QUEENSLAND AGRICULTURAL JOURNAL

VOL. VI. SEPTEMBER, 1916. PART 3.

Agriculture.

REPORT ON A VISIT TO MR. J. H. EVANS'S FARM, ST. CLAIR, WALLUMBILLA.

BY R. E. SOUTTER, Manager, State Farm, Bungeworgorai, Roma.

Mr. Evans's property is situated about 16 miles north-west from Wallumbilla, on the Blythdale Creek. It comprises 1,280 acres, the major portion of which is ridgy country, good (sweet) grazing country, and the balance low creek country. The property was selected five years ago; it is now subdivided into a number of paddocks, a nice residence has been erected, also the necessary outbuildings and yards for dairying, &c. A large area has been cleared on the flat lands adjacent to the creek, the whole of which at the time of my visit was under crop, 7 acres being devoted to vegetables, the balance winter cereals.

Mr. Evans has grown vegetables successfully every year since he has been there, 1915 included. This season he expects to clear £200 from

these crops alone. He has approximately 30,000 cabbages, the saleable ones of which will bring in an average price of 5d. apiece. They are well grown, many being over 10 lb. in weight, without being coarse. Cauliflowers, of which there are about 5,000, look promising, and an average return of 6d. per head is expected for these. Turnips grow exceedingly well, white, as well as Swede reaching 20 lb. in weight, being solid and devoid of fibrous matter, and of excellent flavour when cooked.

Other crops growing to perfection were beetroot, mangels, carrots, eschalots, &c.

Potatoes have also done well this season, half an acre of blueskins yielding a return of 15 bags of commercial potatoes and 5 bags of seed.

The soil on the area devoted to the foregoing consists of a light, sandy loam, about 5 ft. in depth, overlying white sand—an alluvial formation.

The light nature of the country will no doubt render the application of fertilisers in the not very distant future necessary under consistent cropping, but in the endeavour to postpone this as long as possible green manuring and rotation cropping are being practised.

In the production of the crops the following methods are adopted:—

Immediately a crop is removed the land is ploughed and harrowed or cultivated as required in order to conserve the moisture. At seeding time, usually about February or March, the ground is ploughed with a double furrow plough, which has affixed to it a piece of wood so shaped as to make the drills. The seeds (cabbage and cauliflower) are sown in these by hand, being covered by dragging from the middle a long stick with a sufficient length of chain attached to form a big loop. No after cultivation is given, only thinning where necessary. The whole cost incurred in producing, including seed, was £15.

Mr. Evans states that he does not consider that the growing of cabbages and cauliflowers would be a paying proposition if they had to be transplanted.

There is a fairly large area of similar land in the district which, with the same methods, can be made as fruitful, as others who are growing similar crops can testify.

At the present time a good deal of this class of produce is being despatched from Wallumbilla west and east, and this business is increasing every season.

RURAL HIGHWAYS IN CANADA.

From the "Agricultural Gazette" of Canada.

No peaceful movement has made more rapid strides in Canada than the improvement of rural highways. Whereas, up to a dozen years ago, a comparatively insignificant amount was expended on country roads, other than the main or trunk roads, there has in recent years been spent in construction and maintenance about $50,000,000. While the farm had plenty of help, slow travel and small loads did not matter, but when every hour and every dollar must be conserved to meet the requirements

of the times, a smooth, hard road at all seasons of the year is demanded by the rural dweller as by the urban citizen accustomed to motor travel. The motor influence has been characterised the nurse, if not the parent, of the good roads movement.

Nor is the extensive use of the automobile confined to the city man. The driving horse and covered buggy and the market conveyance on the farm are being substituted by the motor-car and truck, with the result that not only good but best roads are demanded alike by all classes of the community and in every province in Canada. But it is to the farmer that the matter of the roadway is pre-eminently important. To him it means independence of the railways in some measure, early arrival at the market, ability to transport his produce at all seasons, and freedom from vehicular trouble. With improved roads he will be able to cover twice the distance with half the effort he now exercises. They will also, by affording better facilities for reaching schools, be a practical aid to education.

Following the lead of individual good roads crusaders, associations have been formed in every province. These have merited and secured Government recognition, and have greatly assisted the respective Governments in formulating and carrying out the policies that are now working a revolution in rural highways. And since each province has worked out its own organisation according to local needs, each is dealing with the matter in its own way. In order that these several policies may be compared, a responsible official (the road-master) in each of several provinces is appointed to see that the provisions of the law are complied with.

