ANNUAL RATES OF SUBSCRIPTION.

Farmers, Graziers, Horticulturists, and Schools of Arts, **One Shilling.** Members of Agricultural Societies, **Five Shillings,** including postage. General Public, **Ten Shillings,** including postage.

VOL. XXXVII. 1 APRIL, 1932. PART 4.

Event and Comment.

Tariff Amendments.

WHEN asked to express an opinion on the tariff schedule tabled in the House of Representatives recently, in so far as the new tariff conditions affected the cotton and tobacco growing industries in this State, the Minister for Agriculture and Stock, Mr. Harry F. Walker, stated he took a most serious view of the position, and unless the Commonwealth Government could be induced to vary the tariff schedule, in so far as they relate to those industries, detrimental and far-reaching results would accrue. Frequent and drastic alterations in the tariff schedule are particularly disastrous in their effect upon agricultural production. The confidence of the growers and the stability of the industries are shaken, and once destroyed it is always a difficult matter to encourage growers to renew their efforts in production.

Thriving Industry Threatened.

IN Queensland the cotton industry is being developed along sound lines. Commencing in 1919 with less than 100 acres under cotton, the industry has expanded until in the present season seed sufficient to plant 65,000 to 70,000 acres was applied for by 5,000 growers. Both in its primary and secondary branches the industry provides much employment, and it is estimated that upwards of 4,000 persons have

been engaged in picking cotton in a season. It is calculated that around 3,000 people are employed in the three mills in the Southern States, in addition to a considerable number of hands engaged in the weaving plants operating within the Commonwealth. The assistance in solving the unemployment problem given by the cotton growing and spinning industries can therefore be appreciated, and if both industries were allowed to develop to their full possibilities thousands more people would be employed.

The proposed tariff alteration to eliminate the 6d. per lb. flat duty on cotton yarns has resulted in the Australian spinners, who during the previous season had utilised the whole of the Queensland crop, notifying the Queensland Cotton Board that they intend terminating the present agreement covering the purchase of its cotton. They mentioned that owing to the unsatisfactory condition existing in the spinning industry throughout the world, there were large stocks of yarn in warehouses overseas which could be landed in Australia under the proposed new tariff rates cheaper than Australian spinners could produce yarns of similar quality. With cotton lint quoted at 3½d. per lb., which was the price a few months ago, the proposed duties on yarns would not be sufficient to protect the spinners here even allowing for a 25 per cent. favourable exchange. They would have to close down, and Queensland growers would have to export the balance of the crop and dispose of it under most adverse conditions.

Liverpool values for cotton are abnormally low, especially those for American types, which are considerably lower than the costs of production in the United States. As Queensland cotton is of the same type, it will be necessary to sell this season's crop in that unprofitable market if the Australian spinners cannot continue to operate. This will also complicate the financing of the first advance made when the growers' consignments are received at the ginneries. It can be realised, therefore, just what drastic effects the proposed tariff alterations may have on cotton-growing in this State.

Industries of Exceptional Promise.

THE Queensland Government has been zealously endeavouring to retain men on the land and to encourage production, particularly in respect of products for which there is a market offering within the Commonwealth. Both cotton and tobacco are crops that fall within this category. Australian cotton spinners' requirements for the present season have been estimated as probably being about 20,000 bales; and the tobacco requirements of the Commonwealth are estimated at not less than 20,000,000 lb. Both industries thus give exceptional promise of success if they are fostered in their early stages and until they become permanently established. The removal of the former protective tariff may result in the annihilation of both industries.

The proposed tariff alteration is of great concern to the Government, which has assisted, through the Agricultural Bank and by guarantee to the Commonwealth Bank, in providing large sums of money necessary for the establishment of both industries. The acquisition of the cotton ginneries by the growers from the British Australian Cotton Association, at a figure of £137,500 would probably not have eventuated had the Government not rendered assistance by guaranteeing the amount.

Effect of Tariff Amendments on Tobacco Growing.

THE proposed alterations, so far as tobacco was concerned, will, if ratified, have a most disastrous effect upon what promised to be a most important primary industry for Queensland. In fact, it is felt that, if persisted in, they can only result in the throwing back of that industry to the position it occupied ten years ago.

It is to be remembered that during the past five years both the Commonwealth and the State Governments has been giving particular attention to the development of the tobacco industry in Queensland. As it was considered that it had come to be successfully established, the industry would eventually mean the retention within Australia of millions of pounds sterling annually.

In the course of the same interview Mr. Walker said that the experimental and developmental work which had been carried out had been eminently successful, and the industry had now reached a stage in production at which it was reasonable to expect that it would soon become an important factor in the economic progress of the State. He had only to mention that for the current season his own Department had sold tobacco seed to over 1,600 different intending growers.

Queensland Tobacco Acreage.

ALLOWING for climatic conditions, the incidence of disease and inexperience on the part of growers, it was estimated that the actual acreage that would be harvested this year in Queensland would be about 5,600 acres. To illustrate the wide spread of the industry over Queensland, he quoted the approximate areas now under tobacco in the different parts of the State, viz.—Inglewood and Texas, 1,300 acres; Stanthorpe and Killarney, 400 acres; Brisbane, 250 acres; Maryborough, Bundaberg, Gladstone, and Rockhampton, 200 acres; Mackay and Sarina, 230 acres; Townsville, 700 acres; Bowen, 200 acres; Cairns hinterland, 2,400 acres. The prospective crop from these areas indicated the substantial advance that had been made, and it would be a tragedy if the development of such a promising industry were now arrested so soon after it had got on its feet.

Continuing, he added that the experience of the past five years showed that portions of Queensland were admirably suited for the production of the best quality leaf, but there were circumstances connected with the growing of tobacco that rendered imperative the possession on the part of growers of a substantial amount of capital. It could be realised that capital would not be forthcoming in the future were there any doubts as to whether the industry was likely to receive fair encouragement or otherwise.

As a matter of fact, the Queensland Government had already rendered considerable financial assistance to growers, and had specially made available at a nominal figure large areas of land suitable for tobacco growing. The growers on their part had expended considerable sums in providing flue-curing barns and other equipment. The industry had now reached the decisive moment at which it can be permanently established or annihilated, either by the giving or withholding of the protection enjoyed by practically all urban industries.

Furthermore, concluded Mr. Walker, tobacco and cotton growing had already proved invaluable agencies in the settlement and profitable utilisation of land, the importance and urgency of which, in the light of present national problems, no Government, Federal or State, could afford to ignore.

[Since the foregoing was written, a Queensland delegation, led by the Minister for Agriculture and Stock, Mr. Walker, visited Canberra, and as a result of its representations Mr. Walker, on his return, expressed confidence that the cotton industry would benefit; he also voiced the hope that the Commonwealth Government would make a decision acceptable to the growers of tobacco leaf.—Ed., "Q.A.J."]

THE QUEENSLAND SUGAR INDUSTRY.

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

PART XXV.

ALIEN PENETRATION.

FOR many years past considerable discussion has taken place as to the number of alien, or people of non-British stock who are either growing cane or are employed in the industry. The figures are generally grossly exaggerated, for, according to the unanimous finding of the recent Federal Committee of Inquiry on the sugar industry, there are only about 10 per cent. wholly foreign engaged in the industry, and most of those are settled in No. 1 district.

In the years immediately preceding 1925, relatively large numbers of Italians and other Southern Europeans were arriving in Queensland, and the Government of the day appointed Mr. T. A. Ferry (at that time Under Secretary of the Chief Secretary's Department) as a Commissioner to inquire into and report on the social and economic effect of the increase in the number of aliens in North Queensland. Mr. Ferry reported that the Commonwealth Publicity Department had advised that the number of Italian and Greek migrants to Australia during the thirty years prior to 1901 had averaged 150 per annum, but by 30th November, 1924, the rate had increased to 6,854 per annum, and since then there had been a still greater annual increase. In fact, during the three and a-half years ended March, 1925, the migration to Australia of Italians and Greeks had been greater than at any period in the forty years preceding 1925.

The main reason given for the increase in the number of aliens arriving in Australia was, amongst others:—

> The action of the United States of America in restricting the migration of Southern Europeans to that country and the political situation in Italy at the time, the advice and assistance of friends and relatives in Australia, and the publicity obtained by Australia during the war, and particularly the better conditions and higher rates of pay enjoyed by members of the A.I.F. as compared with other soldiers in the allied armies.

The rapid increase in the number of aliens arriving in Queensland during the few years prior to 1925 coincided with the period of restriction of alien immigation by the United States.

An Italian who gave evidence before the Commissioner stated, "There are in Italy people who have an interest in getting as many immigrants into Australia as possible, and these people have been spreading reports that there was plenty of work in Australia at very high wages, and that immigrants could make a lot of money in a short time."

During the three and a-half years ending September, 1924, the excess of arrivals over departures of foreign persons was 16,148—at the rate of 4,614 per annum. At the time of the Commissioner's report they were arriving at the rate of over 11,000 per annum. During the six months previous they had been arriving in the sugar districts of Queensland in such numbers that it was obvious they could not all be employed in the sugar industry, in which there was already over-production. This was creating an anti-foreign feeling. Immediate trouble was averted by

the fact that in most cases these new arrivals disappeared into the country and for the time being lived in barracks on the farms; where necessary, they were supplied with food by their countrymen. Large numbers of them had relatives who had been in Australia for some time.

Greeks were generally of an undesirable type, and did not make good settlers. They lived mostly in towns and carried on business in cafés, fish shops, and boarding-houses, &c.

In a pamphlet issued by the Maltese Government the Maltese is described as a "docile and conscientious worker," and this description was fairly accurate.

Numerically, the Commissioner remarked, the question of alien immigration to North Queensland is largely a question of Italian immigration.

The history of early Italian settlers should be of interest, and may be summarised as follows:—

In a report for the year 1898, the Queensland Agent-General remarked:—

> "It will be remembered that in 1890 a number of families of the peasant class from Piedmont and Lombardy were taken to Queensland by Signor Fraire, of Townsville, and located in the Wide Bay district and on the Herbert River area. These people had done so well that they have sent for their families and friends, and there are some forty nominations now in this office waiting for the nominee to get passages from Italy without the expense of coming to London to embark."

It is in the Herbert River area to-day that the greatest number of Italians are found, and from that district, and by the nominations to a large extent of the residents in that area, that they have spread to other Northern districts.

In December, 1891, a shipload of Italian agricultural labourers arrived in Queensland, numbering in all 335. Of these, 266 landed in Townsville. The majority of these immigrants entered the sugar industry as canecutters, and subsequently became cane farmers. They have made their homes and reared families in North Queensland, and have no desire to return to Italy, except perhaps to visit the place as the land of their birth. One of these early settlers, who arrived at Ingham as a boy, was educated at the State school, and had been very successful as a cane farmer. Since his arrival he had never been further south than Townsville. At Innisfail a witness stated that he had arrived with Signor Fraire's party in 1890, and had since worked as a canecutter and farmer at Mourilyan, Mulgrave, and again at Mourilyan, opening up new country in each case, and had fifty-two relatives in the district, all of whom were doing well.

These early arrivals were from Northern Italy, and were of a selected peasant class, and generally were lifelong cultivators of the soil. For some years many of the Italian immigrants to Northern Queensland were relatives of those brought out by Signor Fraire. They knew exactly where to go and what to expect on arrival. They quickly conformed to the laws of the State and the British standard of living, and were, without friction, absorbed in the social and economic life of the country.

The general opinion is that the Northern Italian is a very desirable class of immigrant. He is thrifty and industrious, law-abiding, and

honest in his business transactions. Those arriving in the past have generally been trained agriculturists, many of whom have become successful farmers. It is said that the Italian is not a pioneer and prefers to take up farms already made. This view is no doubt due to the fact that in recent years the majority of the Italians buying farms have, of necessity, bought farms already improved. However, it is not disputed that in the early days in the Herbert River, and in the Mulgrave and Mourilyan areas, the Italians did clear dense scrub and cultivate the land. In the latest area opened (the Tully) the following is the record of improved and unimproved farms bought by Italians:—Improved, 7; unimproved, 29.

As regards the Italian as a unionist, the following testimonies were given by three experienced members of the Australian Workers' Union, and similar references were given by others:—

(1) "In my opinion the Italian is a man who will stick up for his rights. He does his work well. I should say the Italian is as good a unionist as any other class of worker."

(2) "The Italian members of the union are loyal to the union. They are anxious to carry out the awards and laws of the country. The Italian does not wish to work more than eight hours a day. Every member of the union demands the full rate laid down by the award."

(3) "As far as I know, the Italians do not undercut the rates of the Sugar Award."

It was pointed out in 1914 by the Director of Sugar Experiment Stations (Annual Report, 1914) that many British canegrowers were selling out to Italians and other foreigners, who were keenly desirous of obtaining sugar farms. Their methods were for several of them to put their earnings together and pay a deposit on a farm and then to place one of their number on to run it. The remainder go on working in the canefields until they have saved enough to pay a fresh deposit, when another Italian goes in. At that time it was perfectly safe to say that 99 per cent. of the sales that had been recently made on the Herbert River were to Italians.

In 1916 the following information regarding the number of Italian and other foreigners engaged in the sugar industry in the Johnstone and Herbert areas was supplied to a Board of Inquiry in connection with the sugar industry:—

FARMERS.

District.	British.	Non-British.
Johnstone River	130	111
Herbert River	186	80

CANECUTTERS.

District.	British.	Non-British.
Johnstone River	84	306
Herbert River	85	315

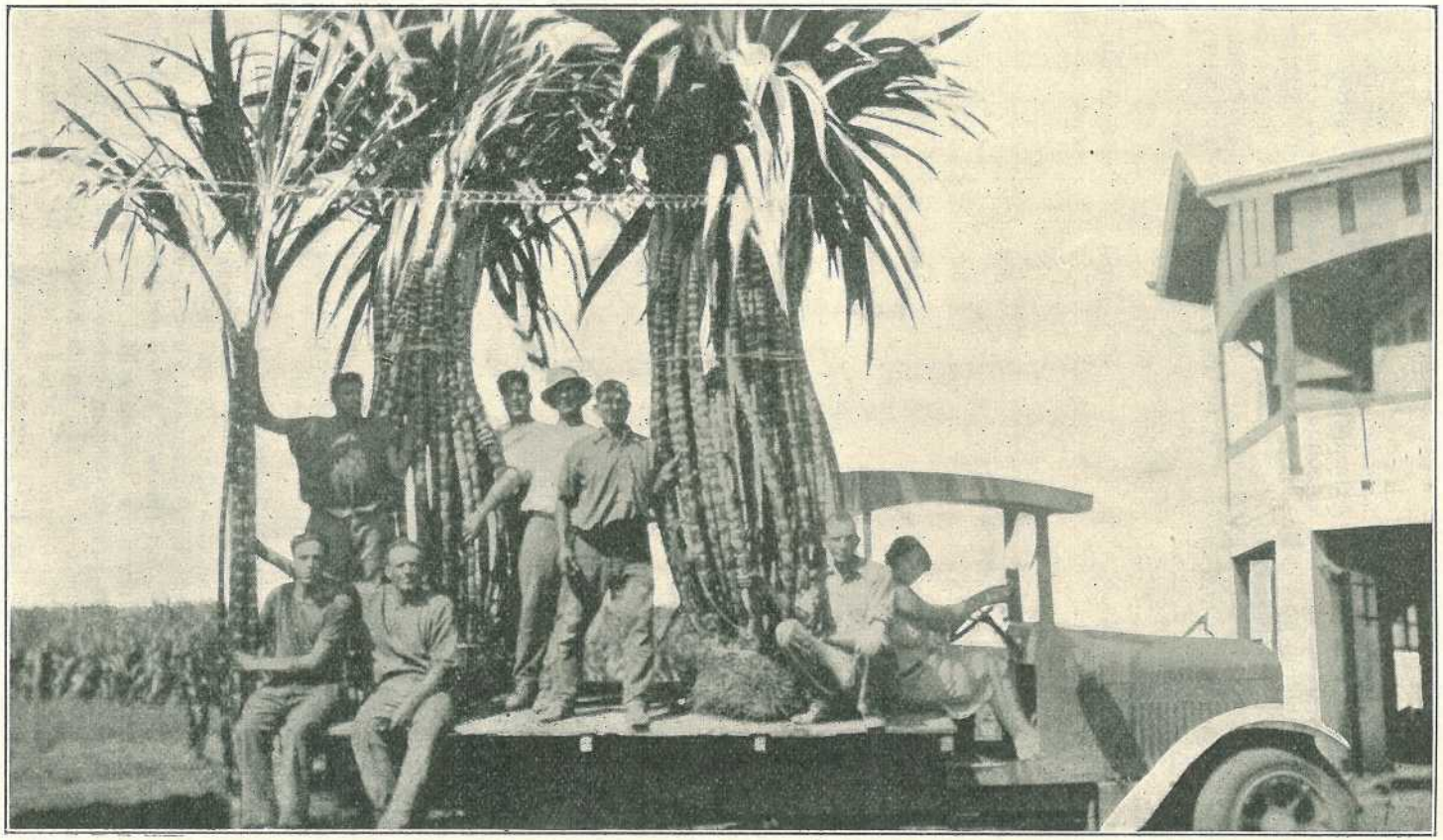


Plate 43.—Italians taking Stools of Cane to an Agricultural Show in North Queensland.

