public Curator, because his activities are purely in the interests of Queenslanders, and their benefit and consideration are his main desire. The handling of thousands of estates and individual trusts raises problems of a very special nature

very different from those arising out of a strictly commercial business. Apart from the question of safety (which, of course, is undoubted), not the least among these problems, is the assuring of the efficient and personal attention to which each estate is entitled. That this aim has been attained is very evident by the very large number of messages of appreciation and congratulation that have been received from time to time from satisfied beneficiaries and clients. Though to err be human, the Public Curator never passes on the cost of a mistake to his clients. The Office makes good its own errors.

As the Public Curator is a corporation sole, he runs his Office on purely business principles without interference in any way by the Government which happens to be in power at any time. This makes for public confidence, because no part of the public moneys is used in the payment of salaries or in the general upkeep of the Office, which is entirely self-supporting, and which is not in the slightest degree a charge on the general revenue of the State. The expenditure on the salaries of 180 officers alone amounts to £45,000 a year, or an average of £250 a year per officer. In 1916 the number on the staff was 39. In that year the investments amounted to £97,000. In 1929 they amounted to £1,020,776.

Banana Board Election.

On the 27th February last Regulations were passed under the Banana Industry Protection Act providing for the election of growers' representatives on the Banana Industry Protection Board. These Regulations, numbered 27 to 37, inclusive, have been rescinded, and new ones have been substituted therefor. The old regulations have been altered in several respects, of which the chief are as follows:—

The present Banana Board, consisting of two representatives of the Minister and two representatives of the growers nominated by the Committee of Direction of Fruit Marketing, will continue in force until the 30th September, 1931. The Board was due to expire on the 31st August, 1930, but, by means of such extension, no election will be necessary until 1931. The growers' representatives for each district (of which there are two, the same as formerly) must be nominated by growers resident in that district only, and no person shall nominate for more than one district.

All elections will be by preferential voting; under the old Regulations the voting was not to be preferential.

In the event of any vacancy on the Board caused by the death, retirement, or resignation of any member, the Minister may now either appoint some person qualified to vote at elections of the Board to fill the vacancy, or else order an election. The person so appointed or elected will hold office only until the time of the next general election of members of the Board.

There will be a separate election for each of the two districts, instead of one general election for the whole of Queensland as under the old Regulations.

Tomato Marketing.

On the 31st July last the Committee of Direction issued a Direction relating to tomatoes to come into operation as from the 15th September, 1930, to the 15th December, 1930. Petitions were sent in from various districts asking that an Order in Council be issued by the Governor in Council declaring that the tomatoes to which the Direction relates shall be acquired by the Committee of Direction as the owners. A ballot was accordingly held by the Committee of Direction, with the result that 68.85 per cent. of the votes polled were in favour of the acquisition. As the required majority of 60 per cent. in favour was obtained, an Order in Council has now been issued giving effect to the wishes of the growers.

The Order applies only to tomatoes grown in the Petty Sessions Districts of Maroochy, Caboolture, Esk, Woodford, Kilcoy, Redcliffe, Brisbane, Cleveland, Southport, Logan, Beaudesert, Wynnum, Goodna, Ipswich, Marburg, Laidley, Lowood, Harrisville, Dugandan, and Rosewood—briefly, the district bounded on the north by Nambour, on the south by the New South Wales border, and on the west by Rosewood, and including the islands in Moreton Bay. All tomatoes produced for sale in this area during the period of about three months from the 20th September, 1930, to the 15th December, 1930, shall be acquired by the Committee of Direction as the owners thereof. The Committee of Direction has the power to do such things as it thinks necessary for the purpose of enabling it to effectively carry out the marketing of such tomatoes as the owners thereof for and on behalf of the growers, and the only purpose for which it intends to use this power is to prevent the despatch to the Southern States of immature tomatoes. Any interstate contracts which had been entered into prior to the date of this Order will not be prejudiced by the acquisition. The Order will remain in force only from the 20th September to the 15th December, 1930.

Filing Crosscut Saws.

The work of sharpening crosscut saws is greatly facilitated by marking off the correct tooth angle, which is 30 deg., on the top of the saw clamp at 1-inch intervals. If the file is kept parallel to the marks while filing the saw the angle of the teeth is sure to be correct.

Codling Moth Control.

Fruitgrowers generally, and apple and pear growers in particular, will be interested in the result of an experiment carried out by the Horticultural Division of the Victorian Department of Agriculture on the trees of two orchards in the Doncaster district.

The trees were sprayed six times, the first spray consisting of 2½ lb. of arsenate of lead powder and 1 lb. of spreader, with 80 gallons of water. A week later a second spraying of 2½ lb. of arsenate of lead with approximately 3 quarts of Volck white oil and 1 lb. of spreader to 80 gallons of water was given. This was repeated three weeks later, and again three weeks after that. The fifth spraying, a little over a month later, consisted of 1½ gallons of Volck with 1 lb. of spreader to 100 gallons of water, and this mixture was again sprayed another month later as the sixth and final spraying.

The results on the apples particularly were outstanding. The fruit matured ten to twelve days before fruit on other plots not treated. The skin was very much brighter, cleaner, and more highly coloured. A careful check of the fruit when picked disclosed the fact that only a fraction over 1 per cent. of the fruit was infected, leaving practically 99 per cent. absolutely clean and free from infection. One of the big advantages of the late spraying with Volck is the absence of residue on the fruit when picked, thus eliminating the necessity of wiping the fruit.

The experiment brought to light the fact that Volck seems to repel the moth, or at least prevents it from recognising its hosts, as it was noticeable that fewer eggs were deposited on the fruit that had been sprayed with Volck.

Another conclusion come to by the experimenters was that an oil-arsenate spraying, such as arsenate of lead and Volck, controls scale insects and red spider as well as codling moth.

The result of this test, scientifically conducted by experts, points the way to the successful control of codling moth, which is an ever-increasing pest in this State. Growers interested in Volck white oil can obtain full information about it from the Queensland distributors, A.C.F. and Shirley's Fertilizers Limited, Brisbane.

Peanut Board.

On the 29th May last a Notice of Intention to make an Order in Council constituting a Peanut Board to apply to all peanuts produced in Queensland was issued. A ballot was held on the question of whether it should be made or not, and this ballot resulted with 346 votes in favour and 62 against the Pool, giving a majority of 84.8 per cent. in favour. An Order in Council has therefore been issued constituting a Peanut Board for ten years to apply to all peanuts produced for sale in Queensland.

All peanuts produced for sale in Queensland are to be a commodity, and will be divested from the growers and become the property of the Board as owners. All peanuts must be delivered to the Board in an unshelled condition, and a grower shall not remove any of the peanuts produced by him from his premises, except for delivery to the Board or its agents, unless the prior consent of the Board has been obtained.

The Board will consist of four elected representatives of the growers and the Director of Marketing or a deputy appointed by the Minister. The following have been appointed members of the new Board:—Messrs. F. C. Adermann (Wooroolin) and A. S. Clark (Sandhills), until the 27th August, 1931; and Messrs. F. G. Petersen (Kingaroy) and A. G. Whiting (Atherton), until the 27th August, 1932.

Persons entitled to vote at any referendum or election in connection with the Board shall be those who have produced peanuts for sale in Queensland at any time during the twelve months immediately prior to such election or referendum.

The old Peanut Board now goes out of existence, and this new Board takes over all the assets and liabilities of the old Board. The new Pool will last for ten years—that is, until the 27th August, 1940. The existing Peanut Board Levy Regulations dealing with levies to provide for storage facilities, &c., shall continue to be operative during the currency of this new Pool.

Fertiliser Facts.

Each succeeding crop that is grown lessens the fertility of the soil. That is a fact in nature that has been proved by the chemist, who can determine the proportions of nitrogen, P_2O_5, and K_2O present in the stalk and leaves of each variety of plant, and can thus calculate the total amount of those elements removed by each acre of crop. An average yield of sugar-cane, for example, removes 60 lb. of pure nitrogen (equal to 300 lb. ammonium sulphate), 50 lb. of phosphoric acid (equal to 240 lb. of superphosphate), and 140 lb. of pure potash (equal to 280 lb. of muriate or sulphate of potash).

This plant food has then served its purpose as nature intended. Like the coal that is mined and used for industrial purposes, it has performed its duty; but the soil, just as the coal mine, has, in consequence, lost a definite portion of its store of wealth.

Apart from the chemists' determinations, the falling off in the soil's fertility can be observed, in the case of land that has been long under cultivation, by the poorer crop yield.

Owing to the patient experimental work of eminent scientists, more particularly those of the last century, this steady decline in the fertility of cultivated land can be arrested by the application of artificial fertilisers.

The practice of fertilising sugar-growing land has become well established in Queensland, and the expenditure on fertilisers is one of the regular items of cost in the production of sugar-cane—a cost, however, that produces a substantial increase in the value of the crop. The price of this commodity has been falling steadily for over a year past, and a further reduction of 35s. per ton in the price of sulphate of ammonia and a consequential reduction in the price of mixed fertilisers has been announced by Messrs. A.C.F. and Shirleys Fertilizers Limited.

It is announced that mixtures and sulphate of ammonia are now lower in price than ever before. It is to be expected that the lower prices will encourage heavier applications to the land, as we are not yet using nearly sufficient to replace the annual wastage of plant food that is removed by the crop and is lost in other ways. Systematic fertilisation plus good farming methods point the road to "more money per acre."

Ray-therapy for Pigs.

Referring to an account of experiments in ray-therapy which have been carried out over a period of three years at a Hertfordshire farm, the "Morning Post" says: "Little pigs have been sent to market four weeks earlier than usual, their lives having been shortened, but at the same time made merrier, by intensive light treatment from tungsten arc lamps. Potential bacon was artificially increased in some cases at the rate of 3 lb. a day."

The report of the experiments states that experiments with ultra-violet rays in connection with farming are being carried on by Mr. J. O. Hickman, at Micklefield Green, Hertfordshire.

Mr. Hickman has also found that ultra-violet rays, applied for a few seconds before milking to the udders of his cows, have greatly reduced the bacteria in the milk. The subsequent irradiation of the milk still further reduced the bacteria content, enabling it to be kept fresh for a much longer period. At the same time it added to it the valuable vitamin D, the anti-rickets vitamin, without destroying the equally valuable vitamin A.

Beef Consumption in the United States Falling Off.

Per capita consumption of beef in the United States was 12 lb. less, while pork consumption was 8 lb. more during 1928 than in 1926, the State and Federal Division of Agricultural Statistics reported recently.