In the June issue of the above "Gazette," statements prepared by the chief road officials of the various provinces of the Dominions are published, outlining the policies pursued and setting forth the legislation under which the roads are maintained, and the organisation for carrying on the work.

From amongst these statements we take the following:—

PRINCE EDWARD ISLAND.

"By the Road Act of 1812 each of the 470 school districts in the province was constituted a road district with a average road mileage of 7·6.

The roads in each district are looked after by a road-master appointed by the Lieutenant-Governor in Council. On or about the 15th of March, each road-master makes out a list of all persons within the district liable to pay road tax, setting forth the amount payable by each, and about the 1st of April serves each person with a notice of his liability, which person can, within a week, elect to commute the payment of same by rendering personal service, or service by a substitute, or to pay cash.

The tax consists of $1·50 levied on each person between the ages of 21 and 65, also 40c. for each horse owned over three years of age, $1 for each dog, and $3 for each bitch.

For labour in commutation of tax a man is allowed $1·50 per day and for a horse 75c.

Those wishing to perform statute labour are summoned by the road-master on twenty-four hours' notice to meet him and to work upon the highways and bridges at such different days, and in such groups as he may think proper, subject, however. to the approval of the Commissioner of Public Works.

A full return of all taxes levied, received, and expended is made by the road-master to the Commissioner of Public Works, and also a report on the condition and requirements of the roads and bridges within his district, and an estimate of cost of repairs and improvements, and of the taxes for the ensuing year.

Emergency repairs needed in any district are reported at once to the Commissioner of Public Works by the road-master. If considered necessary, the place is visited by the engineer, who advises and specifies as to work requiring to be done, which work is usually sold by public auction to the lowest bidder, but may be done by day labour. The building of bridges and new roads, and the carrying on of larger improvements on the roads, is done directly by the Commissioner of Public Works, on the recommendation of the provincial engineer, the cost being a charge on the provincial revenue. The road tax is only about sufficient for road maintenance such as can be accomplished by road machines and road drags. These machines are supplied by the department to the road-masters, who furnish the men and horses necessary for their working.

The policy of the Government has been to rebuild bridges with permanent structures of steel or concrete, and to replace the small wooden culverts with concrete pipe. An approximate estimate of the proportionate number of bridges and culverts thus permanently built would be about 10 per cent.

In the way of improved roads, attention is being given to the building up and draining of low roads, to the improvement of grades on hills by cutting down or opening roads around, and all with a view to afford a foundation for the harder wearing surface which will eventually come. The expenditure for the year 1915 was $36,000 from road tax, and from provincial revenue on roads $33,500, and on bridges $53,000.

NOVA SCOTIA.

The principle at the basis of all the early road legislation in this province was that the laying out and maintenance of the highways was a municipal affair. The roads were laid out under commissioners appointed by the county councils, and maintained by statute labour. Although the later Acts have placed the subject matter of roads to a large extent under the control of a provincial department, the idea of municipal maintenance by statute labour has not been entirely abandoned. Under the legislation at present in force (Acts 1907, Chapter 2) an official of the Department of Public Works and Mines, called the Road Commissioner, has general supervision over the building and maintenance of roads and bridges. He controls the expenditure of all road moneys appropriated by the Provincial Legislature. In each municipality, inspectors of roads and bridges are appointed by the Lieutenant-Governor in Council, on the recommen-

dation of the Road Commissioner. It is the duty of each of these municipal inspectors to report to the Commissioner as to the condition and requirements of the roads within his territory, and to make estimates of the cost of proposed or necessary improvements. Every inspector also divides the municipality under his charge into road districts, and appoints road-masters for each district. These road districts for the most part correspond with the polling divisions. It is the duty of every road-master to report to the inspector as to the requirements, and to direct and supervise the expenditure on the roads within his district.

In addition to such sums as may be appropriated by the Legislature for road expenditure, there is also legislation (Acts 1908, Chapter 4) under which a poll tax is payable by all residents of the municipality. It is also provided by such legislation that all property within the municipality shall be rated for the maintenance of the roads within the road section in which the owner of the property resides. The boundaries of the road sections within each municipality are fixed by the municipal council. The fund raised by these methods (that is, the poll tax and the municipal road tax) is administered by officials appointed by the municipal council, called surveyors of highways. One such surveyor is appointed for each road section, whose duty it is to collect the municipal road taxes and expend the same "in a judicious and economical manner," and to superintend the sectional work performed on the roads. Some unity in the administration of the road funds is sought by providing that the road-masters appointed by the provincial inspectors may be the same persons as are appointed surveyors by the municipal councils.