In 1923 the Director of Sugar Experiment Stations stated in his Annual Report:—

"Considerable interest has been aroused by the influx of Italians and other foreigners to certain Queensland sugar districts, and exaggerated statements in this connection are not uncommon. For the purpose of obtaining reliable figures, the various mills from Mossman district to the Herbert River district were asked to furnish figures, and this information was most courteously supplied. The proportions of non-British farmers and canecutters in these districts were as under:—

FARMERS.

District.	British.	Non-British.
Mossman	98	13
Cairns and Babinda	370	80
Johnstone River	325	207
Herbert River	188	182

CANECUTTERS.

District.	British.	Non-British.
Mossman	120	40
Cairns and Babinda	326	356
Johnstone River	205	470
Herbert River	36	403

It will be observed that the bulk of non-British settlers was on the Herbert River and Mourilyan. The further north one goes from these centres the less is the foreign canecutter in evidence. No figures were collected from the mills south of the Herbert River, as foreign settlement in these districts is negligible.

The total number of non-British farmers given in the above returns was 482. As the entire number of sugar farmers in Queensland in 1923 was estimated to be 4,900, the percentage of foreign farmers engaged in sugar-growing was less than 10 per cent.

It will be remarked, on comparing the two tables given above for 1916 and 1923, that the non-British element had largely increased during the period between the two years given, especially on the Johnstone River. On the Herbert River area the number of non-British farmers had slightly decreased, but the non-British canecutters were much more numerous. On the Johnstone, not only had the non-British canecutter increased, but the non-British farmer had too. On the other hand, the number of British farmers was also much higher, due to the opening and development of the South Johnstone Sugar Mill. The latter mill was not included in the 1916 figures, having only just commenced operations.

In his report Mr. Ferry stated that the excess of arrivals over departures (as far as Italians were concerned) from April, 1921, to September, 1924, was 6,909.

At the conclusion of his report the Commissioner suggested that the Commonwealth and State Governments might give consideration to—

(*a*) The regulation and control of migration from country of origin to distribution in Australia, with particular regard to the nationality and fitness of the immigrant, the number arriving at any one time and for any locality .. . . . It is desirable that aliens be not permitted to arrive in any one district in such numbers as to become a majority of the workers in such district . . . . It invites strife and racial disturbances and leads to the formation of alien groups anti-British in sympathy and outlook.

(*b*) There should be a better selection of migrants of a type that would assist rather than hinder the building up of superior social and economic conditions in the State. Foreign clubs should not be encouraged, as they assist in promoting an undigested mass of alien sympathy and alien purpose. They encourage the migrants to retain the customs, speech, and traditions of a foreign land.

Since the time the report of the Commissioner was published the number of Italians and other foreigners entering Queensland has very considerably decreased. From 1925 to 1927 a good deal of hostile criticism and much exaggeration as to the number of Italians and other foreigners that were either buying farms or being employed in the industry also took place.

From Mackay north indignation meetings were held, largely by workers and returned soldiers, expressing indignation at the action of British and Australian farm owners disposing of their farms to Southern European immigrants, and it was even advocated that if a truck of cane came from a Southern European to any of the mills it should not be crushed. It was stated that some members of the Australian Workers' Union in some of the mills had taken action and refused to handle cane which had been cut by Italians, but the latter had now overcome that difficulty by purchasing farms. One speaker stated:—

> "An agent in Mackay had been informed by the Italian Consul that there were 200 Italian immigrants waiting to purchase farms in the Mackay district, and the fertile district of Marian was to be their objective. At present there is just over 190 suppliers to the Marian Mill, and if we got 200 Italian-owned farms there it will mean that they will dominate the district."

He went on to say that in Italy at that time a fleet of vessels was being fitted out for the express purpose of bringing droves of Italians to Australia.

Somewhat later, Mr. Bruce, who was then Prime Minister of Australia, was asked at a public meeting in Cairns for the Federal policy in regard to influx of Southern Europeans. Mr. Bruce reminded his audience that we had flung out a challenge to the world in that Australians wished to maintain this continent white. That "White Australia" policy is not understood outside Australia, and was not sympathetically regarded by other nations; but Australia had not yet said that she would not allow Europeans to come here; she had not said that she would extend that policy to white people as well as to coloured

people. The Italian people were just as white as anyone in the hall. Australians were white people, and so were the Italians. If Australia were to suddenly say, "We will not allow any more white people to come to Australia," they could imagine what the effect would be upon other nations of Europe; it would be foolish of Australia to raise a great international situation at this juncture by refusing to admit Southern Europeans. He could say, however, that the Commonwealth Government was in diplomatic touch with all the nations of Europe who were concerned in this matter. They were making representation to them to the effect that there was only a very limited capacity for the economic absorption of aliens in Australia at present. As a matter of fact, statistics he had obtained showed that a very limited number of aliens were coming into Australia. Every alien coming into Australia had to get his passport visaed in his own country, and had to be in possession of £40 if he was not guaranteed employment in Australia. In these circumstances, was it wise to say to the world that we in this uninhabited continent were going to shut our gates and apply to Southern Europeans the restrictions we were applying to Asiatics. He suggested that such an attitude would be very unwise.

The statistics he had obtained showed that British people arriving in 1924-25 were 32,765; in 1925-26, 33,297; in 1926-27, 33,672. The number of Italians arriving in 1924-25 was 6,414; in 1925-26, 2,046; and in 1926-27, 4,914. Other Southern Europeans arriving in 1924-25 were 3,961; in 1925-26, 574; and in 1926-27, 231. Other Europeans generally arriving in 1924-25 were 1,916; in 1925-26, 1,847; and in 1926-27, 2,860. With regard to Queensland, he had heard wild stories that this State was being flooded by Italians. The actual position was that the Italian immigration into Queensland in 1926 was—total arrivals 130, departures 300, excess of departures over arrivals 170. For the first five months of the present year (1927) the arrivals were 153 and the departures 127, so that the excess of the arrivals over departures in the last five months amounted only to 26 persons.

"I will put it to you as people of common sense," concluded Mr. Bruce, "whether it is worth while running the risk of creating an international situation of great danger because in the past five months you have twenty-six more Italians in Australia. That would be an unreasonable and stupid attitude for Australian people to take up."

At a later dates the unions entered into agreement with a number of the Northern mills limiting the number of Southern Europeans to be employed and giving preference to a large number of British gangs.

When the Sugar Inquiry Committee sat in 1930, they inquired thoroughly into the position. In their report a table is given showing the percentage of wholly foreign employees, which includes farmers, mill hands, canecutters, and field hands, as under:—

District.	Number.	Percentage Wholly Foreign.
No. 1 District	10,652	23·4
No. 2 District	10,153	2·4
No. 3 District	7,932	2·2
	Districts combined	10·1

The percentage thus disclosed in respect of the whole industry, say the Committee, is not such as to detract from its general standard as a typical Australian industry—a census of other industries may disclose an equal or greater blend of foreign extraction.

The percentage of foreign element in the far North (No. 1 District) relative to the total number of producers in the district and in the whole State of Queensland is of importance in view of its remoteness and physical detachment. The implication of non-assimilation in the national structure arising from such conditions would appear to be strong, and further analysis is necessary . . . . The complaint in regard to the predominance of aliens would therefore appear to have special reference to the Northern (No. 1) district on account of its vulnerable nature and the relatively large number of aliens engaged in the sugar industry there. It is in relation to this district, therefore, that the alien question has the greater significance, and as such it has received the earnest consideration of the Committee . . . . However. the present policy of the Commonwealth Government (in co-operation with the foreign Governments concerned) has, since 1928, resulted in a decreased flow of alien migrants to Australia, inasmuch as it has been mutually arranged that visas shall be granted only in the case of female relatives or fathers or sons of aliens residing in Australia.

The whole Committee was in agreement with this policy, realising that if the rate of flow of aliens to Australia of a few years ago had been maintained the dilution of British personnel engaged in the industry and the measure of foreign control of the settlement would have been a matter for some concern.

It is noteworthy that very few foreigners have been employed within the sugar-mills.

The strong desire of Italians to become possessed of cane farms has certainly led to inflation in the price of Northern lands in the past. If a property were on the market it was not uncommon for an Italian to offer a bigger price for same, providing the vendor would accept a smaller deposit, and tales have been told of £10,000 farms being sold on a £50 deposit.

[TO BE CONTINUED.]

TO NEW SUBSCRIBERS.

New subscribers to the Journal are asked to write their names legibly on their order forms. The best way is to print your surname and full christian names in block letters, so that there shall be no possibility of mistake.

When names are not written plainly it involves much tedious labour and loss of valuable time in checking electoral rolls, directories, and other references. This should be quite unnecessary.

Some new subscribers write their surname only, and this lack of thought leads often to confusion, especially when there are other subscribers of the same surname in the same district.

Everything possible is done to ensure delivery of the Journal, and new subscribers would help us greatly by observing the simple rule suggested, and thus reduce the risk of error in names and postal addresses to a minimum.

FARM FERTILITY TRIALS.

RESULTS FOR THE 1931 SEASON.

By H. W. KERR.

(Continued from the March issue.)

BURDEKIN DISTRICT.

The plot returns from this district might be considered as a whole, as they indicate a definite response to but one constituent of our mixtures—nitrogen. The results from the trials on the farms of Messrs. Hoey Brothers and G. E. Watt are particularly interesting in this regard. The former plot has since been ratooned, and the need for nitrogen was most evident early in the growth of the ratoon crop. The results all suggest that failure to apply an early dressing of available nitrogen in the form of artificial manure may be largely responsible for the failure of ratoon crops in this area. The erratic nature of the results from certain of the treatments in these trials is doubtless due to the abnormally dry season experienced; the crop was grown almost entirely by irrigation, and hence the effects of topography were aggravated. On G. E. Watt's block, which is situated on the oldest area of the district, an average yield of 53 tons of cane per acre was recorded, and on the plots receiving complete fertilizer several tons per acre of dead cane remained on the field.

Location.—**Hoey Brothers' farm, Pioneer.**

Soil Type.—Old alluvial loam.

Variety.—Badila. Age of crop—Eighteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	300 lb. Suplhate of Ammonia + 360 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	25·3	30·8	32·0	24·2	33·2
C.C.S. in cane	17·7%	17·9%	17·9%	17·6%	17·4%
Value of crop	£55 13 0	£68 13 0	£71 7 0	£52 17 0	£71 8 0
Less harvesting costs	£9 10 0	£11 11 0	£12 0 0	£9 2 0	£12 9 0
Return	£46 3 0	£57 2 0	£59 7 0	£43 15 0	£58 19 0
Increased or decreased return due to fertilizer	..	£10 19 0	£13 4 0	Decrease. £2 8 0	£12 16 0
Cost of fertilizer and application	..	£3 6 0	£3 12 0	£2 18 0	£4 13 0
Profit or loss from fertilizer ..	..	Profit. £7 13 0	Profit. £9 12 0	Loss. £5 6 0	Profit. £8 3 0

Location.—**G. E. Watt's farm, Dick's Bank, Brandon.**

Soil Type.—Old alluvial loam, typical of the area.

Variety.—B. 208. Age of crop—Nineteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	47·7	53·2	56·0	56·0	52·6
C.C.S. in cane	17·9%	18·1%	17·9%	17·8%	17·6%
Value of crop	£106 6 0	£120 7 0	£124 16 0	£123 18 0	£114 17 0
Less harvesting costs	£17 18 0	£19 19 0	£21 0 0	£21 0 0	£19 15 0
Return	£88 8 0	£100 8 0	£103 16 0	£102 18 0	£95 2 0
Increased return due to fertilizer	..	£12 0 0	£15 8 0	£14 10 0	£6 14 0
Cost of fertilizer and application	..	£2 5 0	£3 2 0	£3 12 0	£4 9 0
Profit from fertiliser	..	£9 15 0	£12 6 0	£10 12 0	£2 5 0

Location.—**Ferguson Brothers' farm, Airdmillan.**

Soil Type.—Alluvial loam.

Variety.—B. 208. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	44·2	47·7	44·9	38·9	43·9
C.C.S. in cane	17·1%	16·1%	16·2%	17·2%	15·8%
Value of crop	£93 0 0	£93 0 0	£88 2 0	£82 7 0	£83 12 0
Less harvesting costs	£16 12 0	£17 18 0	£16 17 0	£14 12 0	£16 9 0
Return	£76 8 0	£75 2 0	£71 5 0	£67 15 0	£67 3 0
Decrease due to fertilizer ..	..	£1 6 0	£5 3 0	£8 13 0	£9 5 0
Cost of fertilizer and application	..	£3 6 0	£3 12 0	£2 18 0	£4 13 0
Loss from fertilizer	..	£4 12 0	£8 15 0	£11 11 0	£13 18 0

Location.—**B. Tapiolas's farm, Ivanhoe.**

Soil Type.—Alluvial loam.

Variety.—Badila. Age of crop—Seventeen months. Nature of crop—Plant cane.

RESULTS.

	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	35·7	40·1	40·2	38·8	37·9
C.C.S. in cane	16·7%	16·1%	16·7%	16·4%	16·6%
Value of crop	£72 18 0	£78 4 0	£82 1 0	£77 9 0	£76 18 0
Less harvesting costs	£13 8 0	£15 1 0	£15 2 0	£14 11 0	£14 4 0
Return	£59 10 0	£63 3 0	£66 19 0	£62 18 0	£62 14 0
Increased return due to fertilizer	..	£3 13 0	£7 9 0	£3 8 0	£3 4 0
Cost of fertilizer and application	..	£2 5 0	£3 3 0	£3 12 0	£4 10 0
Profit or loss from fertilizer	..	Profit. £1 8 0	Profit. £4 6 0	Loss. £0 4 0	Loss. £1 6 0

Location.—**S. Gibson's farm, Home Hill.**

Soil Type.—Alluvial loam.

Variety.—Badila. Age of crop—Twelve months. Nature of crop—Plant cane.

RESULTS.

	No Fertilizer.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	31·6	33·2	31·7	29·1	33·1
C.C.S. in cane	14·4%	14·7%	13·9%	14·9%	14·3%
Value of crop	£52 19 0	£57 5 0	£50 14 0	£51 3 0	£54 18 0
Less harvesting costs	£11 17 0	£12 9 0	£11 18 0	£10 18 0	£12 8 0
Return	£41 2 0	£44 16 0	£38 16 0 Decrease.	£40 5 0 Decrease.	£42 10 0
Increased or decreased return due to fertilizer	..	£3 14 0	£2 6 0	£0 17 0	£1 8 0
Cost of fertilizer and application	..	£3 6 0	£3 12 0	£2 18 0	£4 13 0
Profit or loss from fertilizer	..	Profit. £0 8 0	Loss. £5 18 0	Loss. £3 15 0	Loss. £3 5 0

MACKAY DISTRICT.