Total meat consumption, which has been steadily declining for years, dropped from 145 lb. per capita in 1926 to 139 in 1927, and 138 lb. in 1928, the report said.

"The yearly kill of beef in 1926 was the largest in history, and it has dropped severely since that year, when the average person ate 63.6 lb. of beef plus 8.2 lb. of veal," the report continued. "Last year beef consumption in the United States was only 51.7 lb. per capita, and veal consumption only reached 6.8 lb.

"Lamb and mutton apparently have become more popular, the amount eaten by each person changing from 5.5 to 5.6 lb. in the last two years, but this still leaves lamb as only 4 per cent. of all meat eaten in America. In England it makes up more than 20 per cent. of the meat diet."

Effect of Lack of Minerals in Stock Foods.

It has been emphasised on many occasions in these columns that in practically every district throughout Australia there is an urgent necessity for the addition of mineral matters to the diet of farm stock, particularly pigs. In the absence of or deficiency in the daily supply of these very necessary additions to the diet of the animals, numerous abnormal conditions are likely to develop, and among these might be mentioned rickets, one of the most frequent and important of the diseases due to mineral deficiency. In this condition, which occurs pricipally in pigs under twelve months of age, the bones, instead of becoming strong, hard, and able to stand the strain of increasing weight, remain soft and comparatively pliable and frequently enlarged at their extremities (the joints). The trouble is more likely to occur where the animals are housed in small, dark, and badly ventilated sties, where, in addition to improper diet, they are not permitted free range or very necessary exercise in the sunshine. Deficiency in the vitamin content of the food exaggerates the condition and exaggerates other evils.

Such animals are, of course, unthrifty and, not being able to stand up to the strain imposed on their bony structure, fall a prey to hog lice, intestinal worms, skin diseases, &c., all of which result in slow and unsatisfactory growth and loss of profit.

Strangely enough, crops grown on soils which are deficient in minerals also suffer in that they are not chemically complete, while the grain and resultant meals prepared from crops grown on these soils are also weak in mineral content. Where in-pig sows are fed on poor country and where their feed is improperly balanced or deficient in chemical content, it is possible they will produce one or more pigs dead at birth, or only half developed, or very weak and puny and unable to fend for themselves. The rickety pigs are weak and are liable to become crippled at the least strain. Pigs suffering from rickets are not as resistant to the more serious diseases as are pigs strong and robust, nor are the sows likely to rear their litters satisfactorily. The only way to overcome these troubles is by cleaning up the surroundings, improving the housing and accommodation, correct feeding, and by the addition to the daily food supply of mineral matters like ground limestone, wood ashes and charcoal, sterilised bone meal.

A suitable mineral mixture may be compounded from the following recipe:—

Salt	20 lb.
Ground limestone	40 lb.
Sterilised bone meal	40 lb.
Ferric oxide	5 lb.
Potassium iodide	3 oz.

This mixture should be carefully prepared, thoroughly mixed, and be placed in a suitable trough protected from the weather and placed in such a position that the pigs can have free access to it at any time. Care and attention and improved methods of management are the only remedies for rickets.

Mr. Chris. Sheehy—An Appreciation.

Thus the "Queensland Producer":—The work of the Secretary of the Council of Agriculture (Mr. Chris. Sheehy) is deserving of special mention. During the past year he has been untiring in his efforts in not only furthering the objectives of the Queensland Producers' Association, but has also done a vast amount of useful work designed to promote the welfare of the producer. Mr. Sheehy has not spared himself in any way, and there is not the least doubt his heart is in his work.

He is a veritable mine of information concerning every detail of the Q.P.A. activities as well as the primary industries of the State and Commonwealth. His task is a very onerous one, but he has brought to it exceptional natural ability and a great capacity for hard work. These, combined with his unfailing courtesy and tact, have contributed much to his outstanding success as secretary of the organisation.

[Mr. Sheehy was formerly a valued officer of the Department of Agriculture and Stock, and in the early days of the organisation was seconded for service as assistant secretary to the Council of Agriculture. On the later reorganisation of that body he was appointed secretary, also secretary of the Queensland Butter Board.—ED., "Q.A.J."]

The Return of the Horse.

The increased number of motor-cars on the road has not banished the horse by any means, and it is cheering to know that horse transport is more than holding its own, despite the increased competition of mechanical transport. It is calculated that there are still over 3,000,000 used for business purposes in the country, over 1,000,000 of which are used in agriculture. The horse has been found to compare very favourably with mechanical transport in cost and maintenance, with the result that many firms and public bodies have rediscovered the value of the horse. We referred recently to the testimony of the railways, and their experience is confirmed by the use of horses by the transport departments of municipal authorities and the larger co-operative societies.—"Live Stock Journal" (England).

Pasture Improvement—A New Zealand Example.

Agriculturists who visited New Zealand could not fail to appreciate the remarkable results achieved there in pasture improvement, stated the Agrostologist of the New South Wales Department of Agriculture in the course of a recent address. It must be remembered, however, that the climatic conditions existing throughout the greater part of New Zealand were of such a nature that no difficulty was experienced in establishing and maintaining succulent pastures of Rye Grass, Cocksfoot, and Perennial Red and White clovers—four of the recognised world's best pasture plants.

Our hot summer weather and more or less uncertain summer rainfall were detrimental to Rye grass, and consequently it was difficult to maintain this grass in a productive state in districts such as the far North Coast, said the speaker, but much could be done with our coastal pastures as they existed to-day in the subdivision of paddocks into smaller areas in order to obtain better control of pasture growth, the application of suitable fertilisers, the use of grass harrows, the scattering and working in on paspalum pastures of seed of the winter grasses and clovers recommended for various districts by the New South Wales Department, and the conversion of surplus pasturage into grass silage or grass hay. Work along these lines was in operation at Berry and Wollongbar Experiment Farms, in addition to smaller trials at representative centres from the Tweed River to the far South Coast.

The main reasons why New Zealand could produce and maintain a supply of sucker lambs suitable for export were:—

1. The excellent pastures available, and climatic conditions which were conducive to the best growth of English grasses and clovers.
2. Sheep of the highest quality were the only types used in the production of export lambs.
3. Freezing works were numerous and were located in the main lamb-producing centres.

Regarding dairy stock, too, one of the most notable features was the excellent standard of animal on the farms.

It had been recognised many years ago in New Zealand that the grading up of the pastures was absolutely essential in order to produce early-maturing lamb or beef and to maintain milking cows in a state of high production. In 1914, 40,000 tons of fertilisers were used for top-dressing pastures, whereas in 1928-29, 315,000 tons were applied to 2,385,182 acres. The area of sown grasses and clovers in the Dominion was over 16,000,000 acres.

In all of the main dairying centres good pasture management was adopted. The subdivision of paddocks into areas of from three to six acres being a special feature of the work. Excess grass growth was controlled by the use of the mowing machine, and the cut material was made into grass silage or grass hay. The aim of the dairy farmer was to have available short nutritious pasturage for the milking cows. The animals always had access to the best feed, and the general practice was to stock at the rate of about twenty cows per acre for about two days, the remaining feed being cleaned up by the followers (generally dry and young stock). The paddocks were then harrowed with special grass harrows to spread the animal droppings and aerate and scarify the surface soil.

The main essential before commencing a system of intensive grazing in the dairying districts of Australia would be to build up reserves of grass silage, maize or sorghum silage, or grass hay as a standby for dry periods and to meet the shortage of feed which generally occurred on pastures in the winter months.

The Newspaper.

"What strikes me more and more about readers is their ingratitude. People grumble at the newspapers, but what would those grumblers do if they could not get their newspapers? I cannot help thinking a lot of nonsense is said about the so-called defects of the Press. I prefer to think of its wonderful achievements, its immense variety, and the wealth of ability bestowed upon it."—Lord Hewart.

Road or Rail—Motors as Feeders to Long-Distance Railways.

Although there are those that believe that eventually the railways will be converted into motor tracks, it is much more likely that under proper organisation the railways eventually will come into their own, as carriers for all long-distance traffic other than that of an exceptional nature, such as goods too bulky to be transported by rail. The problem is one that will be difficult of solution, especially in Australia with its wide spaces.

Commenting upon this subject London "Engineering" says that no arbitrary definition can be given of long distance traffic, but given effective regulation of road undertakings it is probable that, in general, either goods or passengers can be more conveniently and economically carried by rail over distances much in excess of fifty miles. So far as passengers are concerned, greater distances by road tend to become slow and tedious as compared with rail travel. The matter is on a different footing as regards goods traffic, as in this case a balance must be struck between economy and speed. It may be admitted that at the present time, goods can often be carried more than twice the stated distance more cheaply and expeditiously by road than by rail, but, on the whole, the tendency is for the cost of road transport to increase, and that of rail transport to decrease, and we believe that the English railways are now fully alive to the importance of eliminating vexatious delays by speeding up collection and delivery, and the elimination so far as possible of idle time at depots. If we are correct in our surmise, the proper function of road traffic becomes that of acting as a feeder for long-distance rail traffic, and providing local services up to distances of about fifty miles, particularly in the direction of cross-country runs. Such a programme leaves ample scope not only for the existing road carriers, but adequate provision for expansion.

"Big Fleas have Little Fleas——."

How a ruthless war against insect pests in every part of the Empire is being directed from a headquarters in a Buckinghamshire village is described in a report issued recently by the Empire Marketing Board ("The Biological Control of Insect and Plant Pests"). A converted country house at Farnham Royal, near Slough, is used as a clearing station and breeding centre for "beneficial" insects. These are despatched to the Dominions and Colonies to attack their harmful brothers, who cause an enormous annual loss to plant and animal life. The good insects are parasites, and control the bad insects by laying their eggs in or on the pest's grubs and eggs, and then by feeding on them. In the three years of its existence, the "Parasite Zoo," as the laboratory has been called, has been asked by Dominion and Colonial Governments to investigate some seventy different kinds of insect and weed pests in the hopes that parasites might be found.

Damage done by insects is extremely costly. Blowflies, for instance, annually destroy about 5 per cent. of the sheep population of Queensland, and have been estimated to cost Australia £4,000,000 a year. The wheat stem sawfly did £2,500,000 worth of damage in 1926 in one province alone. America suffers so severely that a sum of no less than £2,000,000 was recently spent by the Government in one year in an effort to check the advance of a single insect, the European corn borer. This borer is now advancing into Canada. The United States has recently spent no less than £12,000,000 in fighting five insects.