The tendency of later legislation has been towards bringing the expenditure on the roads under provincial administration. The Legislature in 1912 and 1913 provided a sum of $600,000 for smaller bridges and culverts to be built of permanent material; also, in 1913, provision was made that an allotment of $10,000 in each of the eighteen counties of the province should be expended for improvement on main through highways and important laterals, and also that the annual fees received for the registration of motor-cars should be expended in road improvement. There had been expended to the close of the year 1915 $154,000, and of the fees received for the registration of motor-cars $19,000.

The policy adopted by this province may be briefly stated to be, first, to build the larger bridges of permanent material, and as the population is largely around or near the shore it follows that the bridges are near the mouths of the rivers, and generally of considerable length and comparatively expensive.

Up to the end of the calendar year 1915, the sum of $3,400,000, in round numbers, had been spent upon the construction of 1,238 larger bridges, of which 760 are of steel and iron, resting on masonry or concrete substructures. The next step undertaken and now in progress was to construct the culverts and smaller bridges of permanent material upon the roads subject to the greatest travel, and to this end instrumental surveys were made and the structures located to the best advantage in respect to satisfactory side drainage. In connection with these structures, generally built by contract, some of the side ditching was

included. The good material of the side drainage is placed on the roadbed, shaped to proper form and surfaced where most required with gravel or broken stone. The expenditure for this class of work to the end of the calendar year was $503,000, and upwards of 2,000 miles had been provided with this class of structures. The next step will be the perfecting of the drainage—both as regards side ditching and the form of the roadbed—surfacing, and the abolition of narrow tires. No macadam roads are in contemplation. At present it is believed to be more economical to make good dirt roads, keep them in good repair, and eventually as travel increases and financial conditions warrant, to proceed with more perfect surfacing.

There is the equivalent of 46 in. of rainfall during the year, mostly in the early spring and late autumn. The frequent thaws and freshets during the winter months cause the destruction of the roadbed and structures, and owing to climatic conditions existing in the province the maintenance of roads is a matter requiring a large expenditure per mile, and constant care and attention.

QUEBEC ROAD IMPROVEMENT.

During the few years that the laws of 1911 and 1912 have been in operation the roads of the whole province of Quebec have been transformed.

Out of 45,000 miles of provincial roads, 20,000 miles are regularly and systematically maintained under the supervision of the Roads Department.

Since 1908, 557·15 miles of roads have been gravelled in the province. During the same lapse of time 1,205·65 miles have been macadamised.

Since 1908, about 12,000 culverts (under 8 ft. arch) in concrete, iron, steel, or stone, have taken the place of the same number of wooden bridges.

Since 1912, the road Edward VII., between Montreal and the boundary near Rouse's Point, about 39 miles, was built by the Government. In 1913, the construction of the Montreal-Quebec road, on the north shore of the St. Lawrence, about 150 miles in length, was begun by the Government. This road, which will altogether change the conditions of traffic in the district which it traverses, will be finished this summer. The Levis-Jackman road, about 93 miles in length, will also be completed this summer by the Government. In 1915, the Sherbrooke-Derby road, 33 miles long, was completed. The Edward VII. and Montreal-Quebec roads are built in macadam; in a few months from now the first will be covered with a coat of asphalt; the Levis-Jackman and Sherbrooke-Derby roads are in gravel with the exception of 6⅔ miles on the Sherbrooke-Derby, which are in tarira macadam. In addition to the four provincial roads above mentioned, a plan for the construction of a road connecting Three Rivers and Grand Mère is actually under consideration.

Since 1912, about 500 municipalities have asked to share in the advantages offered by the Government to macadamise or gravel their roads under the law of 1912.

The Roads Department owns 57 macadam apparatus, which are loaned to the municipalities according to the circumstances. The department also owns a number of other machines, such as rollers, tractors, road machines, cranes, scrapers, which are, at the present time, being used in the construction of the Levis-Jackman road.

In addition to the machines owned by the Government, the municipalities own 143 complete sets of implements.