The growing season for the 1931 crop was one of the driest on record. As a consequence we find that poor tonnages were harvested, and, almost without exception, the plant crops showed little or no response to artificial manures. The obvious explanation is that the natural plantfood supply was not a limiting factor, under the dry conditions, and all crops suffered mostly from a water deficiency. The ratoon crops from the trials of the previous year were, on the other hand, decidedly benefited by the fertilizer applications. Thus the trial on E. K. Glen's farm, though yielding only 12·7 tons of cane on the plots receiving complete fertilizer, showed almost double the crop produced on those receiving no treatment, and the net profit was £2 12s. per acre. This farm is situated on the area which was particularly badly treated by the weather in both 1930 and 1931.

Location.—**P. Hand's farm, Wandaru.**

Soil Type.—Stony hillside loam.

Variety.—M. 1900. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

	No Fertilizer.	240 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 120 lb. Potash.	240 lb. Super-phosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 240 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	20·5	20·9	20·8	21·5	22·1
C.C.S. in cane	16·3%	16·9%	16·3%	16·8%	16·6%
Value of crop	£40 11 0	£43 6 0	£41 3 0	£44 5 0	£44 15 0
Less harvesting costs	£7 14 0	£7 17 0	£7 16 0	£8 1 0	£8 6 0
Return	£32 17 0	£35 9 0	£33 7 0	£36 4 0	£36 9 0
Increased return due to fertilizer	..	£2 12 0	£0 10 0	£3 7 0	£3 12 0
Cost of fertilizer and application	..	£2 11 0	£2 16 0	£2 1 0	£3 9 0
Profit or loss from fertiliser ..	..	Profit. £0 1 0	Loss. £2 6 0	Profit. £1 6 0	Profit. £0 3 0

Location.—**J. Trevaskis's farm, Farleigh.**

Soil Type.—Sandy loam on gentle slope.

Variety.—M. 1900. Age of crop—Eleven and a-half months. Nature of crop—First ratoon.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia +300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 240 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 240 lb. Potash.
Tons cane per acre	10·2	10·8	12·2	14·9	17·2
C.C.S. in cane	18·2%	17·9%	17·8%	17·8%	17·6%
Value of crop	£23 1 0	£23 19 0	£26 18 0	£32 17 0	£37 7 0
Less harvesting costs	£3 17 0	£4 1 0	£4 12 0	£5 12 0	£6 9 0
Return	£19 4 0	£19 18 0	£22 6 0	£27 5 0	£30 18 0
Increased return due to fertilizer	..	£0 14 0	£3 2 0	£8 1 0	£11 14 0
Cost of fertilizer and application	..	£2 5 0	£3 2 0	£4 0 0	£4 17 0
Profit or loss from fertilizer ..	..	Loss. £1 11 0	..	Profit. £4 1 0	Profit. £6 17 0

The good effects of a complete mixture on this soil type are even more pronounced than on the plant crop. This class is characterised by high c.c.s. values in matured crops, and hence we find that the complete fertilizer showed a profit of £6 17s. per acre.

Location.—**H. Single's farm, Foulden, Mackay.**

Soil Type.—Recent alluvial sandy loam of good natural fertility.

Variety.—Q. 813. Age of crop—Thirteen months. Nature of crop—First ratoon.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 240 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 240 lb. Potash.
Tons cane per acre	10·2	15·1	16·3	17·3	17·6
C.C.S. in cane	16·2%	15·9%	16·4%	15·8%	16·2%
Value of crop	£19 18 0	£28 14 0	£32 7 0	£32 14 0	£34 6 0
Less harvesting costs	£4 14 0	£5 13 0	£6 2 0	£6 10 0	£6 12 0
Return	£15 4 0	£23 1 0	£26 5 0	£26 4 0	£27 14 0
Increased return due to fertilizer	..	£7 17 0	£11 1 0	£11 0 0	£12 10 0
Cost of fertilizer and application	..	£2 5 0	£3 2 0	£4 0 0	£4 17 0
Profit from fertilizer	..	£5 12 0	£7 19 0	£7 0 0	£7 13 0

Following on a heavy plant crop, this land suffered particularly from the effects of the prolonged dry weather. The increased yield from sulphate of ammonia was, however, greater than with the plant crop. The response to potash and superphosphate was of minor importance.

Location.—**C. F. Miles's farm, Te Kowai.**

Soil Type.—Alluvial loam.

Variety.—P.O.J. 2714. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	240 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 120 lb. Potash.	300 lb. Super-phosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	21·1	22·4	23·9	22·8	23·8
C.C.S. in cane	14·4%	14·1%	13·9%	14·2%	14·0%
Value of crop	£35 7 0	£36 10 0	£38 3 0	£37 11 0	£38 8 0
Less harvesting costs	£7 18 0	£8 8 0	£8 19 0	£8 11 0	£8 18 0
Return	£26 9 0	£28 2 0	£29 4 0	£29 0 0	£29 10 0
Increased return due to fertilizer	..	£1 13 0	£2 15 0	£2 11 0	£3 1 0
Cost of fertilizer and application	..	£2 15 0	£2 16 0	£2 5 0	£3 13 0
Profit or loss from fertilizer ..	..	Loss. £1 2 0	Loss. £0 1 0	Profit. £0 6 0	Loss. £0 12 0

Location.—**Palms Plantation, Palms Estate.**

Soil Type.—Alluvial loam.

Variety.—D. 1135. Age of crop—Twenty-seven months. Nature of crop—Standover plant.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 240 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	22·5	22·1	23·3	24·3	22·5
C.C.S. in cane	13·7%	13·3%	13·7%	13·6%	12·8%
Value of crop	£35 5 0	£33 7 0	£36 10 0	£37 13 0	£32 1 0
Less harvesting costs	£8 9 0	£8 6 0	£8 15 0	£9 2 0	£8 9 0
Return	£26 16 0	£25 1 0 Decrease.	£27 15 0	£28 11 0	£23 12 0 Decrease.
Increased or decreased return due to fertilizer	..	£1 15 0	£0 19 0	£1 15 0	£3 4 0
Cost of fertilizer and application	..	£2 5 0	£2 19 0	£3 12 0	£4 5 0
Loss from fertilizer	..	£4 0 0	£2 0 0	£1 17 0	£7 9 0

Location.—**Branscombe Plantation, Palms Estate, Pleystowe.**

Soil Type.—Alluvial loam.

Variety.—Q. 813. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	240 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 120 lb. Potash.	240 lb. Super-phosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 240 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	12·8	13·6	14·5	12·8	13·9
C.C.S. in cane	16·5%	16·0%	16·0%	16·2%	16·1%
Value of crop	£25 15 0	£26 6 0	£28 1 0	£25 3 0	£27 2 0
Less harvesting costs	£5 9 0	£5 9 0	£5 12 0	£5 9 0	£5 11 0
Return	£20 6 0	£20 17 0	£22 9 0	£19 14 0 Decrease.	£21 11 0
Increased or decreased return due to fertilizer	..	£0 11 0	£2 3 0	£0 12 0	£1 5 0
Cost of fertilizer and application	..	£2 11 0	£2 16 0	£2 1 0	£3 9 0
Loss from fertilizer	..	£2 0 0	£0 13 0	£2 13 0	£2 4 0

Location.—**A. Breadsell's farm, Pleystowe.**

Soil Type.—Alluvial loam.

Variety.—Q. 813. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

——	No. Fertilizer.	180 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	180 lb. Sulphate of Ammonia + 120 lb. Potash.	240 lb. Super-phosphate + 120 lb. Potash.	180 lb. Sulphate of Ammonia + 240 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	14·2	15·0	15·4	14·8	14·2
C.C.S. in cane	15·8%	15·6%	15·5%	15·8%	15·5%
Value of crop	£27 0 0	£28 0 0	£28 10 0	£28 2 0	£26 5 0
Less harvesting costs	£5 10 0	£5 13 0	£5 16 0	£5 15 0	£5 10 0
Return	£21 10 0	£22 7 0	£22 14 0	£22 7 0	£20 15 0 Decrease.
Increased or decreased return due to fertilizer	..	£0 17 0	£1 4 0	£0 17 0	£0 15 0
Cost of fertilizer and application	..	£2 4 0	£2 9 0	£2 1 0	£2 12 0
Loss from fertilizer	..	£1 7 0	£1 5 0	£1 4 0	£3 7 0

Location.—**E. K. Glen's farm, Pleystowe.**

Soil Type.—Average alluvial soil of the Pioneer Valley.

Variety.—Q. 813. Age of crop—Thirteen and a-half months. Nature of crop—First ratoon.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 240 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	7·3	10·0	10·0	11·6	12·7
C.C.C. in cane	14·6%	14·1%	13·2%	14·5%	14·1%
Value of crop	£12 9 0	£16 6 0	£14 18 0	£19 13 0	£20 14 0
Less harvesting costs	£4 0 0	£4 12 0	£4 12 0	£5 4 0	£5 8 0
Return	£8 9 0	£11 14 0	£10 6 0	£14 9 0	£15 6 0
Increased return due to fertilizer	..	£3 5 0	£1 17 0	£6 0 0	£6 17 0
Cost of fertilizer and application	..	£2 5 0	£2 18 0	£3 12 0	£4 5 0
Profit or loss from fertilizer ..	..	Profit. £1 0 0	Loss. £1 1 0	Profit. £2 8 0	Profit. £2 12 0

The increases from fertilizer are of the same order as were recorded for the plant crop. The influence of the fertilizer was to convert a crop failure into a modest first ratoon crop. Fertilizer does seem to give results on ratoons even in a very dry year.

Location.—**Mrs. E. Webb's farm, Pleystowe.**

Soil Type.—Alluvial soil.

Variety.—Q. 813. Age of crop—Sixteen months. Nature of crop—Plant cane.

RESULTS.

——	No. Fertilizer.	216 lb. Sulphate of Ammonia + 288 lb. Super-phosphate.	216 lb. Sulphate of Ammonia + 120 lb. Potash.	288 lb. Super-phosphate + 120 lb. Potash.	216 lb. Sulphate of Ammonia + 288 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	10·0	10·7	9·9	9·3	10·2
C.C.S. in cane	15·7%	15·4%	15·5%	15·4%	15·1%
Value of crop	£18 18 0	£19 13 0	£18 7 0	£17 2 0	£18 5 0
Less harvesting costs	£4 12 0	£4 18 0	£4 19 0	£4 13 0	£4 14 0
Return	£14 6 0	£14 15 0	£13 8 0	£12 9 0	£13 11 0
Increased or decreased return due to fertilizer	..	£0 9 0	£0 18 0 Decrease.	£1 17 0 Decrease.	£0 15 0 Decrease.
Cost of fertilizer and application	..	£2 11 0	£2 14 0	£2 5 0	£3 10 0
Loss from fertilizer	..	£2 2 0	£3 12 0	£4 2 0	£4 5 0

Location.—**H. Barfield's farm, Tannalo.**

Soil Type—Alluvial loam.

Variety—E.K. 28. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

	No Fertilizer.	225 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	225 lb. Sulphate of Ammonia + 120 lb. Potash.	300 lb. Super-phosphate + 120 lb. Potash.	225 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	25·1	25·5	24·2	26·8	27·5
C.C.S. in cane	17·9%	17·7%	17·7%	17·8%	17·4%
Value of crop	£55 19 0	£56 2 0	£53 5 0	£59 8 0	£59 3 0
Less harvesting costs	£9 8 0	£9 11 0	£9 2 0	£10 1 0	£10 6 0
Return	£46 11 0	£46 11 0	£44 3 0 Decrease.	£49 7 0	£48 17 0
Increased or decreased return due to fertilizer	..	..	£2 8 0	£2 16 0	£2 6 0
Cost of fertilizer and application	..	£2 13 0	£2 14 0	£2 5 0	£3 11 0
Profit or loss from fertilizer ..	..	Loss. £2 13 0	Loss. £5 2 0	Profit. £0 11 0	Loss. £1 5 0

Location.—**Comerford Brothers' farm, Finch Hatton.**

Soil Type.—Loam typical of hillside outwash soil.

Variety.—M. 1900 Seedling. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

	No Fertilizer.	240 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	240 lb. Sulphate of Ammonia +120 lb. Potash.	300 lb. Super-phosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 120 lb. Potash.
Tons cane per acre	22·3	22·2	23·7	22·4	22·7
C.C.S. in cane	16·1%	15·4%	15·0%	16·3%	16·2%
Value of crop	£43 10 0	£40 16 0	£42 1 0	£44 7 0	£44 13 0
Less harvesting costs	£8 7 0	£8 6 0	£8 18 0	£8 8 0	£8 10 0
Return	£35 3 0	£32 10 0 Decrease.	£33 3 0 Decrease.	£35 19 0	£36 3 0
Increased or decreased return due to fertilizer	..	£2 13 0	£2 0 0	£0 16 0	£1 0 0
Cost of fertilizer and application	..	£2 14 0	£2 16 0	£2 4 0	£3 12 0
Loss from fertilizer	..	£5 7 0	£4 16 0	£1 8 0	£2 12 0

Location.—**F. Letchford's farm, Finch Hatton.**

Soil Type.—Sandy loam, outwash soil.

Variety.—M. 1900 Seedling. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

	No Fertilizer.	200 lb. Sulphate of Ammonia + 250 lb. Super-phosphate.	200 lb. Sulphate of Ammonia + 125 lb. Potash.	250 lb. Super-phosphate + 125 lb. Potash.	200 lb. Sulphate of Ammonia + 250 lb. Super-phosphate + 125 lb. Potash.
Tons cane per acre	19·2	19·8	19·7	19·4	19·9
C.C.S. in cane	17·6%	16·7%	17·2%	17·4%	17·7%
Value of crop	£41 18 0	£40 8 0	£41 16 0	£41 14 0	£43 16 0
Less harvesting costs	£7 4 0	£7 9 0	£7 8 0	£7 6 0	£7 9 0
Return	£34 4 0	£32 19 0 Decrease.	£34 8 0	£34 8 0	£36 7 0
Increased or decreased return due to fertilizer	..	£1 5 0	£0 4 0	£0 4 0	£2 3 0
Cost of fertilizer and application	..	£2 7 0	£2 12 0	£2 3 0	£3 6 0
Loss from fertilizer	..	£3 12 0	£2 8 0	£1 19 0	£1 3 0

Location.—**H. Ivers's farm, Rosella.**

Soil Type.—Sandy loam, typical of Homebush area.

Variety.—Q. 813. Age of crop—Fourteen months. Nature of crop—First ratoon.

RESULTS.

	No Fertilizer.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 240 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	8·9	11·5	12·9	13·0	13·8
C.C.S. in cane	14·3%	14·3%	13·0%	14·4%	14·2%
Value of crop	£14 15 0	£19 1 0	£18 16 0	£21 16 0	£22 13 0
Less harvesting costs	£4 14 0	£5 4 0	£5 10 0	£5 4 0	£5 10 0
Return	£10 1 0	£13 17 0	£13 6 0	£16 12 0	£16 13 0
Increased return due to fertilizer	..	£3 16 0	£3 5 0	£6 11 0	£6 12 0
Cost of fertilizer and application	..	£2 5 0	£2 18 0	£3 11 0	£4 4 0
Profit from fertilizer	..	£1 11 0	£0 7 0	£3 0 0	£2 8 0

The results on the ratoon crop show a decided response to sulphate of ammonia, and, contrary to the findings of the plant crop, the influence of potash appears to be asserting itself. However, it is often found that potash shows results in a dry year, while phosphates are more valuable in a wet season. Again what was practically a crop failure was converted into a reasonable ratoon yield by the use of artificial manures.

Location.—**P. Simonsen's farm, West Plane Creek.**

Soil Type.—Sandy forest ridge soil.

Variety.—P.O.J. 2714. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	216 lb. Sulphate of Ammonia + 300 lb. Superphosphate.	216 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Superphosphate + 180 lb. Potash.	216 lb. Sulphate of Ammonia + 300 lb. Superphosphate + 180 lb. Potash.
Tons cane per acre	14·6	16·6	14·7	19·1	19·9
C.C.S. in cane	14·5%	13·3%	15·1%	14·1%	13·1%
Value of crop	£24 15 0	£25 1 0	£26 8 0	£31 2 0	£29 7 0
Less harvesting costs	£5 13 0	£6 5 0	£5 14 0	£7 3 0	£7 9 0
Return	£19 2 0	£18 16 0 Decrease.	£20 14 0	£23 19 0	£21 18 0
Increased or decreased return due to fertilizer	..	£0 6 0	£1 12 0	£4 17 0	£2 16 0
Cost of fertilizer and application	..	£2 12 0	£3 2 0	£2 14 0	£3 19 0
Profit or Loss from fertilizer	..	Loss. £2 18 0	Loss. £1 10 0	Profit. £2 3 0	Loss. £1 3 0

In this area, where the rainfall was somewhat better than that of the Pioneer Valley or the Homebush area, the fertilizer appears to have had some influence on the plant crop. Results show a definite gain from potash and superphosphate, particularly the latter. This is in accordance with our findings elsewhere in the case of sandy forest soils.