Shipments of some twenty different kinds of insects have been sent overseas, generally in cold storage, in special cases with food such as raisins, or sugar and water, for rations. Fourteen consignments of a parasite which attacks woolly aphis have been distributed in England, India, and Kenya Colony. This has succeeded in practically exterminating woolly aphis in New Zealand. Parasites of the wheat stem sawfly, the whitefly, and the pine shoot moth have gone to Canada; one which attacks the sheep blowfly has been shipped in large quantities to Australia and South Africa; a Californian ladybird has gone to Madras; a miniature wasp which eats the pear slug has gone to New Zealand, and a bollworm to the Barbadoes. In all, a total of about fifty-eight shipments, comprising some 100,000 specimens, have been shipped from the laboratory to various parts of the Empire.

An Important Factor in Farm Profits.

The farmer generally pays more attention to the price of his products than to the cost of producing them, but the prices of those commodities sold on a world market—wheat, wool, butter—are largely uncontrollable by him, points out Dr. A. E. V. Richardson, in the South Australian "Journal of Agriculture." On the other hand the costs of production, within limitations, are subject to the farmer's control. Various items entering into production costs are virtually fixed; these include taxes, land capital costs, upkeep and certain general expenses. But the major costs of production, excepting only land capital costs, are not fixed—they vary with the intelligence and skill of the farmer, and the power and equipment he applies to them. It is in the preparation of the land, seeding, tillage, cultivation, harvesting and hauling of the crops that the major expenses are incurred, and to the degree to which these can be reduced the profits of the farmer can be increased.

Progress in Empire Buying.

Evidence of the growth of Empire buying in the United Kingdom is contained in the annual report by the Empire Marketing Board.

The purpose of the Empire Marketing Board is clear and definite. It is to improve the quality and increase the quantity of Empire products marketed in the United Kingdom and to make Empire buying a national habit. From this centre radiate all the diverse activities of the Board. The scientist at his laboratory table serves its central purpose no less than does the salesman at his shop counter.

No amount of persuasion brought to bear upon the consuming public in all its forms would succeed unless it was supported by the wholesale and retail traders. The Board has accordingly endeavoured to secure the fullest co-operation of all kinds of traders concerned with Empire marketing.

The year has seen a steady extension, on the marketing side, of the services provided by the Board. The rise of the "National Mark" as a factor of prime importance in placing home-grown foodstuffs on an orderly marketing basis has been actively assisted by the Board. The direct initiative and responsibility for the "National Mark," as for all schemes for improving the condition of agriculture in the United Kingdom, falls, of course, on the Ministry of Agriculture and the Scottish Department of Agriculture. The Board has co-operated with these departments by providing the necessary funds, as well as by advertisement and other channels of publicity. In all its activities the Board has continued to put first the interest of the home producer.

Cultivating the Fallow—The Implements to Use.

The implements that should be used in working the fallow depend very much on the nature of the soil and the state of the fallow. If the soil is medium to heavy loam and is free from weeds the harrows or springtooth cultivator would serve. If semi-alluvial brown loam, light red loam, or heavy black self-mulching soil, and free from weeds, the harrow would be the most suitable implement. If heavy red loam or clay country, or if weeds are prevalent, the rigid tine scarifier should be used. The determining factor is usually the amount of weed growth. It is often possible to deal very effectively with weeds when very young by the use of the harrows, but should weather conditions and other factors delay the working until the weeds are too big, the rigid tine cultivator with suitable points will put the fallows in excellent condition.

The rigid tine cultivator or scarifier is the most satisfactory implement for most classes of soil. Compared with the springtooth—because it can be set to the desired depth—it does much more uniform work, makes a more even mulch, and leaves the top of the compacted subsurface area level, not ridged. This makes for a much more uniform condition of the fallow generally, and results in a more even crop. With the correct points, or fitted with knife bars, it can deal much more effectively with weed growth, particularly thistles and melons; it has not, however, the sifting action of the springtooth, and should not displace it for the early cultivations.

The disc cultivator is without doubt the best implement of all to put the fallow in bad condition. Admitting its value in destroying large weeds, it is evident that these could almost always have been killed while quite small by the use of other implements. Large weeds are a sign of a neglected fallow. Deep discing ruins the compacted sub-surface layer, delivering the clods to the bottom and fine soil to the surface, where it is easily crusted by the first rains. As discing is usually carried out in January or February, not only is the whole physical condition of the fallows practically ruined, but rapid evaporation of moisture results, and there is not sufficient time to restore consolidation unless special means are devised, and they very rarely are.—A. and P. Notes, N.S.W. Dept. Agric.

Why the Boy Leaves the Farm.

Why did you leave the farm, my lad? Why did you bolt, and quit your dad? Why did you beat it off to town and turn your poor old father down? Thinkers of platform, pulpit, press, are wallowing in deep distress; they seek to know the hidden cause why farmer boys desert their pa's. Some say they love to get a taste of faster life and social waste. Some say the silly little chumps mistake the suitcase cards for trumps, in wagering fresh and germless air against the smoky thoroughfare. We've all agreed the farm's the place, so free your mind, and state the case.

Well, stranger, since you've been so frank, I'll roll aside the hazy bank, the misty cloud of theories, and show you where the trouble lies. I left my dad, his farm, his plough, because my calf became his cow. I left my dad, 'twas wrong, of course, because my colt became his horse. I left my dad to sow and reap because my lamb became his sheep. I dropped my hoe, and stuck my fork, because my pig became his pork. The garden truck that I made grow, 'twas his to sell and mine to grow. It's not the smoke in the atmosphere nor the taste of life that brought me here. Please tell the platform, pulpit, press, no fear of toil or love of dress is drawing off the farmer lads, but just the methods of their dads.—From an American journal.

Cultivation of the Fallow—Importance of Spring Workings.

Fallowed land contains its maximum amount of moisture in the spring, but evaporative agencies become increasingly active from this period onward, and if cultivation of the surface is neglected a steady loss of the stored moisture will take place.

In experiments at Longerenong Experiment Farm, Victoria, the moisture content of a worked and a neglected fallow was carefully ascertained at different depths every month. Certain land was ploughed and cultivated in September, one portion receiving no further cultivation, and the other being worked in the same way and at the same time as other fallow land in the vicinity. On 1st November there was already a difference in the moisture content, and by April the difference was marked, the neglected fallow having in the first 4 feet 27.16 per cent. of moisture, while the cultivated fallow had 32.71 per cent. As February and March were months of good rainfall, the difference in the top 4 feet was not as great as it would have been in a dry summer, but further tests showed that the rains referred to had gone a good deal deeper than 4 feet in the cultivated portion, and remained there to nurture the succeeding crop. Californian investigators found that while in uncultivated land there was 4.3 per cent. of moisture in the first foot of soil, in cultivated land there was 6.4 per cent., and continuing their experiments at every foot to 6 feet below the surface, they showed that the advantage was the same almost the whole way down.

Weeds also, of course, play their part in depleting a neglected fallow of moisture. They rob the soil also of plantfood, and spread their seeds to the detriment of the next crop.

Provided the soil has been ploughed when in good condition, it can with advantage be left some weeks in the rough state as broken by the plough. Recently ploughed land is covered with the most effective mulch possible, and even if the surface becomes somewhat caked, little is gained by working it in the winter. In this rough state, too, it readily absorbs moisture, permitting rain to penetrate into the subsoil, and loss of moisture by run-off is reduced to a minimum under these conditions. Moreover, a greater surface of soil is exposed to weathering agencies such as frost, air, and sun, which have a mellowing influence on the soil. As the soil begins to dry up in the early spring, however, it is necessary to break the surface to renew the mulch and begin the preparation of the seed-bed.

The actual amount of working the fallowed land will require will depend upon the climate and the condition of the soil. If the moisture is to be conserved, the soil must be stirred as soon as the effectiveness of the mulch is destroyed by rain; mulches are only effective when loose and dry. Even a light shower is sufficient, under some conditions, to render a mulch ineffective; and when this is the case the soil is often drier twenty-four hours after the shower than if no rain had fallen. This is due to the increased capillarity of the particles, caused by the wetting and consequent compacting of the soil, resulting in loss of subsoil moisture by evaporation.

Two things have to be kept in mind in the working of the fallow through the summer: first, the preservation of an effective surface mulch, and second, the preparation of a seed-bed that will afford the most favourable conditions for the germination of the seed and the growth of the crop. The actual manner of the cultivation of the surface, and the implements to be used for the purpose, differ considerably. On the great bulk of the soils in our wheat areas, especially on those

that tend to break up readily, the practice preferred by many farmers is to work the fallow first with the harrows and then with the springtooth cultivator to the full depth of the original ploughing. The effect is to bring the clods in the worked soil to the surface, while the fine soil is sifted to the bottom, forming a layer of a couple of inches of finely divided soil which readily becomes compacted and united with the subsoil.

By enabling the cultivation to be completed in a minimum of time, wide stretches of harrows are very useful for the first cultivation of the fallow in the early spring, when delay for only a few days may result in a very serious loss of soil moisture. They also prepare and pulverise the soil for the subsequent working with the cultivator.

On some of the heavier soils harrowing is sometimes advisable after ploughing, for if not worked down somewhat during the winter, while still moist, the clods are very hard to deal with later; they become dry and hard in the summer, and none of the ordinary implements are capable of breaking them down to smaller sizes. If such soils are harrowed down soon after ploughing many of the clods will be considerably reduced in size. When the soil is infested with the seeds of the wild oats it is an advantage to harrow after ploughing in order to encourage the early germination of the oat seeds.

On soils that set after rain and on which it is desired to maintain a cloddy mulch, it is not advisable to harrow after ploughing, as this practice helps to make the surface too fine without improving the condition of the soil below the surface.—A. and P. Notes, New South Wales Department of Agriculture.

Herd Testing as an Aid to More Profitable Dairying.

The main object of herd-testing was to find out the cows that were not profitable, and by breeding, feeding, and culling to increase the average production of the herd, explained Mr. E. P. Filmer, at a recent gathering of New South Wales farmers. The average yield per cow for the State was 150 lb. of butter per annum, yet there were some herds which were doubling that yield and many others which were over the 200-lb. mark. This simply went to show the great number of cows that should have no place in the dairy herds, and which were not showing their owners a profit.

Describing the development of the herd-testing movement in his own (the Candelo) district, Mr. Filmer said that in 1921 he and the manager had gone exhaustively into the average production of cows milked to supply the factory. They found this to be about 115 lb.—at most not more than 120 lb.—of butter per cow per annum, and this fact had stirred some of them to form a unit in connection with the factory. After eight or nine years' continuous testing he had been enabled to increase the average yield per cow in his own herd from 180 lb. to just on 250 lb. of butter per annum, and this with a herd ranging from 95 to 100 head. On looking over his last twelve months' test records he found the best cows made 519 lb. of butter, five over 400 lb., thirty-two over 300 lb., sixty-two over 250 lb., and ninety over 200 lb. For the period 1927-28, the best cow made 415 lb., thirty-seven over 300 lb., sixty over 250 lb., and eighty-one over 200 lb.