Each year the Provincial Parliament passes a vote "Improvement of Rural Roads," out of which subventions are granted for the maintenance, the macadamising, or gravelling of roads. This vote is generally $250,000. Before the law of 1912 was passed, it has been as large as $350,000.

Since 1911, the Provincial Government has paid for the maintenance and improvement of earth roads and for the construction of macadam or gravel roads, the purchase of machinery and administration expenditure, a total of $14,584,681·12.

The road improvement system of the province of Quebec presents two characteristic features: 1. Full autonomy is left to the municipal councils, these being free to accept or refuse the advantages that are offered to them. The objection might be raised that roads might be improved in a certain number of districts only, but this objection has been eliminated by the construction of provincial roads.

2. It provides for the construction by the Government of large arteries between the new centres, the effect of which is to complete the improvements made by municipalities remote from each other, and to create, in addition to local roads, long-distance communication roads.

MANITOBA.

THE GOOD ROADS BOARD.

The Act is administered under the Department of Public Works, through a Good Roads Board, consisting of three members and of which the Highway Commissioner is chairman. The duties of the board are to carry out the provisions of the Act, investigate and determine upon the most suitable methods of road construction and maintenance best adapted to the various sections of the province, and to assist and co-operate with municipal representatives in formulating adequate systems of roads in their respective municipalities.

APPLICATION FOR ASSISTANCE BY MUNICIPALITY.

Applications from the municipal councils for assistance under the Act are directed to the Good Roads Board. The proposal of the council is investigated by the board, assisted by its engineers, and its recommendation thereon made through the Minister of Public Works to the Lieutenant-Governor in Council for approval, which approval, if obtained, is given by Order in Council, and the municipal council thereby authorised to proceed with the work.

METHOD OF FINANCING ROAD IMPROVEMENTS.

A municipal council building a road or system of roads under the Act may procure the funds for so doing by any of the three following methods, viz.:—

1. By the issue and sale of debentures. Such debentures being for a term not exceeding thirty (30) years shall bear interest at a rate not exceeding six (6) per cent. The total amount of debentures which a municipality may issue under the Act must not exceed six (6) per cent. of the total assessed valuation of all real property in the municipality subject and liable to taxation and as shown on the revised assessment roll of the municipality. A municipal debenture by-law requires the approval of a majority of the ratepayers of the municipality, or portion thereof affected, who have voted upon such by-law.

2. By a special annual rate not exceeding five (5) mills on the dollar, which may be levied against the whole or any portion of a municipality benefited.

3. By apportioning a proportionate share of available municipal funds for the use and benefit of any portion of the municipality, which in the opinion of the council is specially benefited by the work.

PERFORMANCE OF WORKS.

All works to be performed under the Act are let by contract by the municipal council, subject to the approval of the Good Roads Board, unless it is mutually determined by the council and the board that it can otherwise be performed to better advantage. The works must be carried out in accordance with plans and specifications of the board and at all times under the general supervision of an engineer of the board.

GOVERNMENT FINANCIAL ASSISTANCE.

When any works have been undertaken by a municipality under the Act, the council, during the progress and upon the completion of such works, shall transmit to the board a statement setting forth the expenditures to date in carrying out the same, together with a statutory declaration of the treasurer of the municipality that such statement is correct, and upon such statement being verified by an engineer of the board, and certified by him that the works have been performed according to plans and specifications, and the contracts in that behalf, the Minister may, upon receiving said statement duly certified to by the board, direct the payment to the municipality of the following proportions, respectively, of said expenditure:—

1. In case of works, other than earth roads but inclusive of bridges and culverts (if such are of a permanent character) a sum equal to one-half (½) of the amount of all expenditures shown as aforesaid.

2. In case of earth roads, a sum equal to one-third (⅓) of the cost thereof, including bridges and culverts, and if such bridges and culverts be of a permanent character, the amount of aid may be increased to one-half (½) the cost of said bridges and culverts.
3. In case of roads forming part of a system of provincial highways, two-thirds (⅔) of the cost of construction thereof.

MAINTENANCE OF WORKS.

The cost of maintaining the works performed under the provisions of this Act in a state of good repair is borne by the municipality exclusively, and paid for out of the general funds raised annually for the ordinary purposes of the municipality, and not out of the moneys raised by debentures under the Act for the purpose of construction. If a municipal council fail to keep in good repair any roads constructed under the Act, the municipal commissioner may cause such maintenance work to be performed, and may collect the expense thereof from such municipality by levies made from time to time in accordance with the Municipal Commissioner's Act.