[TO BE CONTINUED.]

MATURITY TRIALS.

Vegetables vary considerably in the time they occupy in maturing their crop. Climatic conditions, variety, time of the year at which they are planted, class of soil, aspect of the land, and even method of cultivation influence the time taken, but the following table shows approximately the periods that should elapse between sowing and harvesting:—

Name of Vegetable.	Time usually occupied in maturing.*	Name of Vegetable.	Time usually occupied in maturing.*
Artichoke (Jerusalem)	5 –6 months.	Melon (Rock)	4 –4½ months.
Beans (Broad)	4½–5 ,,	Melon (Water)	4½–5 ,,
Beans (French)	1½–2 ,,	Onion	7 –9 ,,
Beet	2½–3 ,,	Parsnip	5 –6 ,,
Cabbage	3 –5 ,,	Peas	3 –4 ,,
Carrot	2½–3½ ,,	Potatoes	3 –4 ,,
Cauliflower	4 –6 ,,	Pumpkin	3 –4 ,,
Celery	5 –6 ,,	Radish	3 –4 weeks.
Cucumber	2 –3 ,,	Shallot	3 –4 months.
Endive	2 –2½ ,,	Silver Spinach Beet	1¾–2½ ,,
Leek	4 –5 ,,	Tomatoes	4 –5 ,,
Lettuce	2 –2½ ,,	Turnip (White)	2½–3 ,,
Marrow	1¾–2 ,,	Turnip (Swede)	4½–5 ,,

* Approximate only, and in the case of crops that bear over an extended period calculated up to the commencement of harvesting.

DISEASES OF TOMATOES.*

By J. H. SIMMONDS, M.Sc., Plant Pathologist.

THE following diseases of tomatoes are discussed in these notes:—Irish Blight, Fusarium Wilt, Septoria Leaf Spot, Target Spot, Spotted Wilt, and Blossom-end Rot.

Irish Blight.

Irish blight is commonly thought of as a disease of the potato rather than the tomato, since it was in connection with the former crop that it first reached economic importance. The disease is due to the attack of a fungus parasite, *Phytophthora infestans*. It was apparently introduced into Europe from South America, the original home of the potato, some time prior to 1842, for at this time it has been recorded as being well established in Europe. In 1845 a serious epidemic occurred in both Europe and North America, of which one of the results was the noted Irish famine. Further severe outbreaks have occurred since then when climatic conditions have been suitable. The tomato is a close relative of the potato, and for that reason several of the diseases affecting one have been able to attack the other. Of these Irish blight is an example.

Symptoms.

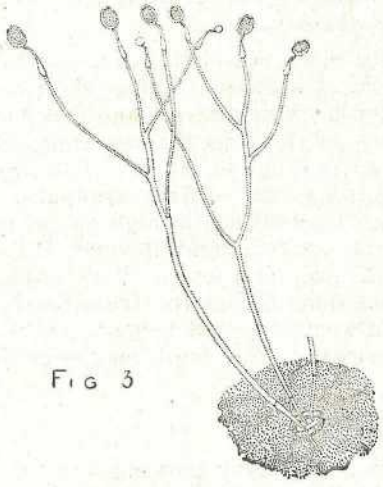
The first easily noted sign of the disease takes the form of dark-brown patches on the leaves, commonly working in from the margin. If the weather is at all wet these areas will assume the appearance of a soft rot, and enlarge rapidly. Finally the entire leaf may become affected and shrivel up. (Plate 44, fig. 1.) Blackish lesions are also formed on the stem and leaf-stalks. The fungus in this case may produce complete cincturing of the part attacked, when the whole of the outer portion of the branch affected will wilt and die. Under moist conditions there will be seen, on the under surface of the leaves and on the stem covering the brown areas, a delicate whitish down formed by the fruiting bodies of the fungus as they project out from invaded tissue.

The grower's attention is usually more especially attracted to the disease when the fruit become affected. A somewhat diffuse light-brown patch arises on the skin of the green fruit. This enlarges and may finally cover a large proportion of the surface, at the same time turning a dark though somewhat mottled brown colour. (Plate 44, fig. 2.) The margin of the discoloured area may be definite or may diffuse gradually into the general green of the healthy skin. On cutting through one of these spots the discolouration will be seen to extend right through the skin of the fruit and may penetrate even the pulp and septa. Very often the fruit rot extends to considerable dimensions before the fructification is produced. This appears during humid weather as a delicate white mould on the surface of the discoloured region. The fruit may sometimes constitute the main part of the plant attacked.

Causal Organism.

The fungus causing Irish blight in its ordinary growing stage is very similar to most other fungi, and consists of clear, slender, branched threads

* Reprinted from "Pests and Diseases of Queensland Fruits and Vegetables" by Robert Veitch, B.Sc., F.E.S., and J. H. Simmonds, M.Sc. Published by the Department of Agriculture and Stock, Brisbane, 1929.



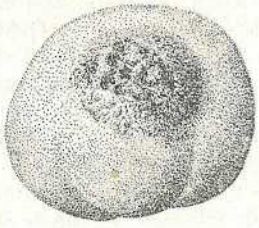


PLATE 44.—IRISH BLIGHT OF THE TOMATO.

Fig. 1, Foliage symptoms. Fig. 2, Fruit rot. Fig. 3, Fruiting stage of the causal organism (*Phytophthora infestans*), highly magnified.

or mycelium, these threads being less than $\frac{1}{1000}$ inch in width. They ramify among the cells forming the plant tissue, absorbing nourishment for themselves, and thus bring about the destruction of the invaded part, producing the symptoms described above.

If the weather is sufficiently moist, the fungus after a few days' vegetative growth will commence to form its fruiting stage. Short aerial threads or hyphæ grow out through the breathing pores situated on the under surface of the leaf and other parts attacked. These branch three or four times, and on the ends of the branches are formed delicate lemon-shaped spores or fungus seeds. (Plate 44, fig. 3.) These spores are produced in enormous numbers, and are so minute that they can easily float about in the air and thus serve to spread the disease throughout the field. Should a spore come to rest on a tomato plant moist with dew or rain, its contents divide up into from six to twelve smaller portions, which escape from the spore-case and swim round in the surface moisture by means of two vibratile filaments. These swarm spores, as they are called, soon come to rest and send out a slender thread known as a germ-tube, which penetrates the surface of the plant and commences once more on a period of vegetative activity within its tissues. If conditions are not suitable for the development of swarm spores, which must have moisture for their existence, the spore itself may sometimes develop a germ-tube direct.

Contributing Conditions.

Unlike those of many fungi, the spores of *Phytophthora infestans* are thin-walled and delicate, and are therefore restricted to certain ranges of temperature and moisture for their development and continued existence. Probably the best temperature for the development of the disease lies between 60 and 70 deg. F. The spores are killed if the temperature approaches 80 deg. F. for any length of time, and at temperatures round about 90 deg. F. the mycelium itself soon dies out in the leaf tissues. For the germination of the spores leading to spread of the disease, abundant moisture is necessary, either in the form of heavy dews or rain with accompanying humid conditions. Thus for the occurrence of an epidemic there must be a certain combination of temperature and humidity. In coastal Queensland a temperature suited to the development of Irish blight is likely to occur only during the cooler months. This period usually coincides with the dry season. Hence this disease in normal years does not reach serious proportions. However, it sometimes happens that a period of wet weather occurs during the autumn, winter, or early spring growing season, and considerable loss from Irish blight is the result. This was well illustrated by the outbreak of this disease in the Bowen district during July and August of 1927. Rain to the extent of 1.8 inches fell on 23rd and 24th July, accompanied by a sudden fall in temperature, the daily maximum from 23rd July to 3rd August ranging from 57 to 77 deg. F., with an approximate daily average of 58 deg. F. With the advent of hot dry weather the loss from blight rapidly diminished. If the weather is exceptionally wet, blight may spread sufficiently to cause serious loss even during warmer months.

Growers should therefore be prepared to take steps to minimise the loss from Irish blight. The precautions necessary will also aid in controlling certain other leaf diseases to which the tomato is subject.

CONTROL.

1. General farm sanitation will go a long way towards the control of most fungus troubles, and should be practised in the case of Irish blight. If leaf disease has been present, the remains of the crop should be destroyed by fire after harvesting is completed. When possible the same ground should not be planted to tomatoes for two years in succession. Tomatoes should not follow potatoes, and *vice versa*.

2. Spraying with Bordeaux or Burgundy mixture has been shown to give an effective control over Irish blight when the spray is properly made and applied. The plants should be sprayed when about 6 inches high, and again as often as necessary to keep the foliage well covered with poison. The number of applications will depend on weather conditions. During periods of wet muggy weather spraying may have to be done every few days, as it is under these conditions that the spores are best able to germinate and the protective covering of spray is liable to be washed off by the rain. The spraying should be thorough, in order to ensure that both upper and lower surfaces of the foliage are covered.

Bordeaux and Burgundy mixture should be used at the 6-4-40 and 6-8-40 formulæ respectively. If applications are to be made at frequent and regular intervals, these quantities can be reduced as mentioned in the chapter dealing with the preparation of these sprays.

Fusarium Wilt.

There are at least four distinct wilt diseases affecting tomatoes in Queensland. These consist of a bacterial wilt caused by *Bacterium solanacearum*, two fungus wilts due to the organisms *Fusarium lycopersici* and *Verticillium alboatrum*, and the virus disease dealt with later. The commonest and most generally distributed of these is the Fusarium wilt, which will be described below.

SYMPTOMS.

Wilting is not always a marked symptom of this common tomato trouble. The lower leaves of the plant usually commence to take on an unthrifty appearance, turn yellow and then brown, and finally dry up. This effect may gradually extend up the stem until finally the whole plant has withered. In other cases the plant will suddenly wilt and die before the drying of the leaves has progressed to such an extent. If seedlings or young plants become infected they may remain stunted from the start, if not dying completely.

CAUSE.

The fungus (*Fusarium lycopersici*) causing this disease can live for many years as a saprophyte on decaying vegetable matter in the soil, and from there enter the tomato plant through injuries to its roots. The fungus grows up through the tissues of the root into the main stem, where it develops chiefly in the large water-conducting vessels, gradually working up the plant through these. The presence of the fungus affects the vessels to such an extent that the supply of water and food material passing up from the soil is diminished. This leads to the general unthrifty appearance of the plant, and eventually when water conduction is completely stopped wilting takes place. Sometimes only the vessels running up one side of the stem supplying a particular lateral will be invaded, when the leaves of the latter may die while the rest of the plant remains healthy.

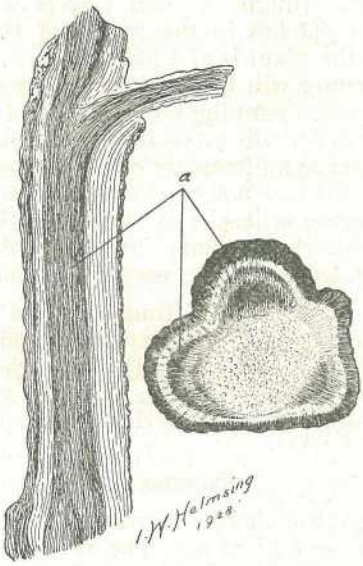


Fig. 1.—Fusarium Wilt of Tomato. Portion of stem with outer layer removed and enlarged transverse section to show darkening of vascular tissue at *a*.

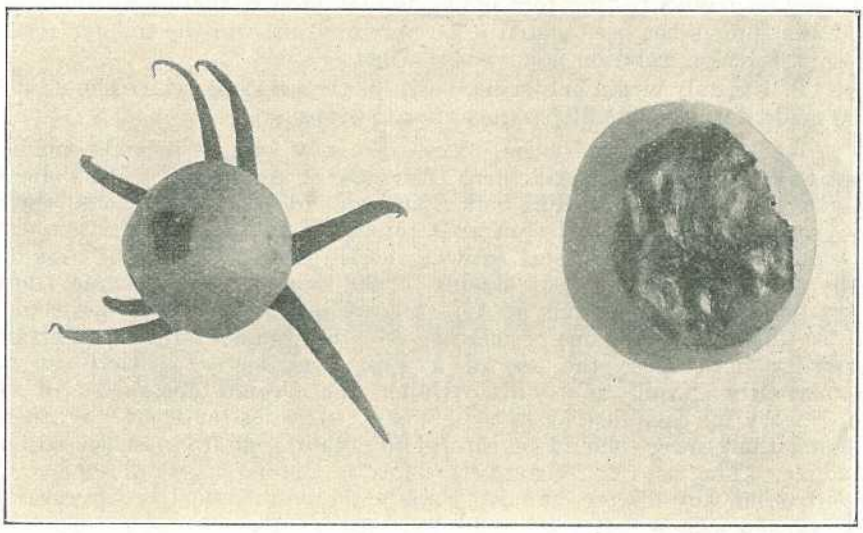


Fig. 2.—Blossom End Rot.

Plate 45.

If the base of an affected plant be cut across with a clean knife just above ground-level, the fungus-invaded vessels will be seen to stand out as distinct brown patches in the region of the large-celled woody tissue, which in a healthy plant is of a light-green colour. When the bark is peeled off the browning will be observed to extend for a considerable distance up the stem, often running out into lateral branches. (Plate 45, fig. 1.) This discolouration will serve for a quick diagnosis of Fusarium wilt. Somewhat similar symptoms are displayed by plants affected with bacterial wilt, but in this case a slimy bacterial ooze will exude from the cut vessels. Verticillium wilt closely resembles Fusarium wilt in its general symptoms and in the method of attack of the causal organism, but is apparently of much less frequent occurrence than the latter.

The reproductive stage of the fungus is not greatly in evidence. Numerous small sickle-shaped spores may be formed on the surface of old decaying crowns. These are shed into the soil, where they may develop and the fungus live as a saprophyte on decaying vegetable matter until another tomato crop becomes available for attack.

CONTROL.

As the causal organism obtains entrance through the roots, spraying for this particular disease is of no use. The difficulty of effective control is increased by the soil-frequenting habits of the fungus.

1. Pull up and destroy all diseased plants as soon as noticed, in order that the number of spores dispersed into the soil may be reduced to a minimum. The crop as a whole should be removed and burnt as soon as harvesting has ceased.

2. If the land becomes infected it should be subjected to rotation of crops, returning to tomatoes only after at least a three-year interval. As the fungus has been stated to be able to remain in the soil for seven years, a longer rotation is advisable when possible.

3. Use only virgin or sterilised soil for the seed-bed, which should not be made near the site of previous tomato crops.

4. Use resistant varieties. There are now in Queensland—mainly owing to the work of the Northern Instructor in Agriculture, Mr. Pollock—several varieties, including both American and local productions, which in some districts exhibit resistance to Fusarium wilt. Unfortunately, owing to variation in local growing conditions and probably also to the occurrence of different strains of the fungus, the resistance does not hold good throughout all tomato-growing districts in Queensland. Also, the presence of one or more of the other tomato wilts in a certain locality may cause the use of a Fusarium-resistant variety to be apparently devoid of results. Under the circumstances it will be necessary for each district to try out these varieties for itself. When so doing the growers should be careful to obtain seed from an accredited source. The use of resistant varieties is the most useful means of controlling any disease, and is certainly the best method in the case of Fusarium wilt.

Septoria Leaf Spot.