Herd testing had everything to commend it to the dairy farmer as a good business proposition and it also made the work much more interesting. But many disappointments awaited the beginner. The cow he thought the best in the yard, if not in the district, might be found to be unprofitable, and the one thought hardly worth keeping might be "carrying the favourite on her back."

It was not advisable to sell or cull out on one test. It was advisable to go on for a number of years. He would advise setting a standard and then gradually raising it. They would find that some cows did extra well for two or three months under favourable conditions and then went off; others did not do so well at first, but they were consistent producers to within two or three months of next calving, and when their production was totalled they were much ahead of the big yielder of a month or two. Hence the necessity for testing over a period. In his opinion testing should be continuous—it was unwise to test for a year and then leave off. They were constantly getting fresh milkers in the yard either by purchase or breeding.

The dairyman who had, say, from 80 to 100 cows, and who wanted stock as much as butter, might be able to do without testing, but the man who had, say, forty cows could not afford to keep "boarders." Testing was vital to him—it meant the difference between success and failure. If a farmer had a herd of, say, forty, and each was producing 175 lb. of butter per annum and he raised this to 250 lb. per annum, which was quite possible, it meant an increase of 3,000 lb. of butter, which at 1s. 3d. per lb. amounted to £187 10s., an amount that would more than pay the interest on an overdraft of £2,500 at 7 per cent.

There was another aspect also, for when the farmer knew his cows' production he was not in the dark when selecting his own heifers to carry on with, for the old saying that "like produces like" was true, especially when the farmer was wise in the selection of the sire.

In many cases it had been the practice to get rid of cows at from 8 to 10 years old, their owners contending they were unprofitable, but he could not agree with that. They had in their herd a few cows that were first tested in 1919, and were still profitable, as during the last testing period they had made up to 300 lb. of butter. It was also advisable to get as many heifers as possible from an extra good producer, even to the extent of keeping her longer than usual.

The figures presented by Mr. Filmer showed that the factory's production had steadily increased from 363,516 lb. to 540,214 lb. during the four years 1926-29, despite the fact that there were upwards of 200 cows fewer than in 1926. That increase, he said, had been largely due to the improvement in the herds that had come about through testing.

The Importance of Pedigree.

It is a matter of some surprise (writes a correspondent to the "Livestock Journal," England) that there are still men claiming to be stock-breeders who do not realise the value of pedigree—men to whom it is necessary to explain the meaning of pedigree. A stockman replied to a question of mine the other day that he "would breed a good beast without pedigree." Undoubtedly he could, but he could never succeed ultimately so well without pedigree as he could with it. As a matter of fact, a good sound non-pedigree herd is the best foundation one can have upon which to use a good pedigree bull for the improvement of the commercial stock. Still, one should aim higher than that. It is not possible to raise up a pedigree herd without a pedigree foundation. To improve commercial stock by using a pedigree bull is one thing. The use of the right kind of bull will do all that one can hope for in that direction. Starting a pedigree herd means using pedigree females as well as pedigree males.

The value of pedigree is that it enables one to know more definitely beforehand what to expect in the progeny. With pedigree one knows the kind of animal being bred from, but without it one does not. The family tree might be a long one or a short one, but, providing it has been a successful one, it helps by enabling the breeder to take his aim beforehand. Without entering into a discussion of the technique of breeding, it may be said that the successful pedigree animal is the one that, besides having a good pedigree, carries all the characteristics of the breed in colour, size, conformation, and physical ability. Without these last-named qualities pedigree is not of much use in an animal. On the other hand, pedigree denotes ability to carry these qualities, prepotency to perpetuate all the desirable qualities of the breed.

I mention these points because there has been a good deal said during recent years on the desirability of improving commercial stock by a more extended use of pedigree bulls, and many people have come to regard this as sufficient effort. But it cannot be too clearly emphasised that the mere use of a pedigree bull, though good and valuable in itself, is not pedigree stock-breeding. The point which the intelligent farmer often has to decide is whether he will go on merely improving his commercial herd by this means or whether he will embark upon pedigree breeding. It is then that a consideration of the value of pedigree comes in. What is pedigree in practice and what is its value?

We are all agreed that the use of a pedigree bull will improve a commercial herd. A pedigree herd enables us to contain in that herd those desirable qualities which when used on non-pedigree animals improves their quality. We ourselves breed those qualities we so much want. The value of pedigree consists first of the power which its use puts into our hands for retaining and using all the best qualities of a breed and, secondly, of the means which it provides for enabling us to build up to an ideal in breeding so that we may further improve on the quality of the breed and breed out undesirable points.

There are very few really successful pedigree breeders; and that is why we are obliged to go to someone else to improve our herd and why we are willing to pay the price.

In conclusion, it may be said for the benefit of those contemplating pedigree breeding or of changing their methods, that there is a cash value to pedigree. Pedigree in an animal, no matter when he is disposed of, is of some cash value over and above its ordinary commercial value. To some this may sound a small point, but really it is a very important one, and we shall do well not to lose sight of it, especially in its full application to the value of a herd.

Fecundity of Berkshires.

The statement that "Berkshires do not farrow enough pigs," has been challenged by the Berkshire breeders of America.

Attention has been turned to the statistics as contained in the first 1,400 litters in volume 63 of the "American Berkshire Record." The 1,400 litters showed a total of 12,309 pigs farrowed, or an average of 8.792 pigs to the litter.

Of the 12,309 pigs farrowed in these 1,400 litters, 9,803 of them were reared. This makes an average of 7.002 pigs reared per litter.

A summary of the 1,400 litters shows—

9	litters	of	3	pigs	each
19	litters	of	4	pigs	each
46	litters	of	5	pigs	each
99	litters	of	6	pigs	each
177	litters	of	7	pigs	each
282	litters	of	8	pigs	each
294	litters	of	9	pigs	each
215	litters	of	10	pigs	each
130	litters	of	11	pigs	each
61	litters	of	12	pigs	each
42	litters	of	13	pigs	each
12	litters	of	14	pigs	each
11	litters	of	15	pigs	each
2	litters	of	16	pigs	each
1	litter	of	17	pigs.	

Pasture Improvement—A Southern Farmer's Experience.

Mr. F. J. Smith, of Bombala, New South Wales, has experienced considerable success in connection with the top-dressing of the natural pastures on his property, as well as with the sowing of introduced grasses and lucerne.

The benefits derived from superphosphate on oats and lucerne convinced him that the use of fertiliser was a payable proposition, and he decided about six years ago to test the value of superphosphate on the most important (from the grazier's point of view) of all crops—grass.

He selected 40 acres of natural pasture which had a carrying capacity of one and a quarter sheep to the acre, and applied the superphosphate in March at the rate of 1 cwt. per acre. The immediate results were not spectacular, but clover and trefoil gradually made an appearance, and greatly added to the quality of the pasture, as well as the bulk of feed available, until to-day Mr. Smith estimates that the carrying capacity is two and a-half sheep to the acre—just double what it was six years ago. Although he found that the wool of sheep on top-dressed pasture coarsened up somewhat, still the increased weight of the fleece more than made up for any loss in that respect. Moreover, there was an added advantage in that the animals depastured on the top-dressed area were far healthier and comparatively free from internal parasites.

The estimated cost of top-dressing was only about 7s. 6d. an acre in this case, and as the benefit of the application is noticeable for about three years, the cost can fairly be reckoned as spread over that time.

Mr. Smith has had even greater success with the sowing of grasses for the improvement of his pastures. On one paddock, of five sheep-to-the-acre country, he sowed Subterranean clover seed at the rate of 4 lb. per acre, along with superphosphate at 1 cwt. per acre. The increase in carrying capacity has been phenomenal. For the past five years the paddock has averaged four sheep to the acre, while at times it has carried up to nine sheep to the acre. At a cost of 2s. per lb. for the clover seed and 7s. 6d. per cwt. for superphosphate, Mr. Smith, naturally, is convinced that the expense has been well worth while.

On another area he sowed a mixed pasture of Wimmera Rye grass, Cocksfoot, Giant Fescue, Subterranean clover, and lucerne. The ordinary manure spreader was used for sowing the seed, with which had been mixed superphosphate at the rate of 75 lb. per acre. While this land was previously only capable of carrying 1¼ sheep to the acre, it has since carried as many as eight sheep per acre for as long as eight months of the year, and during that time six tons of grass hay had been cut and stacked.

The wisdom of sowing lucerne in a permanent pasture has also been amply demonstrated on this Bombala property, although Mr. Smith confesses that his first efforts to establish lucerne were somewhat unsatisfactory until he decided to top-dress with superphosphate. The success is just another link in the chain of evidence in support of the claim that practically the only place where lucerne will not grow is where it has not been sown.

In the face of such convincing evidence it is very difficult to understand why it is that top-dressing and pasture improvements work generally are not more widely practised. The expense is not great, the returns are considerable, and by making an acre support two sheep (or more) which previously only carried one, such improvement suggests itself as a ready means of cheapening production.

Why Not Hard Work?

"During the war it was shown what an enormous productive activity a people is capable of developing compared with ordinary times," writes "Scrutator" in the "Scottish Bankers' Magazine." "Everyone then vied with his neighbour to help to make two blades of grass grow where one grew before. Since the end of the war the process has been practically entirely reversed.

"Nearly everyone has vied with his neighbour in indulging in an orgy of extravagance and waste. The figures already given surely demonstrate that beyond question. Practically everyone to a greater or lesser extent in every class of the community is involved in responsibility, and it is useless for anyone to try 'to compound for sins they are inclined to do by damning those they have no mind to.' The economic war with unemployment can be won in no other way than the war was won.

"Let us reverse our spendthrift habits and throw all our resources of money and physical power into the reproductive and fructifying channels of productive industry, thus increasing and cheapening the necessaries of life, creating demand for them, and turning the vicious circle of the dole and extravagance and waste into the healthy channel of supply and demand of the necessaries of life. Is it a counsel of perfection? It will need all the determination and self-denial by every class shown in the war, but it will be no less successful than it was in war-time."

No Room for Bad Cattle.