SASKATCHEWAN.

The highway construction work in this province, outside of cities, towns, and villages, which look after necessary work on their own streets, is carried on under two organisations—first, by the Provincial Government; and second, by the councils of rural municipalities. The work carried on by the Provincial Government consists of the construction of timber bridges, steel bridges on concrete foundations, the operation of ferries, and road construction and maintenance. The Government limits its highway work to trunk roads and main market roads. This highway construction work is carried on by the Government and under the control of the chairman of the Board of Highway Commissioners, the entire cost being met by the Government. The bridge work is generally done by contract. Expenditures are made from capital account on all work of a permanent nature, and from income account for work of a temporary nature, such as maintenance and repairs.

The following amounts were voted by the Provincial Legislature for road work for the year ending 30th April, 1915, and for the year ending 30th April, 1916:—

	1915.	1916.
For steel bridges on concrete foundations ..	$300,000	$100,000
Construction and improvement of public highways	1,200,000	200,000
	$1,500,000	$300,000
The amount voted by the Legislature, chargeable to income:—		
Roads and bridges	$500,000	$216,000
Ferry accommodation	90,000	90,000
	$590,000	$306,000

The amounts voted for the year 1915 were about on the same scale as those voted in the years 1912, 1913, and 1914. In 1915, however, owing to conditions incidental to the European war, we did not spend more than about one-third of the amount voted, and for the current year, 1916, the vote has been cut down very considerably.

The rural municipalities work in co-operation with the Provincial Government on the construction of main market roads, but also find it necessary to spend a large amount of their funds on minor roads and for maintenance and repairs. The rural municipalities secure their funds from current taxes, and considerable has also been raised to be expended on permanent improvements, from the sale of debentures. There are about 300 rural municipalities now organised, and a municipality generally is 18 miles square, containing nine townships. The tax rate in the municipalities is not to exceed 10 mills on the dollar, administration, is devoted to highway improvement. The rural municiand practically all of this money, except a small amount required for palities expended on public works in the year ending 30th April, 1914, about $1,975,000.

During the year 1913 and for three or four years previous to this date, we had a system of assistance or grants to rural municipalities for highway work. This system of grants, however, was discontinued in 1914. The main object in giving these grants was to give the Highway Commission the opportunity of exercising some authority over expenditures in rural municipalities and to get in touch with them so as to be able to advise them. This purpose has to a certain extent been accomplished, as shown by the marked improvement in the work of the rural municipalities, but it was found that there was a tendency in some municipalities, in order to take full advantage of the Government grants, to embark on an expenditure beyond what they could finance, with the result that some of them were led into financial difficulties. For this reason and for the reason that it was found very difficult to administer satisfactorily, principally because of the difficulty in having the municipal officials make proper returns, the system of grants was discontinued.

An Act respecting public highways was passed at the recent session of the Legislature. This Act became operative on 1st May, 1916.''

From these examples of the energy with which our Canadian cousins labour to lighten the difficulties of transportation of farm produce, it will be seen that there are ways and means of doing so in a country subject to long winters, ice, snow, and troublesome thaws. How much more easily could good roads be made in Queensland, where the only disability is an occasional flood. Readers of the ''Queensland Agricultural Journal'' may remember a series of excellent articles on ''Good Roads,'' by the Hon. A. J. Thynne.

NO COTTON, NO SHELLS.

By G. STEPHEN HART, F.G.S., Hon. Sec. Munitions League, Mount Morgan.

As the season for planting cotton is again drawing near, it would be well for every Australian to more fully grasp the startling fact that our hold upon Australia will never be secure until we make cotton an important crop. We are within the reach of armed robbers, and we have no guns. Our country cannot be defended without munitions of war, and cotton is absolutely essential for their manufacture. Although high explosives may be made from coal tar products, or from grass tree gum, they cannot be fired from present day weapons without a large charge made from gun-cotton. And gun-cotton is merely cotton suitably treated with nitric acid which we could produce if necessary, and with sulphuric acid which we already manufacture.

Our citizen army and our Australian navy are worse than useless without a plentiful supply of gun-cotton, which at present we are obliged to import. But so long as we have to import it we are using up money urgently needed for other objects—money which we cannot afford to lose. And yet defend our selves we must. We now know something of the fate of a conquered nation. The deliberate systematic murder of every male Australian would be no greater a massacre than that of the Armenians. Our women might even be denied death. Without cotton such happenings are not within our control. Without American cotton they might not to-day be within the control of the Allies, and America does not always see eye to eye with them. There are cotton fields in Egypt and India, and in Asia Minor, but are they large enough? And will the oceans round Australia always be a protection and never a menace?