This disease first appears on the older leaves of the plant as minute grey dots visible on both sides of the leaf but more conspicuous on the lighter under surface. These spots gradually enlarge to about $\frac{1}{8}$ inch in

diameter. At the same time the tissue first affected dries out to a lighter colour, so that finally the lesion appears as a small circular greyish or light-brown spot bordered with a margin of dark brown. The disease is finally characterised by the appearance of a cluster of fine black points on the grey surface. (Plate 46, fig. 1.) As the spots become older a diffuse yellowing spreads out from their margin until finally the whole leaflet may be involved. These then gradually dry out and wither up. In an affected plant the older leaves will be seen to successively assume a spotted and yellow appearance, followed by drying and death. Finally in case of severe attack a tuft of green leaves at the end of the branch may be all that remains. The dying of the central leaves in this manner may expose the fruit to severe sunscald. Spotting also occurs at times on the stem and leaf-stalks.

Cause.

This leaf disease is caused by a fungus (*Septoria lycopersici*). It is the fruiting bodies of this fungus which appear as the characteristic black points on the leaf-spots. These bodies consist of minute flask-shaped receptacles or pycnidia whose mouth projects out upon the surface where it is just discernible to the naked eye. The walls of these pycnidia are formed of dark closely interwoven fungus hyphæ, and from the inner surface are produced numerous long slender many-septate spores. During wet weather these are exuded in a white sticky column from the mouth of the pycnidia, and are transferred from here to healthy leaves by the splashing of rain, by the wind distributing the dust in which they have been washed, by insects, &c. The spores may also be carried about the field upon the person of field workers.

The control of Septoria leaf spot will be considered in connection with that of target spot, a disease with which it shows considerable resemblance.

Target Spot.

This disease, like Septoria leaf spot, is mainly a foliage trouble, though unlike the latter the fruit may also be attacked at times.

Symptoms.

The first symptoms of an attack are seen in the form of minute dark-brown to black specks scattered, often in only moderate numbers, over the older leaves. These increase in size and become surrounded by a halo of a light-green to a greenish-yellow colour which diffuses into the general green of the leaf. The mature spot usually consists of a clearly defined dark-brown area more or less rounded in shape and from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. The fungus causing the disease in its extension through the plant tissue has a somewhat intermittent growth depending on weather conditions. The limit of its extension at various times is defined by a number of concentric slightly raised ridges which give to the spot the target-like effect to which the disease owes its name. (Plate 46, fig. 2.) This marking is not always in evidence, and sometimes the spotting as a whole is less definite and of a more diffuse type. The yellowing of the tissue surrounding the spots extends considerably as these become older, and if the number of infections is at all numerous large portions of the leaf may become involved in the discolouration and will eventually wither and dry out. The older leaves are the first attacked, and the result, as in the case of Septoria spot, is seen in the

gradual drying out of the leaves from the base upwards as the fungus spreads higher up the plant. As with this other disease, scalding of the unprotected fruit is likely to follow.

A similar type of spotting is also produced on the stem and leaf-stalks. The lesions here are of a more elongated shape and are without the yellow border.

The same fungus may cause large black sunken spots on the fruit. These areas are usually covered in their later stages with a black velvety mass of mould-like growth due to the presence of various saprophytic organisms. Fruit infection does not appear to be of common occurrence in Queensland.

CAUSE.

The organism producing this disease is *Alternaria solani*, a fungus which is responsible for a similar trouble sometimes affecting the potato crop. The spores of this fungus are brown club-shaped bodies divided up by several transverse and an occasional longitudinal septa. They are produced on short conidiophores which project in clusters from the surface of the leaf, the whole being faintly visible as a dusky growth over the older diseased spots.

The spread of target spot takes place by dispersal of the spores from the diseased leaf surface with the aid of rain, wind, &c., as in the case of Septoria spot.

CONTROL OF SEPTORIA LEAF SPOT AND TARGET SPOT.

The fungi causing both Septoria and target spot are much alike in regard to their method of attack and effect on the plant, and both diseases are amenable to the same treatment.

Each affects the older leaves, more especially when the plant is approaching a mature size or is in a poor state of vigour owing to the presence of nematodes or unsuitable growing conditions. For this reason these diseases are often considered to be merely the natural result of ageing. However, considerable loss may be experienced through diminution in vigour and shortening of the productive life owing to the attack of one or both of them. Much damage is occasioned also should the mature fruit become sunscalded through being exposed by the premature loss of the central leaves.

The fungi concerned in these diseases may pass from season to season on old infected plant remains left undestroyed from a previous crop. When once infection of a new crop has taken place, further batches of spores are continuously produced from the affected spots and are spread by wind and rain, &c., through the whole field, and falling on clean plants create further centres of infection. Efforts for control should therefore proceed along the following lines:—

1. Destroy all old plant material by fire as soon as the crop is off.

2. Spray regularly with Bordeaux mixture in order to prevent infection. Young plants may be attacked in the seed-bed and the planting of infected seedlings may be the cause of trouble later in the field. Spraying should therefore commence in the bed when the plants are 3 to 4 inches high. The strength for use in this early stage should be reduced to a 3-4-40 formula. Later applications should be made with the 6-4-40 mixture as for the control of Irish blight. If desired Burgundy may be substituted, using the 3-4-40 and 6-8-40 formulæ respectively.

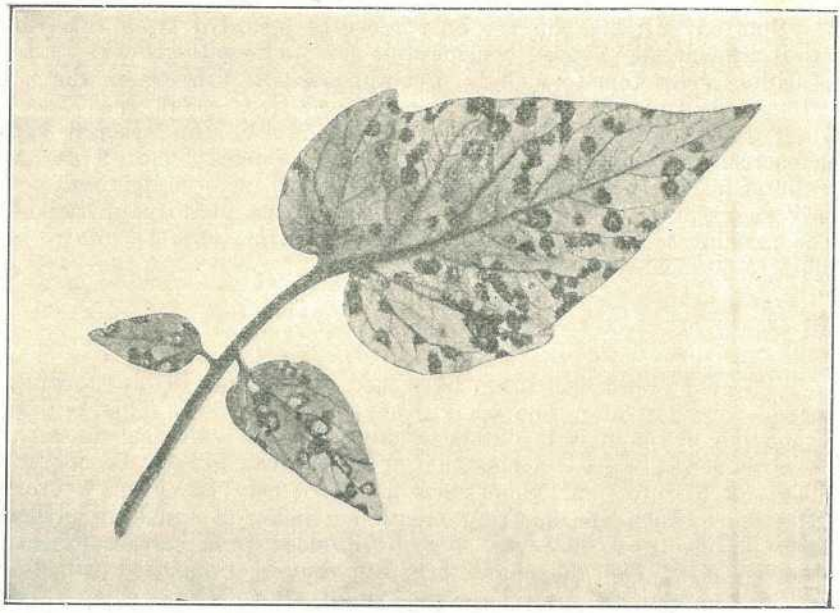


Fig. 1.—Septoria Leaf Spot.

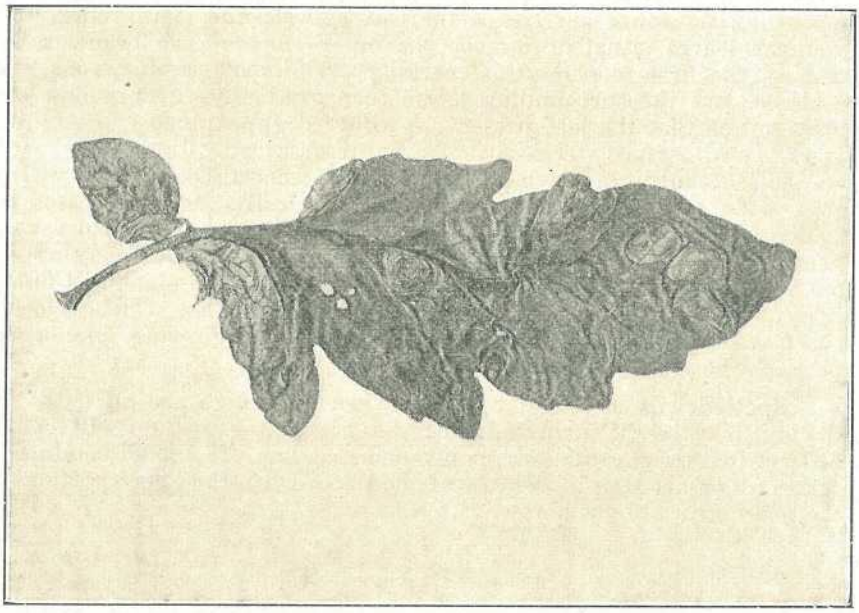


Fig. 2.—Target Spot.

Plate 46.

Spotted Wilt.

Spotted wilt is a disease only recently recorded from this State, but it has already caused considerable loss to tomato-growers in some localities. This tomato malady first appeared in Victoria in the 1915-1916 season, and was later fully described by Brittlebank, the Victorian Plant Pathologist, who named it "spotted wilt" on account of its characteristic symptoms. It has now been reported from all the Australian States. In Queensland the disease has so far been definitely noted only in certain tomato-growing districts in the vicinity of Brisbane. The amount of loss sustained on different farms varied from an odd plant to 50 per cent. of the crop.

SYMPTOMS.

Affected plants can often be picked out from a distance owing to the development of a somewhat drooped appearance. This is due to a tendency of the main leaf-stalk to curve down and the leaflets to curve upwards at the edges. A cessation of growth can usually be noticed as the result of infection. Sometimes the plant as a whole has a bronzed appearance when the spotting mentioned below is much in evidence. These appearances, however, may be induced to a certain extent by other diseases, and the characteristic symptom of spotted wilt is the presence on the leaves of numerous small brown spots which produce in the early stages a distinct mottled pattern. These markings may be rather indefinite and somewhat diffuse, giving a more general bronzing to the leaf, but more typically they are roughly circular in shape, varying in size from minute dots up to an area of about $\frac{1}{8}$ inch in diameter. (Plate 47.) They are variously scattered on the upper and sometimes the lower surface of the leaf between the main veins. The younger leaves situated towards the outer ends of the branches are usually the first to show this marking. The spots if numerous may coalesce, and the surrounding tissue then gradually turns yellow and dries out so that the leaf presents a withered appearance. (Plate 47.) Dark-brown surface streaks usually linear or broadly linear may occur on the leaf-stalks and stems. On scraping, this discolouration will be seen to be restricted to the surface layer of cells. In some cases the fruit may show brown markings of varying extent which do not usually penetrate the flesh for any great distance. The symptoms may appear on from one to all the branches. In the latter case the plant will finally present the appearance of complete wilt—a condition which is sometimes assumed very rapidly. Very vigorously growing plants are perhaps the most affected.

Spotted wilt in its later stages, when the leaves are all dead and drying, may be distinguished from the common Fusarium wilt by the absence of the brown fungus-invaded patches of woody conducting tissue which are seen in the case of the latter when the lower portions of the main stem are cut across.

CAUSE.

Repeated attempts have been made by workers in the Southern States to find a fungus or bacterial parasite which might be the cause of spotted wilt, but without success. In the absence of a definite parasite of this nature, the disease differs from most common tomato troubles. It

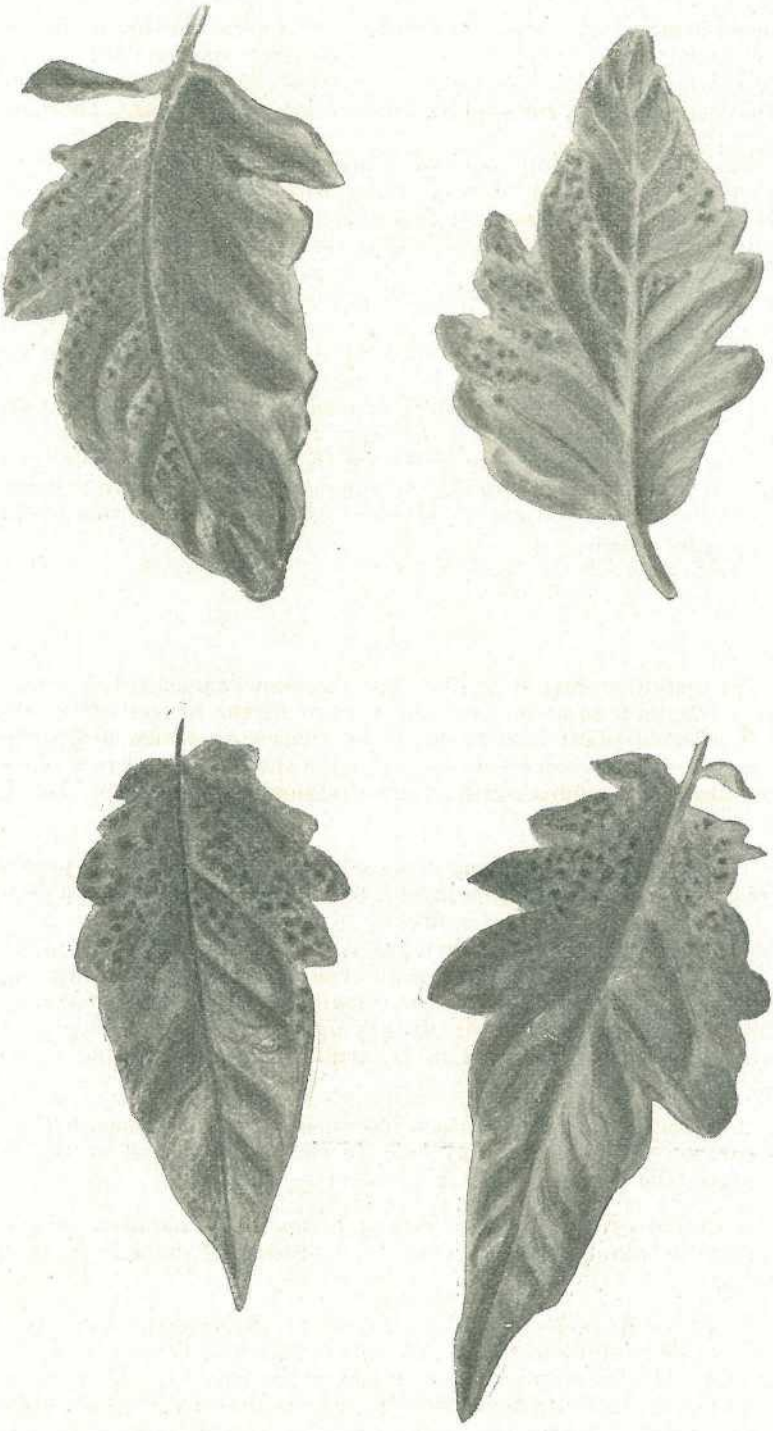


Plate 47.
Leaflets from a Tomato Plant affected with Spotted Wilt.

has been demonstrated recently by H. A. Pittman, working at the Waite Agricultural Research Institute, Adelaide, that spotted wilt belongs to the virus type of plant disease. As regards the nature of the malady, spotted wilt therefore resembles bunchy top of bananas. In this type are grouped a number of diseases presenting certain points of similarity but whose causal agents are so minute that there has so far been developed no means of viewing them with certainty. What little is known about these organisms has therefore to be inferred from the reactions obtained in various experiments with the plant juice in which they have been shown to occur. The way in which the infective agent is transmitted from infected to healthy plants varies with the individual disease. Some virus diseases may be spread by inoculating healthy plants with the juice from a diseased one. In others it is necessary to graft a portion of the affected plant on to the healthy. Many are spread by means of sucking insects. It has been discovered that in South Australia spotted wilt is transmitted by the black carnation thrips (*Frankliniella insularis*). This is a minute insect which easily escapes casual observation. It spreads the disease during its normal feeding habits by transferring juice containing the casual agent or virus from a diseased to a healthy plant.

CONTROL.

No certain means of control has yet been demonstrated. Spraying with a fungicide is of no avail on account of the nature of the disease. As an affected plant may harbour the virus with which healthy plants can be inoculated, such sources of infection should be kept to a minimum. The following recommendations are designed to reduce the loss due to this wilt.

1. Pull up and burn any diseased plant as soon as it appears. A regular inspection of the plot should be undertaken at frequent intervals for this purpose. It is not sufficient to remove a single branch because this is the only one bearing symptoms, since the rest of the plant may be harbouring the infectious agent even though not showing signs of the disease. Unfortunately, under certain conditions the plant may be a bearer of the virus without displaying the usual symptoms. This, however, should not be used as an argument for neglecting systematic destruction.

2. Spraying with a contact insecticide such as Black-leaf 40 for the control of the thrips may help to check the spread of the disease but cannot be guaranteed to give effective control.