What one notices at sales everywhere is that cattle of good quality always sell at a profit. It is the second-class qualities that are the drag on the market, not only failing to make a profit themselves, but depressing trade for the best stuff. One is amazed at the number of cattle of second and even third class quality to be found on the markets. But they are known and the trade for them is bad.

Why do breeders not eliminate this class of stock altogether? This stock not only keeps down the average prices for all qualities, but is a danger in itself. Some of the cattle get passed off, and although a grazier is usually a good judge it is no unusual thing for him to be saddled with inferior animals. Now, it should be remembered that the grazier does not often have much of a good time, and to find his purchases including a few wretched scrubs means that a fine hole is eaten into his profits. This year the grazier is having to pay dearly for his stock. We hope that prices all round will be maintained at a sufficiently high level over a sufficiently long time for him to make his profits.

The grazier and the feeder, much more than the rearer, know their markets. They know the class of stock they must put on the market to sell. Therefore they know what they want to buy. The rearer should be able to supply their needs, and would be able to do so if he would take a little more trouble in buying stock of quality to rear, or in breeding it, as the case may be.

Most of the bad cattle stock in the country is a result of bad breeding. This breeding could be improved, and quickly so, by banning the use of the scrub bull. Many farmers are still under a delusion as to the value of pedigree in the sire, for they think that a beast is a beast, and that if he has good grazing and good feeding he will be all right. But he never will. No amount of care in feeding or other management ever made a badly-bred beast into a good one. There is only one remedy. Keep off the bad bull, and do not buy calves or young stock because they are cheap unless the breeding is good as well. At the moment, with better qualities so dear, there is a temptation to fall back on poor quality because it costs less money. Let those who do this remember that when the market begins to fall the worst stock goes first, and that if money has to be lost over cattle it is the cheap ones—the poor quality ones—that lose most.

There is still much hesitancy, and even silly talk, among farmers on the scrub bull question, but he will have to go, and the sooner all stockmen reconcile themselves to this fact and prepare to conform to reasonable regulations in the matter the better it will be for the stability of British trade. We see the benefits of well-bred cattle, no matter what state the trade is in. Good-bred cattle pay when trade is moderate, when it is bad they keep things together better than poor ones, and in good times they really pay their owners.

In general terms the same remarks apply to sheep, but these, of course, are very dear, and the difficulty in regard to breeding is not quite so great as with cattle. Sheep breeders are a class to themselves, and manage to turn out good stuff. Farmers who are not sheep specialists also seem to recognise the value of a good tup, or a good stallion among horses, more than they do a good bull. Why this should be so is difficult to say, but it seems to be a fact. Still, even with sheep it is quality that

tells. And to-day when sheep are really difficult to buy, we find people who think they will try their hand at the job, starting with just the wrong kind of stock, because this happens to be a little cheaper in each outlay than the best.

Among cattle and sheep the tale is the same. Breed the best and you are sure of a market. Pigs, too, come into the same category, though the position is rather different owing to the liability to rapid soarings and slumps in the trade. But even here quality will out. Especially if it is of the sizable bacon and not too fat kind which the provision merchants can sell so well, and which the curers like to supply. At this time, when stock prices are high, it is well to be on guard against the temptation to indulge in cheap stock, whether cattle, sheep, or pigs.—L. M. Marshall, in the "Live Stock Journal" (England).

Founding a Herd.

Laying the foundation of a herd is a matter to which considerable thought and trouble should be devoted. To the real progressive breeder there is always a goal not yet reached, a perfection not quite attained, more and more desirable characteristics to be bred into the cattle, the expectancy of a mating to be fulfilled, a business that becomes more intensely interesting.

A beginning must be made before there can be any progress. Some will say to buy only the best and mate with the best, but if this were the only way Shorthorn herds would not be as popular as they are. Experience is one of the most necessary requirements and, like learning to swim, the way to learn is to get in. Like many other trades, there is much to learn, and the more one does the more experience and, consequently, the more knowledge. Comparison is a great help, and among several head one is soon finding there are some that have not fulfilled his expectations, and we wonder why, and try to find out if we are real breeders.

We ask some older breeder or herdsman all about the ancestry of our cow and her good points and faults. Then we either conclude that she is not worth bothering about as a breeding proposition or that she needs mating with a more typy and more thickly-fleshed bull. As a better bull will help on all the cows, a bull that nearer meets our new ideal is purchased. The cow is also sold, and with her faults in mind, a better one is purchased. In the new crop of calves we note the improvement, and are pleased.

Now, about this time we find that a neighbour breeder has a cow or two with qualities that we had not been able to see before, and that still another breeder has his cattle in much better flesh than ours. Now, we have known that he takes good care of his cattle and feeds them well, but we were doing all we knew how to do for our own. On asking a friendly breeder who has been successful, we are told that we should have a good feeder or herdsman. Following his advice, a herdsman is added, and if he is one old in experience we soon find out how little we knew, and also have defects pointed out to us we had never seen and knew but little about.

As we go over the breeding of the cows with this man and he tells us of the good and bad things in their ancestry back several generations, and which are cropping out in our calf crop it is then we begin to realise what is meant by a good herd bull, and also how bad we have been needing this herdsman with his wide experience. In fact, the herd-building job begins to look too large for us, and we are half discouraged. But on looking over the situation we find that we are well in advance of many breeders, and doing as well as others and better than many, so we decide to stick and to add a few better breeding cows that more nearly approach our new ideal. We will watch the successful breeders more closely, and watch our chance to put in a breeding bull that is a credit to any herd.

This in time is all done, and we find that we are producing cattle that compare favourably with the good breeders of the country, and it is only a few years since we bought our start. We have grown to like our cattle, and to know them intimately as individuals, as the good or bad of their ancestry is tucked away somewhere in our mind. We figure a year ahead just the proper mating for a certain cow, and speculate on the coming calf, and wonder if any of the defects of its grandparents will be apparent, and rather hope the strong points of the new bull will overcome them.

We have met many strong-minded men who are the foremost men of the nation in their business. We have competed with them, and it has brought out all the generalship there was in us. We have broadened our minds. We have travelled and are acquainted with our own country. We are identified with the people that do things. It is an advantage to our children. We feel that we are on the right road, and that in time we will produce cattle that will be a benefit to future generations. What an interesting and profitable art is herd building, and we begin to realise there is no limit to its success—"The Livestock Journal" (England).

An Irish Litter Record.

In a recent issue of the "Weekly Irish Times" reference is made to the prolificacy of Irish breeding sows. One of these sows, owned by Mr. P. Kennedy, Mountloftus, Goresbridge, had a litter recently of twenty-one strong, healthy pigs. This was considered to be a record in County Kilkenny.

The Real Function of Licks.

The real function of licks, writes the Chief Veterinary Surgeon of the New South Wales Department of Agriculture, lies in providing mineral matter which is lacking in the soil. Frequent attempts have been made to advocate their use on purely medicinal grounds, but most of the claims so made will barely stand inspection. There appears to be no evidence, for instance, that they can be utilised in the prevention of any specific disease, though doubtless where they are used to balance a mineral deficiency they will increase the general power of resisting disease. At times various ingredients which are of no value as food and do not supply any mineral deficiency are included. As examples may be quoted gentian, aniseed, and foemyrec. These are all mild stomach stimulants and carminatives, but the average sheep has a perfectly good appetite which seldom requires stimulating. As agents in the treatment of sick animals they have their place, but not as regular feeding materials to perfectly normal stock.

Denmark's Agricultural Advance.

How Denmark has advanced in the world of agriculture during the last fifty years was pointed out by the President (Mr. Henry Smalley) at the luncheon at Blackburn, Mellor and District Show (England) recently. It had not been done by lower wages, he said, for in Copenhagen wages were from 5 to 10 per cent. higher than in London. Before 1880 Denmark was poor, and had an ignorant agricultural population with very inferior cattle and an apparently small export of dairy produce. In 1928 they exported £66,000,000 worth of agricultural produce, which was £19 per head of her population. Since 1880 she had increased her export of butter nine times, bacon thirty-five times, and eggs thirteen times, and now she exported one-third of the whole of the butter exported in the world, one-quarter of the bacon, and one-tenth of the eggs. How had it been done? By greatly improved education and intensive cultivation. The productivity of the land in Denmark had been increased by 75 to 90 per cent. in the fifty years, and there was a smallholder cultivating ownership of 90 per cent. of the land.

"Music Soothes ——." Broadcasting for Cows.

Mr. A. H. McLean, a farmer of Hauraki Plains, Auckland, New Zealand, claims that there is a marked increase in the production of milk from his cows as the result of providing his herd with wireless music. In proof of his assertion, he can show a drop in factory weights for every Tuesday morning, corresponding to the Auckland broadcasting station's silent day on Monday. Mr. McLean also states that his cows stand quietly as long as the music is coming over, and that they come in to be milked of their own accord when they hear the music commence. It has long been known that cows are fond of music, and some American farmers provide it for them.

It is frequently claimed that milkers who sing at their work get better results than others, but that is usually attributed to the fact that milkers who sing must be in a good humour, and thus treat the cows gently.

Marketing Citrus Fruit—Californian Methods.

Interesting reference to Californian methods of preparing citrus fruit for market is made by Mr. J. W. Blick, of the Producers' Co-operative Distributing Company, Limited, Sydney, in a recent report on the prospects for the marketing of Australian fruits overseas.

The care with which the fruit is handled in the packing sheds with a view to obviating the possibility of the skin being in any way bruised is most striking, it is stated. The same care is exercised in the picking, handling, and transfer of the fruit from the trees to the shed. Before being graded and sized, lemons are washed and brushed for ten minutes in soft soap and water at a temperature of 115 deg. Fahr., and then immersed for five minutes in a bath of bluestone and water at a temperature of 110 deg. Oranges are treated by being first put over the brushes, and then for twelve minutes travelled through a bath of warm water impregnated with a cleanser, the temperature of the solution being 110 deg. Fahr. They are then sprayed with cold water and subsequently dried as they travel over

rollers on their way to the grading tables. By a simple contrivance the word "Sunkist" is stamped on each orange or lemon entering the grader. Although this process is a simple one and involves no extra work on the part of any of the staff and but a small outlay for the appliance, it has done a wonderful lot to popularise the "Sunkist" pack in all parts of the world, for the fruit retains its identity through all trading transactions right into the hands of the consumer.

Coloured wraps are universally used; they improve the appearance of the fruit in the cases, while the attractive labels stand out boldy on the ends of the cases.

Mr. Blick is of the opinion that Canada is a potential market for our citrus fruit (Valencia late oranges, arriving in October or November), and substantial extension should also be possible in the East. To develop trade in those parts of the world, however, it is necessary that Californian methods and packages, including the continuous supply of large quantities of fruit under a common brand, be adopted. These methods in packing and marketing oranges have practically set a standard all over the world, and Australian progress will be simpler and extension more rapid if they are adopted than if we set up standards of our own and have to convince oversea traders that these, together with our fruit, are of equal if not better value than their purchases from U.S.A.

Improving the Dairy Herd.

The bull is a potent factor in the improvement of the herd, but it is not enough that he should be pure-bred and that he should show the points of his breed —he should be of a productive family too. It is sometimes contended that his selection according to his capacity to endow his daughters with the power of high milk production is the only reliable method, but this involves keeping the bull for several years instead of for two or three, which few farmers can do, as it means in practice keeping more than one bull on the farm. An effort should be made, however, to trade bulls in such a way that their whereabouts may be known, for while many bulls are well got rid of, others would be worth a good deal to get back. Whatever its breed, the bull should be of a vigorous, masculine type, capable of transmitting his characteristics to his offspring. Constitution should be indicated by a capacious chest, much width through the region of the heart, a bright, full eye, round barrel, and well-sprung ribs. The skin should be soft and pliable, the neck should carry a good deal of crest, and there should be nothing coarse or flat over the shoulders. The carriage should be active and the manner alert, though the temper must be equable. The placing of the teats in a calf generally follows closely that of the rudimentary teats in the bull, hence a sire should not be purchased in which they are not properly placed. If they are bunched together the animal is certainly not a desirable one. Lack of constitution is indicated by a dull, sunken eye, a long, thin neck, flat ribs, long legs, cramped lung and heart space, harsh skin, and staring coat.

Similarly, quite apart from the qualities of her breed, the cow to be bred from should show femininity and constitution. A distinctly feminine appearance is an indication of activity of the sexual organs. Constitution is denoted by a broad chest, giving ample lung capacity, and a large girth, affording plenty of room for the heart. The barrel should be both deep and long, as there is then plenty of room for the digestion of large quantities of feed. The eye, again, must be full and prominent, the carriage active, the skin loose and soft, the horns and hoofs fine. In form a dairy cow should be wedge-shaped, light in front and heavier behind, and the pelvis broad. The best milkers have invariably a well-shaped udder, and large and tortuous milk veins that extend all over the udder and away from it. Good milkers are generally spare in flesh. Cows that do not produce, say, 160 lb. of butter-fat in a lactation period of 273 days should not be mated, but should be dried off, fattened, and sold. None of the foregoing points must be regarded individually as infallible signs of heavy production—what must be looked for is a combination of them all.

Judgment is necessary in mating sire and dam. In some measure the deficiencies of one may be rectified by the qualities of the other, but this is only true in a measure and only of certain characters. There is no assurance, for instance, that lack of constitution in one animal is likely to be compensated for by the other. The defective animal should be rejected altogether if there is not to be a risk of the progeny proving a "scrub."

Temperamental differences must be taken into account; two highly nervous animals are not likely to be mated to advantage. Relationships must also be watched; if blood connection exists it may be inadvisable to mate the animals.

Feeding is also an important factor in mating cattle. Insufficient and too ample feeding of the animals to be mated must both be avoided.

The Home and the Garden.

OUR BABIES.

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

LEAD POISONING.

Just step on to your veranda and rub your hands hard on the veranda rails. If a powdery substance sticks on your hands, make sure that the paint is non-poisonous. For if not, your house is a death-trap for children.

Lead paint is known to be poisonous all over the world. But lead-poisoning on a considerable scale affecting children only has been reported only from Queensland. Why should this be? The answer is not difficult. For good reasons most of us live in houses built of wood. For convenience in building and for protection against white-ants houses are built on high stumps. The verandas, which are so necessary in this climate, must therefore be protected by rails, and to look well these rails must be painted. Wooden surfaces coated with lead-paint are harmless so long as the paint adheres firmly. They are dangerous (1) while the paint is still moist and sticky, (2) when the paint is loose and powdery. Paint on surfaces outside the house exposed to the weather usually becomes powdery within two or three years. Anyone who has observed little children clinging to the rails of a veranda, and who knows how often their fingers go into their mouths, will understand easily how they get poisoned. It is not only from veranda railings that they get poisoned; painted gates and fences are equally dangerous. Older children sometimes get poisoned in the same way. On inquiry it will usually be found that they have the habit of biting their nails.

Signs and Symtoms.

This is a slow form of poisoning. Lead gradually accumulates in the body, and it may be some time before the child gets ill. Usually the first sign is griping or colic, often called stomach-ache. Of course, colic may be caused by over-eating or indigestible food. But lead-colic has no relationship to food. It may persist at intervals, especially during the night for several days or a week although the child is eating scarcely anything, and perhaps vomiting most of what he does eat. Then rather suddenly the pain stops, and the child eats anything and everything until his next attack, which probably occurs within a few weeks, and is perhaps accompanied by pain also in his legs. If the disease progresses, the next thing noticed is a weakness in the legs. The child walks badly, his legs may give way suddenly, his toes drop so that the foot has to be raised high, and even then his toes barely clear the ground, so that he trips easily. Both legs are equally affected, and you should now know that your child has got chronic lead-poisoning fully established. It will take three months or more for him to recover if he is removed from the source of the poison. If he is not removed, he may be a cripple for life. If he recovers and returns to the poison he will have a second attack, and this will be worse than the first.

Other and more Dangerous Forms.

But lead-poisoning takes other forms sometimes, more acute and still more dangerous. At the very beginning or at any time during the illness the child may have an attack of convulsions. Now convulsions may be due to many causes, the most common being over-eating of fruits, cakes, or sweets; another common cause is high fever coming on suddenly. But convulsions from lead-poisoning are unusually severe and not infrequently fatal. If the convulsions occur easily in lead-poisoning it is very probable that their cause will never be suspected.

The Sad Effect.

The most sad effect of lead-poisoning in children is complete and incurable blindness due to destruction of the optic nerve. These cases are not so common—they usually have had no previous signs of lead-poisoning or none that have been noticed—and consequently they may not be recognised until too late. If recognised, early blindness can always be prevented; after it has been established, no treatment will restore sight. Fortunately there is one symptom that is nearly always present at the beginning of the attack, and that is the development of a squint. This has nothing to do with the common cause of squint, which may be cured by wearing glasses. If your child has a headache and develops at the same time a squint, which he did not have before, get medical advice immediately. He may be suffering from the form of lead-poisoning that attacks the eyes, and prompt treatment may save his sight.

Unfortunately lead-poisoning has remote consequences that are extremely grave by its action on the kidneys. Kidney disease has many causes, and among them is lead-poisoning in childhood. These children may have recovered from their early symptoms but their kidneys may be left defective. Not exactly ill, but never really strong, they survive only to die in their teens or early twenties, usually rather suddenly and unexpectedly.

A Good Law Plus Enlightened Public Opinion.

There is a law in Queensland forbidding the use of lead paint on outside surfaces within the reach of children's hands. Whether this law is effective depends on the existence of public opinion in favour of strict enforcement. Surely we should protect our children.

THE FARM HOME.

PURITY OF FOODSTUFFS—SOME SIMPLE TESTS.

Thanks to the efforts of the authorities that are responsible for the purity of our foodstuffs, the adulteration of commodities is not so common as in the past, says the "Journal of Food Industry," London. Unfortunately, however, impure foods are still on the market. The following tests will enable buyers to determine if the foods they are receiving are pure or otherwise.

The expert coffee taster can tell by simply tasting the beverage if chicory has been added, but to the ordinary consumer this would not mean much. An infallible test is to place a teaspoonfull of the dry coffee in a tumblerful of cold water, stir well with a spoon, and leave for a minute or so. If the water remains clear the coffee is pure, but if it takes on a brownish tint chicory has been added. The darker the brown tint the greater the amount of chicory that has been added.

To test the quality of sugar, burn a sample in an aluminium spoon over a gas jet. If the sugar burns away entirely it is pure, but if any ash remains adulterations have been added.

The best way to test olive oil is to pour a quantity into a small bottle, add an eighth of the quantity of household ammonia, and shake well. If the mixture assumes a milky mass the oil is pure, but if it has a granulated appearance other oils have been added.

The simplest test for butter is to place a little in a spoon and hold it over a gas jet. If the butter boils evenly it is pure, but if it splutters and a scum appears margarine has been added.

To test flour, press a sample in the hand; if, when the hand is opened, the flour retains the impression of it and appears slightly yellow it is pure, but if it falls into powder and retains is usual colour adulterations have been added.

A good way to ascertain if milk has been "creamed" is to skim it after it has stood for an hour or so. If after the skimming a slightly bluish tinge appears round the edges, the milk is all right, but if the edges appear as before, the milk has been "creamed." To test if water has been added to the milk dip the point of a well-polished needle into it, and withdraw, holding the needle perpendicular, with the point downwards. If the milk adheres to the point it is pure, but if all of it drops off water has been added.

FARM HOMES.

MAKING THEM BEAUTIFUL

Beautiful home grounds are the first essential to a beautiful State. No matter how attractive the grounds around public buildings, or how well cared for the borders of our highways, or how numerous and fine the natural beauties of the State, if our home grounds are slovenly and unattractive, then we cannot boast of a beautiful State.

Our slogan should be, "All home grounds, attractive home grounds." Do I hear someone say, "Impossible or impractical." Not so! It is only impossible or impractical when there is no desire for attractive surroundings or lack of initiative or ingenuity in making them attractive. Too expensive! No, not necessarily, for a little labour and the seeds of a few annual flowers to be had for a few pence can often change a repulsive yard into a place which will attract attention and elicit favourable comment. Let us no longer look for lame excuses as a reason for not doing something which we know needs doing and which richly rewards him who brings about the transformation and gives pleasure to his neighbour and to the passers-by.

Fencing and Planting.

An attractive home ground must have the appearance of being well cared for. Nothing detracts more from a place than to have the yard littered with objects which do not belong there. This applies to the grounds in the rear of the house as well as to those in front. If it becomes necessary to store machinery or carry on certain operations between the house and barn, divide the space into two distinct areas and by proper fencing and planting hide the features which would detract from the beauty of home grounds. Twenty-five years ago one would scarcely see in a day's travel a farm home ground which was mowed with a lawn mower. But the farmer appreciates neat appearances as much as his city cousin, and as a result the lawn mower is rapidly becoming standard equipment on the farm. A hay field is attractive, but not when it surrounds the farm home. Mowing of the lawn is necessary, and the lawn mower is the best implement for that purpose. While other methods may be used for keeping the grass under control none of them produce as good a lawn or as satisfactory an appearance as the lawn mower.