3. Avoid excessive use of strong nitrogenous manures, which tend to make the plant more susceptible by producing excessively succulent growth.

4. Clean up and burn the remains of the crop as soon as it has ceased to be profitable, as an odd infected plant left over from crop to crop may be the means of perpetuating the disease. This precaution will also help to control the various fungus diseases of the tomato. It is also advisable to keep the farm as free as possible from weeds and the remains of other crops which may harbour the thrips.

Blossom-end Rot.

The appearance of this disease in a severe form occurs only during certain seasons when the peculiar meteorological conditions necessary for its development are manifested.

Symptoms.

In the first instance a light-brown surface discolouration appears at the apex or blossom-end of a green developing fruit, and gradually spreads until a somewhat irregular circular area of an inch or more in diameter becomes involved. (Plate 45, fig. 2.) The affected region becomes dark brown or leaden brown in colour. The tissue is firm and somewhat shrunken, often sufficiently to cause a definite depression. Internally the flesh of the tomato may be darkened for some little distance below the surface, but except when the fruit becomes invaded by secondary organisms there is no soft rot.

Cause.

Attempts to isolate fungal or bacterial organisms from the early stages of this disease are usually unsuccessful, and it is the general opinion at the present time that the trouble is of a physiological nature and not due to the presence of parasites. The symptoms appear to be brought about when the plant is subjected to an erratic water supply such as occurs when periods of wet are followed by hot dry weather.

It has been suggested that under these conditions the foliage, in order to make up its own requirements, withdraws water from the fruit with the result that some of the apical cells collapse giving rise to the symptoms noted.

The excessive use of organic nitrogenous manures may also be a contributing factor in the development of blossom-end rot.

Control.

By means of good cultivation and when available irrigation, maintain, so far as possible, an even supply of soil moisture throughout the growth of the crop. Avoid excessive use of strong nitrogenous manures.

Control of Tomato Diseases.

After noting the various measures that may be advocated for the control of the common tomato maladies, it will be seen that loss due to any or all of these (with perhaps the exception of spotted wilt) may be diminished by attention to the routine farming practices of sanitation, careful selection of the seed-bed, rotation of crops, good cultivation, and if possible irrigation, together with a regular spraying programme using Bordeaux or Burgundy mixture.

DISEASES OF THE PIG.

E. J. SHELTON, H.D.A., Senior Instructor in Pig Raising.

RINGWORM.

RINGWORM is an affection of the skin caused by the presence of a vegetable fungus, technically known as a Trichophyton (*T. tonsurans*). It is not of great economic importance in well-kept piggeries, but may spread rapidly through a herd where the stock are neglected and kept in unhygienic surroundings. It may be communicated either by human beings or stock, and is therefore of a contagious character. The disease may even infect the person in attendance upon the pigs, particularly if he attempts, with his hands, to remove the crusts or scales when caring for or treating affected animals. The areas most frequently affected are the sides, back, belly, the loins, and the underside of the hams, particularly in breeding sows.

In sows that are suckling their litters the disease spreads along the udders and the flanks, and in most cases the disease would be communicated to the young pigs. In appearance ringworm is not unlike severe sunscald. The affected areas will be variable in size or about the size of a shilling piece. They have a reddened and inflamed appearance, and frequently towards the centre of the "ring" may be seen small bladders or vesicles (blisters), which burst and discharge a sticky fluid that soon dries off and crusts. It is the rubbing off of these crusts that carries risk to the stockman and to other persons and animals on the farm.

Treatment.

Ringworm is not so readily treated in pigs as in the case of horses and cattle, hence stringent measures are necessary.

Mr. Veterinary Surgeon Rudd has suggested the following lines of treatment for ringworm:—

Swab the affected parts with a saturated solution of washing soda and dry off with methylated spirit, care being taken to make certain that at least 1 inch of skin is included outside the affected area; or use one part of Binioxide of Mercury to twenty parts of lard, rubbing this in for five minutes on and close around the affected area; or one part of Corrosive Sublimate to five hundred or even one thousand diluted in water may be used.

Painting with strong liniment of iodine in the treatment of pigs is also recommended, this probably being the most convenient remedy of all.

Preliminary treatment consists of carefully washing the affected areas with warm water and soft soap and drying these with a soft cloth before applying the remedy. Internal treatment is similar to that which would be adopted in any disease likely to affect the digestive organs.

In cases where a sow suckling her young is suffering it might be advisable to wean the litter before beginning the remedial treatment. If this is not possible the young pigs should be watched very closely and be treated immediately any indication of the trouble presents itself.

Having regard to the contagious nature, a pig suffering from ringworm should be promptly isolated and kept away from the other pigs until all risk of infection has passed.

It is recommended also to paint all woodwork in the styes with limewash to which phenyle of a strength of 1 ounce in 1 gallon of limewash is added.

In three or four days' time, scrape off the limewash and paint again with this preparation, having the limewash heated to boiling point before use. The fungus responsible for ringworm has been known to live for three years on the woodwork of pig styes and stables.

STOCK LOSSES, PITTSWORTH DISTRICT.

Mr. King, the Acting Minister for Agriculture and Stock, has made available the following report by Mr. A. H. Cory, M.R.C.V.S., Chief Inspector of Stock, upon the recent losses of stock in the Pittsworth District:—

ON the 26th January 585 store bullocks were dipped at Eskdale and again dipped at Crow's Nest on the 1st February. These cattle were then driven towards Pittsworth. On Saturday evening, the 6th February, the cattle were inspected by Inspector McBean at Southbrook and found healthy, but the inspector reported that the cattle were very hungry and thirsty. The drover camped the bullocks on the Saturday night in a road in which practically nothing but wild mint (*Salvia lanceifolia*) existed, and owing to the stock being very hungry they naturally ate same. They were watered at daylight on the Sunday morning at the Springs, Pittsworth, and were on the mint for 5 or 6 miles after watering. On Monday, the 8th February, the bullocks commenced to die. Post mortems were held by the Stock Inspector and portions forwarded to this Department for analytical purposes. As soon as losses were reported the Assistant Government Botanist immediately left for Pittsworth, as vegetable poisoning was suspected. He reported that the mint was very abundant, also he found a few other poisonous plants, but not in sufficient quantities to cause the losses.

The samples of viscera forwarded to the Agricultural Chemist for analysis showed the presence of arsenic. Samples of water and mint were also analysed, but no mineral poisons were detected.

I am of opinion that the bullocks died from eating "Wild Mint." Had the bullocks had other feed available they would not have eaten the mint to excess, which apparently happened. The mint is looked upon by local stockowners as poisonous, but only when eaten in excess, which is a rare occurrence with local stock.

It is noted with many of our reputed poisonous plants that it is only when cattle are hungry and forced to eat them that losses occur. The arsenic found, in my opinion, was not in sufficient quantities to cause the losses, and its presence in the viscera was due to absorption, the result of recent dippings. The fluids that the bullocks were dipped in were actually below the usual standard recognised by this Department. Further, my opinion that the animals did not die from arsenical poisoning is based on the fact that the symptoms exhibited were not those commonly seen with arsenical poisoning.

Mr. W. D. Francis, Assistant Government Botanist, also supplied the following report upon his inquiries into the same matter:—

I wish to report having visited the Pittsworth district in connection with the recent severe losses of bullocks travelling from Crow's Nest to Goondiwindi.

The plant known in the Pittsworth district as Wild Mint (*Salvia lanceifolia*) is exceptionally abundant on the road from Wyreema to Pittsworth and on some of the roads about Pittsworth. On a flat at Broxburn, where the bullocks were camped on Saturday night previous to the fatalities, the whole width of the road is densely clothed with this plant. Other sections of the route over which the bullocks travelled were also found to be covered by it for some distance. There is no question of the very great abundance of the "Wild Mint" on the route which the bullocks travelled before they were stricken. Messrs. Smyrell and McBean, Stock Inspectors, who accompanied me, were told by the drover that the bullocks began to die early on the Monday morning following the Saturday when they were camped at Broxburn. Quantities of the "Wild Mint" were found by Mr. McBean in the alimentary canal of the bullocks which were autopsied.

The "Wild Mint" is a native of the United States and Mexico. In comparatively recent years it has become naturalised in the Pittsworth and adjoining districts of the Darling Downs. Pammel, in his Manual of Poisonous Plants (published in Iowa in 1911) remarked that it is "a troublesome weed in the west." He refers to it as the lance-leaved Sage. However, he does not attribute to it any poisonous properties. It is therefore to be noted that the plant known at Pittsworth as the "Wild Mint" is a common weed in the Western United States and that it has not, so far as we know, been accused of possessing poisoning properties there.

In the Pittsworth district the "Wild Mint" certainly has the reputation of being a poisonous plant, and men associated with stock appeared to have no doubt that it was the cause of the heavy losses of over 50 per cent. of the total number of bullocks travelling to Goondiwindi.

The history of poisonous plants in Queensland (and perhaps elsewhere as well) shows that the opinions of men associated with stock in the country cannot be ignored. There are at least some instances in which the opinions of stockmen as to the poisonous properties of plants have proved to be correct, even though there appeared to be no other indications to support them.

One instance may be cited. It may be a very appropriate case to quote on this occasion as it has several features in common with the Pittsworth fatalities. For many years it was persistently asserted by stockmen that the Stagger Weed (*Stachys arvensis*) caused staggers or shivers in working horses and travelling stock. The plant implicated in this case was common in England, and it had never been accused of causing harm to stock there. When careful feeding tests were carried out in sheep in New South Wales it was found that the symptoms of staggers were produced when the sheep fed on the weed were driven, and in some cases the sheep which were experimented upon died. Incidentally it should be mentioned that the Stagger Weed belongs to the same family—namely, the *Labiatæ*—as the "Wild Mint" of the Darling Downs. The "Wild Mint," in common with most other members of the *Labiatæ*, contains an aromatic oil. It is possible that this essential oil may be harmful to stock feeding on the plant.

No other plants of a poisonous character were found to be present on the stock route in sufficient quantity to cause the large number of fatalities.

General Notes.

Staff Changes and Appointments.

Messrs. W. H. Keen and C. H. C. Ross have been appointed Canegrowers' Representatives on the North Eton Local Sugar Cane Prices Board.

Constable H. D. Stapleton has been appointed also an Inspector under the Slaughtering Act. Constable Stapleton is stationed at Urandangie.

Mr. W. J. Sanderson, who has been acting in the capacity of Photographer since the retirement of Mr. H. W. Mobsby in August, 1930, has now been officially appointed to the position of Photographer in the Publicity Branch of the Department of Agriculture and Stock.

Mr. W. A. McDougall, Assistant to Entomologist, has been appointed Assistant Entomologist, Bureau of Sugar Experiment Stations, Department of Agriculture and Stock. Mr. McDougall is stationed at the Central Sugar Experiment Station at Mackay.

Mr. E. R. Behne, B.Sc., Assistant to Sugar Technologist, has been appointed Acting Assistant Technologist, Bureau of Sugar Experiment Stations, Department of Agriculture and Stock, until 31st August, 1932.

Mr. R. W. G. Pitman, Land Agent, Roma, has been appointed also an Assistant Inspector of Stock at Roma, as from the 19th March, 1932.

Messrs. C. L. Spotswood, N. H. Elmslie, and G. Gahan have been appointed Honorary Rangers under the Animals and Birds Acts for the recently declared sanctuary at Fairymead, Bundaberg.

Mr. James Greer, of Compo road, Moorooka, and Mr. I. W. Helmsing, Rode road, Nundah, have been appointed Honorary Rangers under the Animals and Birds Acts.

Constable J. Frawley (Capella) has been appointed also an Inspector under the Slaughtering Act.

Canary Seed Board.

Following is the result of the annual election of members of the Canary Seed Board, which was conducted at the Department of Agriculture and Stock:—

*George Burton (Cambooya)	114 votes.
Garrett Denis O'Neill (Allora)	84 "
*Michael Coleman (Nobby)	78 "

* Retiring members.

Messrs. Burton and O'Neill have therefore been appointed for a term of one year as from the 1st March, 1932.

Control of Brumbies

The Governor in Council has approved of the issue of a Proclamation under the Diseases in Stock Acts proclaiming the Rockhampton Stock District as a District for the control of "brumbies" or worthless horses for the period from 5th March, 1932, to 30th April, 1932.

The provisions of section 16A of the Diseases in Stock Acts provide for the destruction of brumbies on stock holdings in Queensland under certain conditions, and apply to such portions of the State as are proclaimed by proclamation, and are limited to a period of not more than four months in any year. Destruction of brumbies may accordingly be carried out in the Rockhampton district by stockowners at any time during the stipulated period, provided that the formalities required by the Acts have first been observed.

Atherton Tableland Maize Board.

The Governor in Council has approved of the issue of an Order in Council under the Primary Producers' Organisation and Marketing Acts, giving notice of intention to extend the operation of the Atherton Tableland Maize Pool Board for a period of ten years from the 1st July, 1933, to the 30th June, 1943.

The Atherton Tableland Maize Board was constituted in 1923, and will expire on the 30th June, 1933.

Any petition for a poll to decide whether or not the operations of the Atherton Tableland Maize Board shall be extended must be signed by at least 10 per centum of the growers of maize who reside in the Petty Sessions Districts of Atherton, Herberton, and Chillagoe, who are engaged in the production of maize, and who have supplied their product to the Board. The petition must reach the Minister on or before the 18th April, 1932.

A Moorooka Sanctuary.

The Governor in Council has approved of the issue of an Order in Council under the Animals and Birds Acts declaring the property of Mr. James Greer, situated on Compo road, Moorooka, to be a sanctuary under and for the purposes of the abovementioned Acts, in which it will be unlawful for any person to take or kill any animal or bird.

Papaw Maturity Standards.

Executive approval has been given to the addition of a clause to Regulation No. 3 of the Fruit and Vegetable Grading and Packing Regulations issued under the Fruit and Vegetable Act, which prescribed a maturity standard for papaws.

The Other Fruits Sectional Group Committee, through the Committee of Direction of Fruit Marketing, made a request that a maturity standard for papaws should be adopted for the purpose of preventing the sale of immature fruit in the South, and accordingly, under the Fruit and Vegetables Act, the maturity standard for papaws will be as follows:—"When the fruit has attained its full growth, and the skin shows indications of a change in colour from green to yellow."

A Bundaberg Sanctuary.

The Governor in Council has approved of the issue of an Order in Council under the Animals and Birds Acts declaring the property of the Fairymead Sugar Co., Ltd., Bundaberg, and adjacent lands, as a sanctuary under those Acts. In addition to the Fairymead property, areas comprising mangrove swamps (Crown lands) and esplanades are included in the sanctuary, also properties on the eastern boundary have been included, which definitely define that boundary as the left bank of the Burnett River. It will be unlawful for any person to take or kill any animal or bird on the abovementioned lands.

PRODUCTION RECORDING.

List of cows, officially tested by officers of the Department of Agriculture and Stock, which have qualified for entry into the Advanced Register of the Herd Book of The Australian Illawarra Shorthorn Society, The Jersey Cattle Society, and The Friesian Cattle Society of Australia, production charts for which were compiled during the period 20th October to 20th November, 1931 (273 days period unless otherwise stated).