Part of the Picture.

Make the house appear as a part of the picture you are painting with grass, shrubs, flowers, and buildings. To do this you must give the house a setting. Trees are valuable for this purpose. Tall trees at the rear of the house and at the sides at some little distance from the house are very desirable. They may not look like much soon after planting, but in years to come they will form a background and frame for the house which will enhance its attractiveness manifold. Trees may also be used along the highway, and if the lawn is fairly large, as individual specimens on the lawn, or if very large, possibly in small clumps. Stick largely to the native trees, particularly the more permanent kinds, and never plant them in rows except along the drive.—J. J. Moore, in "Hoard's Dairyman."

WOMEN AND THE PURSE.

Accustomed as we are to the phrases "economics" and "standard of living" nowadays, we are apt to disregard their real meaning. Miss Janet Mitchell (Thrift Service Director of the Government Savings Bank of New South Wales), at a New South Wales Agricultural Bureau Conference recently, pointed out that while we have concentrated on raising the monetary standard, we have devoted very little attention to the right type of education, which alone can make the individual really profit from increased wages and increased earning powers. Particularly have we been behindhand (said Miss Mitchell) in our appreciation of the importance of training woman for her vocation of home-making. The present economic condition of the country is to a certain extent the responsibility of each one of us, in so far as we have not been spending thriftily and intelligently. "I will take one factor which has contributed to a certain degree to our present economic ills," added Miss Mitchell, "the enormous growth of time-payment since the war, particularly of time-payment as applied to luxury purchases and to articles for immediate consumption, such as clothing. Now, who is responsible for the bulk of such time-payment purchases? The person responsible for the hold this particular type of trading has got on our community is the woman—the wife of the average wage-earner. Yet, can we

altogether blame her, with her lack of training in practical economics, for falling a victim to the lures of 'go-getter' salesmen? Can you expect a woman, who has never studied the question of time-payment in its relation to production and distribution costs, who knows nothing about the heavy overhead expenses of running a time-payment business, to realise that the purchase she makes, say, of £5 worth of clothing by cash order is just one drop more added to the cost of living, and that she, the wife of the man on the small or moderate income, is always the first to suffer by any increase in the cost of living? Or take, for instance, the case of a girl who has passed through high school (although her talents and her capabilities quite obviously do not fit her for a business or professional career) because her parents consider it sets a hallmark of social standing. Can you expect this girl, who has had practically no training in domestic arts, to make the first and most critical years of her married life run smoothly, with the comfort of a well-kept and well-organised home?

"The Domestic Science courses are doing excellent work for some of our girls; but just think what a small proportion of our girl population they are touching!—only a few thousands every year. In Europe and in the United States training in the financial side of home-management is a compulsory part of every girl's education, just as compulsory as the learning of reading and writing.

"At the present time, unfortunately, we have not trained ourselves to think sufficiently highly of the domestic arts—an attitude that is reflected by the whole status of domestic service, and, more seriously, in the unwillingness of numbers of parents to allow their girls to enter on a domestic science training. As one head mistress said to me recently, when she was deploring the relatively few entries there were for the domestic science section of super-primary schools: 'We cannot hope for better things while the parents look upon it as a slur on their child's mentality when you try to persuade them to let the girls take the domestic science course in preference to the commercial or the high school course!' Why should it be a slur on anyone's mentality to wish to learn efficiently the fundamentally important and extremely interesting household arts? Even for the girl who is pre-eminently fitted for a business or professional career, instruction in the intelligent ordering of her household is a necessity. The more skilled we are in any task, the more quickly will it be performed—the more time, therefore, will there be for those things which we consider most worth while.

"Here is a point on which I think we are being forced to revalue our standards. The fact that perhaps for many years we, none of us, will have so much money to spend on outside amusements will force us to lay more emphasis on the importance of simple recreation at home, will force us, therefore, alongside of this, to take more earnest stock of our homes, of our methods of home-making; it will force us to consider more seriously the enormous social value of the woman in the home who does well what is specifically a woman's work, with a sense of pride and dignity in its achievement.

"Country people especially (said Miss Mitchell in conclusion) had a tremendous opportunity to build up the very finest type of home-life, to make the home a centre of interest and recreation, not merely a place where meals were scraped together. The educational work of the Agricultural Bureau was helping people to think more seriously of the importance of building up the right kind of home environment. The only sane standards we could follow were those of living and spending in a manner without menace to our own or our children's future."

CONTROL OF WEEDS ON LAWNS.

Weeds in lawns and on bowling and golf greens cause considerable annoyance and trouble, and are often difficult to control, especially if proper precautions have not been taken from the outset. As a rule, most trouble is experienced on lawns and greens which have not been properly drained, or which are shaded, or where the soil has not been enriched before laying down the grasses. It is obvious, therefore, that control of weeds in such places must be kept in view from the time that the lawns are being established.

In the case of bowling greens and golf greens special care should be exercised to see that they receive direct sunlight throughout the whole of the day, particularly during the winter months, and also that they are thoroughly drained by means of agricultural drain pipes placed below the ground. The soil should also be enriched either by adding a better class of soil or by heavy dressings of well-rotted animal

manure. If these precautions are adopted and high-grade seed, free from weed seed, is sown thickly, little trouble will be experienced from weeds. Subsequently, a vigorous growth of the grass should be encouraged by frequent watering and by top-dressing with well-rotted animal manure composted with soil.

When such dressings are being made, care should be exercised to see that all weed seeds have been destroyed in the compost. This can only be done by compositing the soil and manure in heaps which can be kept under observation for some months. If it is not possible to ensure that the composts are free from weed seeds, it is preferable to use artificial fertilisers for top-dressing.

Despite the greatest care that is taken, however, weeds will occasionally appear in lawns, and they must be immediately hand-pulled. If care is exercised in this direction, no great difficulty will be experienced in keeping the weeds under control. Clover is often troublesome in lawns, and this can be checked to some extent by top-dressing with sulphate of ammonia, which does not encourage the growth of clover, but stimulates the growth of grass, which checks the clover.

Superphosphate and lime should not be used on lawns which are likely to be infested with clover, as they stimulate the growth of clover.

Chemical exterminators cannot be recommended to any extent for control of weeds on lawns, but they can be used, particularly arsenic preparations, for killing individual plants such as paspalum grass. A little of the preparation should be dropped on the middle of the plant.

BOUGAINVILLEA.

Visitors to the beautiful garden of Mr. Thomas, at Indooroopilly, this year were impressed with the many possibilities of design and effect that can be made with this very hardy and showy climber. The appreciation of the bougainvillea is shown by the hundreds of persons who go to see it in bloom. It is a hardy plant, and loves sunshine, and there is no reason why it should not be more widely grown. A little time and patience will amply repay anyone who contemplates its culture. Cuttings strike readily as soon as the blooming period is over. They should be about 12 inches long. Select last season's growth, and plant in sandy soil in a shady place.

Put the cuttings about 6 inches daay in the soil, and press down firmly. Keep the ground moist, not soaking wet. If you require a more immediate result, obtain plants from the florists in pots. There are about seven different colours to select from. When the plants have grown to a height of 2 feet then select your design and prune accordingly. To train the plant make a skeleton design of wire, and then trim the plant by removing all shoots that may be growing in a direction that is not required. About May or June pruning must be stopped, as all the new shoots then appearing will be flowering shoots. As soon as the blooming period is over commence pruning again to still improve your design.

There are many methods of growing bougainvillea, and one that finds favour with many is that of planting it around an old tree that is not wanted, and ringbarking the tree when the bougainvillea is firmly established. It will then hang down from the branches of the tree and form a beautiful garland of bloom. It is an evergreen and never appears unsightly.

Readers are reminded that a cross in the prescribed square on the first page of this "Journal" is an indication that their Subscription —one shilling—for the current year is now due. The "Journal" is free to farmers and the shilling is merely to cover the cost of postage for twelve months. If your copy is marked with a cross please renew your registration now. Fill in the order form on another page of this issue and mail it immediately, with postage stamps or postal note for one shilling, to the Under Secretary, Department of Agriculture and Stock, Brisbane.

Farm Notes for November.

Field.—Farmers are commencing to realise that quick-maturing wheats which possess a degree of rust resistance are more dependable than the slow-growing and often rust-susceptible kinds, which are gradually giving place to these and mid-season varieties.

Growers are advised to make every preparation to work up the surface of the ground immediately after the removal of their crops, so that the soil may be put into good condition to receive any rain which falls, the conservation of which is the best guarantee for the success of the next succeeding crop. Such initial preparation also encourages the early growth of all foreign and weed seeds, and permits of their eradication by the implements used to produce the desired soil mulch. In such manner paddocks are kept clean and the purity of crops is maintained. The careful preparation of areas intended for maize-planting cannot be too strongly impressed upon growers. Deep and thorough ploughing, followed by cross-ploughing and subsequent cultivation of the soil, must precede sowing if success would be attained; and all efforts must be concentrated to obtain a good surface mulch. Failure to follow up the subsequent sowings by harrowing prior to the appearance of the young plant conduces to weed growths and very often entails, by neglect of this operation, subsequent hand-hoeing between the plants in the drills. Harrowing should be discontinued before the plant breaks through the surface, otherwise damage will accrue to the tender shoots of the young plants. When the young maize plant has hardened up it may, with advantage, be lightly harrowed in the direction of the drills, but such practice must discontinue once the plant has attained a height of 6 inches. Close cultivation by inter-row cultivation implements is necessary after every shower to conserve moisture and to prevent weed growth, care being taken to ensure each cultivation being shallower than the preceding one, and so prevent damage to the root system of the plant, which is extensive. Inter-row cultivation should cease with the advent of the cob on the plant; and, if proper attention has been given to the crop, it should, at this period, be unnecessary. Where crops are planted on the check-row principle, inter-row cultivation is facilitated, and more even crops result.

The French millets (red and white), owing to their rapid maturing qualities, form excellent intermediate or supplementary crops, and are suitable for present sowing. Their value for fodder and seed purposes is worthy of more general recognition at the hands of the average farmer.

Past dry periods have impressed upon us the necessity of providing during good seasons against the return of less favourable ones, and in this connection the cultivation of quick-growing fodder plants appeals to us. Many varieties of useful classes of fodder can be cultivated over a large portion of this State; chief of which, perhaps, are the sorghum family for grain and fodder purposes. Of the latter, Sudan grass has much to commend it, and is fast becoming one of the most favoured by stockowners. Grain sorghums, of which Feterita, Red Kaffir, and the various Milos are examples, should occupy a more prominent position for purposes of horse and pig feeding, and are particularly suited to those localities which are unsuitable for maize production. Some varieties of sorghums have strong frost-resisting qualities, and lend themselves to those localities where provision for some form of succulent fodder is necessary during the winter months.