Name of Cow.	Age.	Milk Production.	Butter Fat.	Owner.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
Champion 4th of Oakvilla ..	Mature ..	11,067·031	467·397	W. Marquardt, Wondai
Rosebud 5th of Oakvilla	Mature ..	11,271·883	429·991	W. Marquardt, Wondai
Rosalind of Headlands	Mature ..	9,592·216	388·798	J. Heading, Cloyna
Bud 10th of Fairlie	Mature ..	8,953·75	373·803	C. B. Mitchell, Fairlie
Caroline of Hill Top	Mature ..	8,978·439	368·069	J. A. Heading, Cloyna
May 4th of Oakvilla	Snr. (4 yrs.)	11,371·104	451·677	W. Marquardt, Wondai
Fancy of Glenleigh	Snr. (4 yrs.)	10,116·25	393·038	C. O'Sullivan, Greenmount
Handsome 6th of Oakvilla ..	Snr. (4 yrs.)	8,644·409	343·634	W. Marquardt, Wondai
May 2nd of Frenchview	Jnr. (4 yrs.)	8,899·625	363·801	W. J. Barnes, Cedar Grove
Handsome 7th of Oakvilla ..	Snr. (3 yrs.)	10,485·965	405·169	W. Marquardt, Wondai
Meg 3rd of the Cedars	Snr. (3 yrs.)	7,236·5	308·544	W. J. Barnes, Cedar Grove
Rosebud 7th of Oakvilla	Jnr. (3 yrs.)	9,808·932	375·818	W. Marquardt, Wondai
Blossom 9th of Fairlie	Snr. (2 yrs.)	8,696·0	375·23	C. B. Mitchell, Fairlie
Veine of Wilga Vale	Jnr. (2 yrs.)	8,439·75	318·781	C. O'Sullivan, Greenmount
Flossie 2nd of Murray's Bridge ..	Jnr. (2 yrs.)	7,910·0	308·316	Hemmings Bros., Murray's Bridge
Favourite 2nd of Homelea ..	Jnr. (2 yrs.)	7,362·5	285·874	J. Savage, Humphrey
Duchess 11th of Oakvilla ..	Jnr. (2 yrs.)	7,266·432	282·141	W. Marquardt, Wondai
Countess of Rockleigh	Jnr. (2 yrs.)	6,762·816	240·751	T. Strain, Wondai
JERSEY.				
Brooklands Choice Lady	Jnr. (4 yrs.)	6,045·25	324·625	W. S. Conochie, Sherwood
Greenstock Pussy	Snr. (2 yrs.)	7,244·375	389·824	J. B. Keys, Gowrie Little Plain
Greenstock Gentle Lady ..	Snr. (2 yrs.)	6,501·5	275·867	J. B. Keys, Gowrie Little Plain
Wyreene Crescent	Jnr. (2 yrs.)	7,202·625	402·951	J. B. Keys, Gowrie Little Plain
Burrawong Tranquil	Jnr. (2 yrs.)	5,984·7	311·889	R. J. Bott, Yandina
Trinity Favourite	Jnr. (2 yrs.)	5,527·75	289·709	Sinnamon and Sons, Moggill
Burrawong Rosebud	Jnr. (2 yrs.)	5,005·4	266·006	R. J. Bott, Yandina
Glenview Rozel	Jnr. (2 yrs.)	4,057·35	264·554	F. P. Fowler and Sons, Coalstoun Lakes
Burrawong Velvet	Jnr. (2 yrs.)	4,383·85	259·969	R. J. Bott, Yandina
Glenview Lily	Jnr. (2 yrs.)	4,492·25	254·268	F. P. Fowler and Sons, Coalstoun Lakes
Burrawong Gentle	Jnr. (2 yrs.)	4,747·7	249·359	R. J. Bott, Yandina
FRIESIAN.				
St. Athan Angelina	Mature ..	13,303·25	459·16	W. Newman, Wyreema
St. Athan Wildflower	Mature ..	13,247·0	399·414	W. Newman, Wyreema
St. Athan Dulcimer	Snr. (4 yrs.)	9,340·25	372·015	W. Newman, Wyreema
St. Athan Belle VI.	Jnr. (2 yrs.)	9,835·0	338·056	W. Newman, Wyreema
St. Athan Belle Queen IV. ..	Jnr. (2 yrs.)	9,152·85	302·112	W. Newman, Wyreema
St. Athan Queen Segis IV. ..	Jnr. (2 yrs.)	9,137·2	278·87	W. Newman, Wyreema

ABSORBED FLAVOURS IN CREAM.

Butter-fat has the property of readily absorbing the odour of anything placed in close proximity to it. Milk and cream should therefore never be stored near fruit, kerosene, or any other strong-smelling material.

Common absorbed flavours met with in cream are those due to the absorption of exhaust fumes from oil engines, the odour of oil on the floor or separator block, or smoke from bush or other fires, and to the use of chemicals and disinfectants in the washing-up water. To prevent the firstmentioned, the exhaust should be extended from the engine so as to blow clear of the building. If possible, to minimise the risk of contamination, the engine should be placed in a different room from the separator, the driving belt being put through the wall. In the other cases the remedies are obvious.

TO OBTAIN MAXIMUM MILK PRODUCTION.

Every dairy cow inherits a fairly definite maximum capacity as a producer. The only accurate way to determine this is under the most favourable conditions as regards feeding and management. Many high producers were never discovered because they were never given a chance to show their ability. There are many points to be considered in obtaining maximum production, and success depends mainly on the cow, but the feeder and milkers are important factors.

CLIMATOLOGICAL TABLE—FEBRUARY, 1932.

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	29·82	88	75	97	17	71	18	538	10
Herberton	..	84	64	92	16, 17	55	4	311	10
Rockhampton	29·85	93	73	101	15	69	23	133	5
Brisbane	29·90	88	70	94	15	63	25	70	7
Darling Downs.									
Dalby	29·87	94	66	102	2	59	25	60	4
Stanthorpe	..	86	58	98	21	49	15, 17	105	6
Toowoomba	..	86	62	96	2, 3	56	15,17,18	129	4
Mid-interior.									
Georgetown	29·80	94	73	99	4	67	15	516	11
Longreach	29·78	101	73	109	3, 4	66	8	177	5
Mitchell	29·83	96	67	105	1, 2, 4	54	24	45	3
Western.									
Burketown	29·80	96	78	105	17	72	8	23	2
Boulia	29·80	101	73	111	3	54	8	17	1
Thargomindah	29·82	94	71	113	5	57	8	143	3

RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table showing the Average Rainfall for the Month of February, in the Agricultural Districts, together with Total Rainfall during February, 1932, and 1931 for Comparison.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of Years' Records.	Feb., 1932.	Feb., 1931.		Feb.	No. of Years' Records.	Feb., 1932.	Feb., 1931.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	10·20	31	6·21	4·87	Nambour	9·86	36	5·25	23·08
Cairns	15·47	50	3·68	14·60	Nanango	4·21	50	1·25	6·92
Cardwell	17·02	60	1·51	11·77	Rockhampton ..	7·93	45	1·33	8·89
Cooktown	13·51	56	5·63	9·12	Woodford	8·74	45	2·15	24·12
Herberton	7·63	45	3·11	3·69					
Ingham	16·28	40	3·50	5·49					
Innisfail	22·33	51	4·36	15·98					
Mossman Mill ..	17·63	19	5·12	4·70	*Darling Downs.*				
Townsville	11·27	61	2·19	3·50					
					Dalby	2·90	62	0·60	6·15
					Emu Vale	2·59	36	2·40	2·36
Central Coast.					Jimbour	2·69	44	0·35	4·93
					Miles	2·78	47	0·26	3·11
Ayr	9·02	45	2·80	5·18	Stanthorpe	3·28	59	1·05	3·32
Bowen	8·76	61	1·11	4·23	Toowoomba ..	4·58	60	1·29	8·79
Charters Towers ..	4·44	50	0·15	2·23	Warwick	3·13	67	0·92	2·78
Mackay	11·39	61	2·93	6·48					
Proserpine	12·18	29	3·90	6·26					
St. Lawrence	7·94	61	4·28	4·77	*Maranoa.*				
					Roma	3·02	58	0·11	2·36
South Coast.									
Biggenden	4·47	33	1·91	8·85					
Bundaberg	6·55	49	0·61	23·77	*State Farms, &c.*				
Brisbane	6·34	80	1·70	19·09					
Caboolture	7·97	45	1·50	34·24	Bungeworgorai ..	2·34	18	0·12	1·36
Childers	6·76	37	0·96	14·42	Gatton College ..	3·54	33	1·11	6·64
Crohamhurst ..	13·42	39	3·33	32·17	Gindie	2·86	33	0·50	0·10
Esk	5·62	45	2·49	13·32	Hermitage	2·58	26	0·80	2·22
Gayndah	4·31	61	0·52	4·68	Kairi	9·67	18	..	5·53
Gympie ..	6·77	62	3·27	14·61	Mackay Sugar Experiment Station ..	10·33	35	2·00	5·32
Kilkivan	5·01	53	1·15	5·83					
Maryborough .	6·70	60	1·35	23·56					

GEORGE G. BOND, Divisional Meteorologist.

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., and the Assistant Botanist, Mr. W. D. Francis:—

Parkinsonia Tree.

J.N. (Wallumbilla)—

The specimen is from the Parkinsonia tree (*Parkinsonia aculeata*). This tree is a native of the West Indies and South America. It was first introduced as a hedge plant, but has strayed from cultivation in the western parts of Queensland. We have never heard of poisonous properties being attributed to it. At the request of the Board of Agriculture in Hawaii, it has been destroyed in those islands as an undesirable plant.

Grasses Identified.

H.S.B. (Mundubbera)—

1. *Sporobolus elongatus.*—Rat's Tail Grass. The young leaves of this species are fairly good food for stock.
2. *Astrebla lappacea.*—Wheat-eared Mitchell Grass. This is a good fodder grass, but has not such a high reputation as Mitchell Grass itself (*Astrebla pectinata*).
3. *Aristida* sp.—A three-awned Spear Grass. This specimen will have to be sent to Mr. Hubbard, as he has most of our material of this genus at Kew.
4. *Themeda australis.*—Kangaroo Grass. A fairly good fodder when young.
5. *Themeda avenacea.*—Giant Kangaroo Grass. The leaves, when young, are good fodder.

It is noted with interest that the three-awned Spear Grass is looked upon as a good species for stock.

Digitaria eriantha.

R.J.B. (Mundubbera)—

The grass *Digitaria eriantha* is being experimented with in Queensland at Roma. It is thriving at that place, where it was planted under natural conditions. It competes well with weeds and other grasses, but does not seed freely.

Horehound Plant.

W.H. (Oakey)—

The Horehound plant is *Marrubium vulgare*, a native of Europe and western Asia, now a naturalised weed in most temperate countries. It is not known to possess any harmful properties, but is a stimulant and tonic and is also slightly laxative. It contains a bitter principle, Marrubin. The herb is used as a remedy for colds and pulmonary complaints generally, and the leaves and tops are utilised to a considerable extent in the making up of cough mixtures. There is a small but steady demand for the herb, and its collection in Australia is a minor industry. Regarding its eradication, the Agricultural Chemist has been asked to send you particulars of a suitable spray. It is presumed that you require one that is non-poisonous to stock.

Rare Blue Grass.

H.B. (Condamine)—

The grass is the Rare Blue Grass, *Amphilophis intermedia*, which is not such a good grass as the common Blue Grass, *Dichanthium sericeum*. As a rule it prefers moist situations, and grows vigorously when established. It has been recommended for planting on the banks of rivers and watercourses, where it tends to protect the banks from erosion. As the grass is very common in parts of Queensland, its vernacular name, "Rare Blue Grass," does not appear to be very appropriate.

Galega officinalis.

M.H.S. (Toowoomba)—

Galega officinalis is a common leguminous plant of Southern Europe and Western Asia. It is usually grown from seed, and is listed by Vilmorin-Andrieux and Co. in their 1930-1931 catalogue at 1s. 2d. per lb. Since the publication of the catalogue the exchange rate has undergone considerable alteration, and a pound of the seed would cost considerably more at the present time than the price quoted. It is quite likely that *Galega officinalis* would grown on the Darling Downs. It is also quite likely that it may increase milk production. However, Pammel, in his work on poisonous plants, mentions that sheep have been poisoned as a result of eating this plant.

Johnson Grass.

P.R. (Toowoomba)—

Johnson Grass is a stout, erect perennial, characterised particularly by its underground jointed stems, known as rootstocks, but commonly called roots. At the joints it has a ring of hairs, and occasionally the leaves have patches with a reddish discolouration. The seed heads are large. Send down a specimen for identification. Pull up two or three stems of the grass, showing the roots and the seed heads, and address the parcel to the Government Botanist, Botanic Gardens, Brisbane.

Trees Suitable for the Mackay District.

I.W. (Mackay)—

Eucalyptus miniata is fairly common in parts of North Queensland, especially along the railway from Alma-den to Forsayth. It also occurs on the Gilbert River. The nearest from which we know it is Torrens Creek. It has a wide range is North Australia, stretching from the Northern Territory to the north-west of Western Australia. So far as we have observed, it is a small tree, bearing clusters of large, very bright orange-red flowers. It is a distinctly showy plant, and should do quite well at Mackay. You would have to arrange to get a supply of seeds locally, as it is not stocked, so far as we know, by nurserymen. Some years ago Messrs. Hazelwood Brothers, of Epping (N.S.W.), raised a stock of plants, but we do not think they would have them in the quantities required by you.

Eucalyptus phoenicea is a much rarer tree, found in only a few places in the Northern Territory. We have not seen the tree in the field, but the flowers are said to be smaller and less brilliant than those of *E. miniata.*

Calophyllum (*Calophyllum inophyllum*).—This tree is one of the most beautiful of tropical trees. It has been extensively used as a shade tree about Townsville with marked success. The Curator of the Botanical Gardens there would perhaps be able to supply seed or young trees.

Terminalia trees are suitable for avenue planting in tropical places. *Terminalia catappa*, the Fiji Almond, has been extensively planted in North Queensland, and there are trees about Rockhampton and Townsville. *Terminali Muelleri* and *T. melanocarpa* are native species; so far as we remember, both are planted about the streets of Townsville. The Curator of the Botanic Gardens there, Mr. Anderson, could probably supply you with plenty of seed or young trees if so desired.

The genus *Flindersia* contains some fine species. About Brisbane the North Queensland Ash, *Flindersia pubescens,* has been planted with success, but unfortunately does not set seeds here so far as we know. You would have to arrange for a supply of seed from North Queensland. The Forestry Department would probably be your best source of supply.

Other suitable trees would be the Leichhardt Tree (*Sarcocephalus cordatus*), Buckinghamia (*Buckinghamia celsissima*), *Lagunaria Patersoni, Pongamia glabra,* Umbrella Tree (*Brassaia actinophylla*), Wheel of Fire (*Stenocarpus sinuatus*), Flame Tree (*Sterculia acerifolia*).

If you have no objection to Figs, of course some of these make excellent shade trees.

The native Pines, particularly the Hoop Pine, Bunya Pine, and Kauri Pine, all make suitable ornamental trees. Of course, with the Bunya Pine there is the danger of falling cones. There have been a few accidents in Brisbane with these.

The Home and the Garden.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staff 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.

WHAT BECOMES OF THE BEAUTIFUL BABIES.

HERBERT SPENCER was a well-known philosopher of the last century, and is not yet forgotten. No one has disputed his wide scientific knowledge, though many have dissented from his philosophy. The following passage from one of his writings is dated half a century before George V. became King, but it is not without truth at the present day:—

"To be a nation of 'good animals' is the first condition of national prosperity. Not only is it that the event of a war often turns on the strength and hardiness of soldiers, but it is that the contests of commerce are in part determined by the bodily endurance of producers. Thus far we have found no reason to fear trials of strength with other races in either of these fields. But signs are not wanting that our powers will presently be taxed to the uttermost.

"Going along our own streets to-day what is it that strikes us, if we trouble to observe and think whether we are doing justice to our race? As the crowd passes up and down the street before us, how many youths or adults of either sex could we pick out who would compare favourably, as samples of human perfection, with the beautiful babies who are so comparatively common? The vast majority are out of the running altogether.

"This failure to develop and grow up according to early promise causes no surprise or protest—we have got out of the way of expecting the average man or woman to have shapely feet, good limbs, broad hips, deep chest, square shoulders, good muscles, graceful, easy carriage, and aspect of radiant health and perfection which would be the prevalent type if man took as much trouble about the rearing and care of his own species as he does about the rearing of cattle and horses. Deformed and crippled feet, spindly calves, indifferent bodies, shallow chests, round shoulders, and slouching gait characterise the majority.

"Even among the elect few, where can we find the individual who, however well he may look, would be fairly entitled to 75 per cent. of marks as an ideal specimen of manhood or womanhood, if the five following points were given the place they ought to have in standards of reasonably attainable bodily perfection:—

1. Well-developed jaws and sound, good teeth.
2. Fully developed nose and throat, free from all restrictions or obstructions.
3. Fully developed chest with ample breathing capacity.
4. Sound digestive organs and freedom from indigestion.
5. Shapely, well-developed calves and feet, free from distortions and deformities.

Daily Breaking of Life's Laws.

"Our shortcomings are obvious even to the casual observer, yet for the most part people regard the present state of matters as normal. There is no general protest against human unfitness. So long as people can manage to struggle through their daily work with the help of occasional patchings-up by the doctor and the dentist, it does not occur to them that any higher standard than this is to be expected. Yet it is quite safe to say that, with very few exceptions indeed, the great majority of those who drag along with indifferent health and who hardly ever feel perfectly well, strong, and fit, could have grown up excellent specimens of humanity had they been properly and sensibly reared. For the most part men and women do not suffer from inevitable ill-health or unfitness, but from the results of a few easily avoidable daily transgressions of the laws of life. The main cause of modern bodily unfitness and inefficiency lies with our women, and is due, not to indifference on their part, but to lack of necessary knowledge and consequent failure to put in practice the laws of healthy living as regards themselves and their offspring."

Farm Notes for May.

Field.—May is usually a busy month with the farmer—more particularly the wheatgrower, with whom the final preparation of his land prior to sowing is the one important operation. Late-maturing varieties should be in the ground by the middle of the month at the latest.

Clover land, intended primarily for feeding off, should be sown not later than the end of April.

The necessity of pickling all wheat intended for sowing purposes is again emphasised; and for general purposes, combined with economy in cost of material, the bluestone and lime solution holds its own. To those who desire an easier but somewhat more costly method of treatment, carbonate of copper at the rate of 1 oz. to the bushel and used in a dry form is suggested.

Potatoes, which in many districts are still somewhat backward, should have by this time received their final cultivation and hilling-up.

The sowing of prairie grass on scrub areas may be continued, but should be finished this month. This is an excellent winter grass, and does well in many parts of Southern Queensland.

Root crops, sowings of which were made during April, should now receive special attention in the matter of thinning out and keeping the soil surface well tilled to prevent undue evaporation of moisture.

Every effort should be made to secure sufficient supplies of fodder for stock during the winter, conserved either in the form of silage or hay.

Cotton crops are now fast approaching the final stages of harvesting. All consignments to the ginnery should be legibly branded with the owner's initials. In this matter the consignor is usually most careless, causing much delay and trouble in identifying parcels, which are frequently received minus the address labels.

Orchard Notes for May.

THE COASTAL DISTRICTS.

IN these notes for the past two months the attention of citrus-growers has been called to the extreme importance of their taking every possible care in gathering, handling, packing, and marketing, as the heavy losses that frequently occur in southern shipments can only be prevented by so treating the fruit that it is not bruised or otherwise injured. It has been pointed out that no citrus fruit in which the skin is perfect and free from injury of any kind can become speckled or blue-mouldy, as the fungus causing the trouble cannot obtain an entry into any fruit in which the skin is intact. Growers are, therefore, again warned of the risk they run by sending blemished fruit South, and are urged to exercise the greatest care in the handling of their fruit. No sounder advice has been given in these notes than that dealing with the gathering, handling, grading, packing, and marketing, not only of citrus, but of all other classes of fruit.

It is equally as important to know how to dispose of fruit to the best advantage as it is to know how to grow it. To say the least, it is very bad business to go to the expense of planting and caring for an orchard until it becomes productive and then neglect to take the necessary care in the marketing of the resultant crop. Main crop lemons should be cut and cured now, instead of being allowed to remain on the tree to develop thick skins and coarseness. As soon as the fruit shows the first signs of colour or is large enough to cure down to about from 2¾ to 2½ in. in diameter, it should be picked, care being taken to handle it very gently, as the secret of successfully curing and keeping this fruit is to see that the skin is not injured in the slightest, as even very slight injuries induce decay or specking. All citrus fruits must be sweated for at least seven days before being sent to the Southern States, as this permits of the majority of specky or fly-infested fruits being rejected. Citrus trees may be planted during this month, provided the land has been properly prepared and is in a fit state to receive them; if not, it is better to delay the planting till the land is right.

In planting, always see that the ground immediately below the base of the tree is well broken up, so that the main roots can penetrate deeply into the soil and not run on the surface. If this is done and the trees are planted so that the roots are given a downward tendency, and all roots tending to grow on or near the surface are

removed, the tree will have a much better hold of the soil and, owing to the absence of purely surface roots, the land can be kept well and deeply cultivated, and be thus able to retain an adequate supply of moisture in dry periods. Do not forget to prune well back when planting, or to cut away all broken roots.

All orchards, pineapple and banana plantations should be kept clean and free from all weed growth, and the soil should be well worked so as to retain moisture.

Custard apples will be coming forward in quantity, and the greatest care should be taken to see that they are properly graded and packed for the Southern markets, only one layer of one sized fruit being packed in the special cases provided for this fruit—cases which permit of the packing of fruit ranging from 4 to 6 in. diameter in a single layer.

Slowly acting manures—such as meatworks manure—may be applied to orchards and vineyards during the month; and lime can be applied where necessary. Land intended for planting with pineapples or bananas during the coming spring can be got ready now, as, in the case of pineapples, it is a good plan to allow the land to lie fallow and sweeten for some time before planting; and, in the case of bananas, scrub fallen now gets a good chance of drying thoroughly before it is fired in spring, a good burn being thus secured.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

CLEAN up all orchards and vineyards, destroy all weeds and rubbish likely to harbour fruit pests of any kind, and keep the surface of the soil well stirred, so as to give birds and predaceous insects every chance to destroy any fruit fly pupæ which may be harbouring in the soil. If this is done, many pests that would otherwise find shelter and thus be able to live through the winter will be exposed to both natural enemies and cold.

Further, it is a good plan to clean up the land before pruning takes place as, if delayed till the pruning has been finished, the land is apt to dry out.

Pruning can be started on such varieties as have shed their leaves towards the end of the month, as it is a good plan to get this work through as early in the season as possible, instead of putting it off until spring. Early-pruned trees develop their buds better than those pruned late in the season. These remarks refer to trees—*not vines,* as the later vines are pruned in the season the better in the Granite Belt district, as late-pruned vines stand a better chance to escape injury by late spring frosts.

All worthless, badly diseased, or worn-out trees that are no longer profitable, and which are not worth working over, should be taken out now and burnt, as they are only a menace and a harbour for pests.

Land intended for planting should be got ready as soon as possible, as, if ploughed up roughly and allowed to remain exposed to the winter frosts, it will become sweetened and the trees planted in it will come away much better than if set out in raw land. In any case the land must be properly prepared, for once the trees are planted it is a difficult matter to get the whole of the land as well worked as is possible prior to planting.

Slowly acting manure—such as ground island phosphates or basic phosphates—may be applied to orchards and vineyards. They are not easily washed out of the soil, and will become slowly available and thus ready for use of the trees or vines during their spring growth. Lime may also be applied where necessary.

This is a good time to attend to any drains—surface, cut-off, or underground. The two former should be cleaned out, and in the case of the latter all outlets should be examined to see that they are quite clear and that there is a good getaway for the drainage water. New drains may also be put in where required.

In the warmer parts citrus fruits will be ready for marketing, and lemons ready for cutting and curing. The same advice that has been given with respect to coast-grown fruit applies equally to that grown inland; and growers will find that careful handling of the fruit will pay them well. Lemons grown inland are, as a rule, of superior quality to those grown on the coast, but are apt to become too large if left too long on the trees, so it is advisable to cut and cure them as soon as they are ready. If this is done and they are properly handled, they may be kept for months, and will be equal to any that are imported.

If the weather is very dry, citrus trees may require an irrigation, but, unless the trees are showing signs of distress, it is better to depend on the cultivation of the soil to retail the necessary moisture, as the application of water now is apt to cause the fruit to become soft and puffy, so that it will not keep or carry well.

Land intended for new orchards should be got ready at once, as it is advisable to plant fairly early in the season in order that the trees may become established before the weather again becomes hot and dry. If the ground is dry at the time of planting, set the trees in the usual manner and cover the roots with a little soil; then give them a good soaking; and, when the water has soaked into the soil, fill the hole with dry soil. This is much better than surface watering.

THE HONEY-BEE.

As proof that honey-bees have had longer associations with man than any other insect, Mr. H. Hacker, of the Entomological Branch of the Department of Agriculture and Stock, in a recent radio address through Station 4QG, stated that they figure on the Egyptian monuments as far back as 3,500 B.C., and we even know the price of strained honey under some of the Pharaohs. It was very cheap—only about 2½d. a quart.

The first bees were brought to Australia by Samuel Marsden in the ship "Ann," and safely landed on 27th February, 1810.

Three other species of honey-bees are known, but owing to their nomadic habits it has not been found possible to establish them in our apiaries.

The honey-bees are not domesticated in the same sense as farm animals; they are simply wild insects induced to dwell near our homes by being provided with conditions most suited to their comfort.

Prosperous colonies may occasionally contain as many as 80,000 inhabitants. There is but one queen to each colony, and she may survive several seasons. She is more elongate than the worker and possesses a more pointed abdomen. When a swarm is given off from the hive, it is usually this old queen and not a newborn one that departs. The queen caste is produced from an ordinary fertilized egg, but the grub that hatches from it is fed from day to day with a special kind of food (royal jelly). The drones are robust, of greater size than the workers, and possess large eyes. They, of course, do not sting. They are produced in some numbers seasonally, and finally cast out of the hive by the workers.

Bees have developed a number of adaptations for gathering and transporting nectar and pollen. Their mouthparts are peculiarly modified for sucking up the nectar, which is carried in a large honey stomach, where it undergoes a chemical change. On arrival at the hive it is regurgitated into the comb cells and allowed to ripen.

The whole surface of the bee's body is covered with dense, plumose hairs, which easily hold the pollen grains until the bee sweeps them together, moistens them with a little honey, and attaches them to special pollen baskets on the hind legs.

Bees possess a highly developed sense of smell, and this is a dominant factor in their communal life. There are several distinct odours present in the hive, such as the individual odour, the brood odour, and the wax and honey odours. The hive odour is composed of a mixture of these, and every member of a colony, besides its individual odour, carries the hive odour, which forms the basis of mutual recognition between bees belonging to the same colony.

QUEENSLAND SHOW DATES, 1932.

Goombungee: 2nd April.
Pittsworth: 6th and 7th April.
Chinchilla: 5th to 7th April.
Miles: 13th and 14th April.
Clifton: 13th and 14th April.
Toowoomba: 18th to 21st April.
Dalby: 27th and 28th April.
Charleville: 4th and 5th May.
Boonah: 4th and 5th May.
Mitchell: 11th and 12th May.
Roma: 16th and 17th May.
Ipswich: 17th to 20th May.
Gin Gin: 2nd to 4th June.
Marburg: 2nd and 3rd June.
Bundaberg: 9th to 11th June.
Rockhampton: 21st to 25th June.
Mackay: 28th to 30th June.
Rosewood: 15th and 16th July.
Royal National: 8th to 13th August.
Crow's Nest: 24th and 25th August.
Wynnum: 26th and 27th August.
Beenleigh: 16th and 17th September.
Rocklea: 24th September.
Nerang: 14th October.
Cleveland: 8th and 9th July.

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.

	April, 1932.		May, 1932.		MOONRISE. Apr., 1932.	MOONRISE. May, 1932.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	6.5	5.47	6.22	5.16	1.25	2.9
2	6.6	5.46	6.22	5.15	2.25	3.1
3	6.6	5.45	6.23	5.14	3.19	3.53
4	6.7	5.44	6.23	5.13	4.13	4.45
5	6.7	5.42	6.24	5.13	5.5	5 38
6	6.8	5.41	6.24	5 12	5.57	6.34
7	6.8	5.40	6.25	5.11	6.48	7.29
8	6 9	5.39	6.25	5.11	7.42	8.25
9	6 9	5.38	6.26	5.10	8.40	9.19
10	6.10	5.37	6.26	5.9	9.34	10.13
11	6.10	5.35	6.27	5.9	10.29	11.4
12	6.11	5.34	6.27	5 8	11.24	11.48
					p.m.	p.m.
13	6.12	5.33	6.28	5 8	12.17	12.29
14	6.13	5.32	6.29	5 7	1.8	1.5
15	6.13	5.31	6.29	5.7	1.54	1 38
16	6.14	5.30	6 30	5.6	2.51	2.11
17	6.14	5.29	6.30	5.6	3.8	2.45
18	6.15	5.28	6.31	5 6	3.43	3.22
19	6.15	5.27	6.31	5.5	4.17	4.1
20	6.15	5.26	6.32	5 5	4.53	4.53
21	6.16	5.25	6 33	5.4	5.32	5.52
22	6.16	5.24	6.33	5.4	6.13	6.55
23	6.17	5.23	6.34	5.3	7.11	7.59
24	6.17	5.23	6.35	5.3	8.11	9 4
25	6.18	5.22	6.35	5.3	9.13	10.7
26	6.18	5.21	6.36	5.2	10.16	11.6
27	6 19	5.20	6.37	5.2	11.16	...
						a.m.
28	6.19	5.19	6.38	5.2	...	12.3
					a.m.	
29	6 20	5.19	6.38	5.1	12.17	12 56
30	6.21	5.18	6.39	5.1	1.15	1.49
31	...	...	6.40	5.5	...	2.39

Phases of the Moon, Occultations, &c.

6 April	●	New Moon	11 21 a m.
14 ,,	☾	First Quarter	1 15 p.m.
21 ,,	○	Full Moon	7 27 a.m.
28 ,,	☽	Last Quarter	1 14 a.m.

Apogee, 7th April, at 3.30 p.m.
Perigee, 21st April, at 6.12 a.m.

Mercury will be very nearly on a line between the Earth and Sun on the 10th; but being 2¼ degrees further north no transit across the Sun's face will occur.

Venus and the crescent Moon will be within 2 degrees of each other at 4 p.m. on the 10th in the north-north-west. Although somewhat too near the Sun an interesting daylight spectacle, with or without binoculars, will be afforded for keen observers. After sunset when the Moon and the planet come clearly into view, 18 degrees to the northward of the place of sunset, they will be seen to be less that 4 degrees apart. On the 19th, Venus will be still further away from the Sun as it will then reach its greatest elongation, 46 degrees east of it. From 28th March till 7th May Venus will be traversing the northern portion of the constellation Taurus.

On the 15th at 10 p.m., Jupiter and the Moon, half full, will afford an interesting sight above the western horizon, 8 degrees further south than the one above mentioned. Jupiter will retain an almost stationary position among the stars of Cancer all through April.

The conjunction of Mercury and Mars on the 21st at 6 p.m. will be too near the Sun to be generally noticeable.

When the Moon rises after 11 p.m. on the 27th it will be seen that Saturn will be rather more than 2 degrees to the west of it, an occultation having occurred about 4 hours earlier.

On the 30th, at 5 a.m., Mars and Uranus will be in conjunction in the constellation Pisces. So close together will they be in a telescope or binoculars that the nearness will seem remarkable. The real distance between the two will be about 1,600 million miles.

At Warwick.—Mercury sets at 6.26 p.m., 29 minutes after the Sun; on the 15th it will rise at 5.38 a.m., 35 minutes before the Sun.

Venus sets at 8 p.m. on the 1st, and at 7.58 p.m. on the 15th.

Mars rises at 5.6 a.m. on the 1st, and at 5.1 a.m. on the 15th.

Jupiter rises at 2.55 p.m. and sets at 1.39 a.m. on the 1st; on the 15th it rises at 2.1. p.m. and sets at 12.43 a.m.

Saturn rises at 12.52 a.m. and sets at 2.22 p.m. on the 1st; on the 15th it rises at 12.3 a.m. and sets at 1.29 p.m.

The Southern Cross will be at its furthest eastern position IX. at 6 p.m. on the 1st and upright, at XII. at midnight. These positions will be reached 2 hours earlier at the end of the month.

6 May	●	New Moon	4 12 a.m.
14 ,,	☾	First Quarter	12 2 a.m.
20 ,,	○	Full Moon	3 8 p.m.
27 ,,	☽	Last Quarter	2 55 p.m.

Apogee, 4th May, 5.48 p.m.
Perigee, 19th May, 4.0 p.m.

For places west of Warwick and nearly in the same latitude, 28 degrees 23 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.