Orchard Notes for November.

THE COASTAL DISTRICTS.

November is somewhat of a slack month for fruit in the coastal districts, as the citrus crop, excepting a few Valencia Late oranges, off-season lemons, and a few limes, is over. Pineapples are also scarce, as the late spring crop is finished, and there are only comparatively few off-season fruits ripening. The main summer crop of fruit in the principal producing districts is only in the flowering stage, though that in the more tropical parts is ready for marketing. It is also a slack month for bananas, as the summer fruit is not yet fully developed, and the bunches that make

their appearance are usually poor. They have been slow in developing on account of the comparatively cool weather of winter and early spring, when the suckers were more or less at a standstill. Young suckers should, however, be making vigorous growth now, and the plantation will require constant attention to prevent the stools being overcrowded with too many suckers. Keep the land well worked and free from weeds of all kinds, as good growth now means good bunches in the autumn and early winter. Where there is a danger of the soil washing badly with heavy rain, rows of Mauritius, velvet, or other suitable beans should be planted at right angles to the fall of the land, as the growth they make will tend to hold the soil, and thus save any from being washed away. When planting beans of any kind, either to prevent washing or for green manuring, don't forget to manure them, as thereby you will get a much greater yield, and as none of the manure is removed from the soil, as the crop is allowed to lie and rot on the ground, it is all made use of eventually by the permanent crop.

A good all-round manure for a bean crop is a mixture of 1 cwt. of sulphate of potash and 4 cwt. of basic superphosphate or finely ground phosphatic rock to the acre, and, if the soil is deficient in lime, a dressing of not less than half a ton to the acre will be found very beneficial, as all leguminous plants require lime to yield their maximum return both of haulm and pulse. The pineapple plantations require to be kept in a state of thorough tilth, and no weeds must on any account be allowed to grow. If blady grass makes its appearance it must be stamped out, as once it gets established in the rows it is only a short time before it takes control, and the plantation is ruined, so that it can only be brought back into profit by taking out the pines, killing the blady grass, and, after thoroughly and deeply working the land, manuring it and replanting.

The planting of pineapples and bananas can be continued throughout the month, taking care to see that the land is properly prepared and that the advice given in previous monthly notes is followed. Young papaw plants that have been raised in the seed bed can be set out now, as also can young passion fruit. Citrus orchards require to be well looked after; the ground must be kept in a state of thorough tilth, and if the trees show the slightest sign of distress, owing to lack of moisture in the soil, they must be given a thorough irrigation if water is available for this purpose. The trees should be carefully examined from time to time so as to note when young scale insects of any kind are hatching out, and when this is noted they should be sprayed with a weak emulsion of a miscible oil consisting of one part of oil in forty parts of emulsion, as this is quite strong enough to kill any young scales before they develop their protective covering. As stated in these notes previously, no oil sprays should be used when the trees are suffering from lack of moisture, as they are then likely to do more damage than good to citrus trees. If scale insects are very bad, and it is important that the trees are sprayed, a weak lime-sulphur spray, or even a soap and tobacco or weak resin wash, will kill the young scales as they hatch out. In the earlier districts a keen lookout must be kept for the first appearance of the mites, which are the direct cause of the darkening of the skin of the fruit known as "Maori." The first indication of the trouble is that when the sun is shining on the young fruit it appears to be covered with a grey dust, and if the fruit is examined with a good lens, it will be seen to be covered with large numbers of small yellowish slug-like insects which are living on the skin. Spraying with sodium or potassium sulphide washes, as recommended by the Department, or with a weak solution of lime-sulphur, will destroy these insects and prevent the fruit from turning black. Borers of all kinds should be looked for and destroyed wherever found. Water sprouts, if not already removed, should be cut away. Vines will require careful attention, and the vineyard should be kept in a state of thorough cultivation. Spraying for downy mildew and black spot should be continued, if necessary, as well as sulphuring to prevent oidium.

Fruit fly must be systematically fought whenever seen, and special care must be taken to gather and destroy any early ripening peaches or other fruit that may be infested. If this is done systematically by all growers, as provided by the Diseases in Plants Act, there will be many less flies to attack the later crops of mangoes and other fruits.

Leaf-eating insects of all kinds should be systematically fought wherever seen, by spraying with arsenate of lead, and potatoes and tomatoes should be sprayed with a combined spray consisting of Bordeaux or Burgundy mixture and arsenate of lead, so that diseases such as early blight and Irish blight may be prevented and leaf-eating insects, which frequently cause very heavy losses to these crops, be destroyed.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

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

All kinds of leaf-eating insects should be kept in check by spraying with arsenate of lead, and all grape vines, potatoes, and tomatoes should be kept sprayed with Bordeaux or Burgundy mixture, the former for black spot and downy mildew, and the latter for early and late (Irish) blight.

A CLOTHES-LINE POST.

A serviceable clothes-line post was made out of an old boiler tube and a discarded waggon hub, as shown in the sketch. The boiler tube was cut to a length of 8½ feet, and sunk into the ground so that 6½ feet were exposed. Sections of gas pipe were placed at right angles through the hub, and the latter fitted snugly into

the top of the boiler tube. The construction was given several coats of paint, and withstood hard wear in the open. By using wooden plugs in the ends of the pipes, and boring suitable holes through them, the old boiler tubes may be used to build a substantial railing or fence.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	October, 1930.		November, 1930.		MOONRISE. Oct. 1930.	MOONRISE. Nov. 1930.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	5.36	5.48	5.5	6.7	12.1	1.31
2	5.35	5.48	5.4	6.7	12.58	2.25
3	5.34	5.49	5.4	6.8	1.52	3.17
4	5.33	5.50	5.3	6.8	2.45	4.11
5	5.32	5.50	5.2	6.9	3.39	5.16
6	5.31	5.51	5.2	6.10	4.33	6.16
7	5.29	5.51	5.1	6.10	5.25	7.8
8	5.28	5.52	5.1	6.11	6.21	8.11
9	5.27	5.52	5.0	6.12	7.18	9.13
10	5.26	5.53	4.59	6.13	8.16	10.15
11	5.25	5.53	4.59	6.14	9.17	11.13
12	5.24	5.54	4.58	6.15	10.19	...
					a.m.	a.m.
13	5.23	5.54	4.58	6.16	11.19	12.5
14	5.22	5.55	4.57	6 16	...	12.49
					a.m.	
15	5.21	5.55	4.57	6.17	12.20	1.25
16	5.20	5.56	4.56	6.18	1.15	2.0
17	5.19	5.56	4.56	6.19	2.7	2.32
18	5.18	5.57	4.56	6 20	2.49	3.6
19	5.17	5.58	4 55	6 21	3.26	3.40
20	5.16	5.58	4 55	6.22	4.0	4.18
21	5.15	5.59	4.55	6 23	4.35	5.0
22	5.14	5.59	4.54	6.23	5.9	5.48
23	5.13	6.0	4.54	6 24	5.46	6.43
24	5.12	6.1	4.53	6.25	6.25	7.40
25	5.12	6.1	4.53	6.25	7.10	8.35
26	5.11	6.2	4.53	6.26	8.2	9.31
27	5.10	6.3	4.53	6.27	8.56	10.27
28	5.9	6.3	4.52	6 27	9.52	11.22
29	5.8	6.4	4.52	6.28	10.46	12.15
30	5.7	6.5	4.52	6.29	11.44	1.7
31	5.6	6.6	...	...	12.40	...

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.

Phases of the Moon, Occultations, &c.

8 Oct.	○	Full Moon	4 56	a.m.
15 „	☽	Last Quarter	3 12	p.m.
22 „	●	New Moon	7 48	a.m.
29 „	☾	First Quarter	7 22	p.m.

Apogee, 3rd October, at 6.54 p.m.
Perigee, 19th October, at 5.42 p.m.
Apogee, 31st October, at 12.18 p.m.

Jupiter will rise at 1.23 a.m. on the 1st and at 12.34 a.m. on the 15th.

Saturn will rise at 10.47 a.m. and set at 12.29 p.m. on the 1st; on the 15th it will rise at 9.58 a.m. and set at 11.34 p.m.

The Moon will be in Sagittarius on the 1st, in Capricornus on the 2nd and 3rd, in Aquarius on the 4th and 5th, in Pisces on the 6th, in Cetus and Pisces on the 7th and 8th, in Aries on the 9th and 10th, in Taurus to the 12th, in Auriga and Taurus from the 12th to the 14th, in Auriga and Gemini to the 15th, in Cancer to the 17th, in Leo to the 19th, in Virgo to the 21st, in Libra to the 24th, in Scorpio to the 25th, in Orphineus to the 26th, in Sagittarius to the 28th, in Capricornus to the 31st, and in Aquarius an the 31st.

The two eclipses this month already mentioned will be the only ones visible in Australia this year. During the forty-one minutes when the Moon's partial eclipse will be observable in Western Queensland it will be interesting to notice how the toning down of the Moon's lustre will help to bring into view some of its best known features, such as the great mountains, Copernicus and Tycho, the Mare Crisium, Mare Tranquilitatis, and other great so-called seas. The Sun, being a few degrees south of the celestial equator, the shadow of the earth will be projected in a slightly northerly direction, hence the first contact of the Moon's limb with it will be only 18 degrees from the Moon's most northern point towards the west; then, instead of plunging deep into the shadow, the Moon will skim over rather than through it.

The Southern Cross will be in a horizontal position, 30 degrees west of the south celestial pole, at 6 p.m. on the 1st and at 4 p.m. on the 31st October.

4 Nov.	○	Full Moon	8 28	p.m.
13 „	☽	Last Quarter	10 27	p.m.
20 „	●	New Moon	8 21	p.m.
28 „	☾	First Quarter	4 18	p.m.

Perigee, 15th November, at 4.30 p.m.
Apogee, 28th November, at 8.54 a.m.

Soon after midnight on the 7th the Moon will occult Eta Tauri, a star of about magnitude 2·9, which is very near the Pleiades. This will be interesting, especially to observers with telescopes.

Mercury will pass from west to east of the Sun on the 7th, it will be on the far side of its orbit, and, of course, invisible.

Jupiter will appear to reach the stationary point in its march eastward on the 8th: it will then appear to move backwards towards the west until 15th March next, when it will again appear to be near the middle of the constellation Gemini.