Since last September, when we pointed out the submarine menace, this demon of the deep has become more devilish. We have been permitted to read a few details of what submarine warfare means. We have been told each month that a large and more deadly type of submarine has just appeared. We have been startled to hear that a German submarine has safely crossed the Atlantic, and have had our fears allayed by an official British announcement that it is nothing for a submarine to cross the Atlantic, as more than a dozen British submarines had crossed before the first German! And we all feel certain that to-day's submarines will be surpassed again next month, and that those of next year will be nothing to the ones of the year following. And, to make a further difficulty to our importation of cotton, the building of trans-Atlantic airships has probably been already commenced.

In any case, why trust implicitly to America's cotton always coming to Australia's shores when needed? Americans may not always love Australia. We may annoy them with our views on cattle or on copper, on paper or on the Panama Canal. And, just when we ask for Indian cotton, India may want it too, even if there are no super-submarines between us.

Before a wide-awake nation goes to war, she sees to all these little details. Germany invaded Belgium and got coal and zinc, she overran the north of France and got iron; she rushed to Galicia and past Warsaw and

got petrol; Servia gives her copper; and the Turkish offensive in Asia Minor is towards the cotton fields of Egypt and of India. America was invaded by diplomatists with much the same idea. And Verdun? It has the less worked end of the rich iron field which stretches up towards Metz. A plentiful supply of iron is worth paying a big price for in war time. Might not our next enemy pay something to see that we got no cotton imports? Eight years ago an effort to get cotton grown in Queensland was brought to nought by German influences. That, in itself, should make us try again.

Even if Australian fields are not deluged in blood, may not other parts of the Empire need our cotton to stem the crimson tide? This war is not yet nearly over, and the pendulum of fate may not always swing on our side. A leading French actress said the other day, when she retired from the dramatic stage, "Now that three parts of our men have been taken from us, never to return, the day for such as I am is past." Three parts of our men! We hope the figure is not correct, but all the same it makes us gasp. We are determined to win this war, but this war is not the last. Nor is any long peace assured after it, for many hold that when a man is down is the time to kick him.

Australia has four times the area suitable for growing cotton that America has, and last year America exported to England over 10,000,000 lb. more cotton than the year previous. Probably all this went to make munitions, although in normal times only the waste short cotton is used for that purpose. It was because of our unpreparedness that the money for all this cotton left the Empire. Does it not seem full time that each of us spent a few days to get first-hand information about cotton-growing in Australia?

Some of us tried last year and failed. Three hundred were given seed to plant 800 acres, and 60 wrote to tell us how they fared. About two-thirds of them did not get sufficient rain to grow the plants at all; a number could not even sow the seed, the drought was so severe. It needs about an inch of rain about the time of planting to get the plants established. Once established the cotton bush laughs at drought. Continuous rain at picking-time may make the cotton cling to the hard seed case and makes picking difficult, but the gin will separate the cases with the seeds and will also tease out the matted cotton. Still continuous rain does certainly not improve the ripened cotton.*

We advocate planting with the first good rain after the frosts are over. If planted after Christmas, the crop may be still immature when the next winter's frosts arrive, but these late crops will get an early start after the frosts, whether any rain falls or not, and will have ripe cotton on them at the next Christmas-time. The crop does not ripen all at once, and in some cases may be picked for ten months out of the twelve. One successful grower advocates planting in February and not looking for a crop that season.

Here are some of last year's yields. It must be clearly understood that many of them were only small patches. The bolls were counted on twenty plants and averaged. The yield per acre is what would have

* Two or three days' rain will not seriously injure cotton.—[ED. "Q.A.J."]

been produced if that area of similar plants had been grown. It assumes as good attention to the larger area as to the small actual area.

Locality.	Rainfall while Plants Grew.	Average Bolls per Plant.	Yield per Acre Calculated.
			Lb.
Ballandean	18 inches	32	1,600
Chinchilla	4 inches	12	600
Corona	Drought	60	3,000
Ipswich	20 inches	12	600
Jandowaie	Drought	50	2,500
Gympie	Drought	30	1,500
Mount Perry	Drought	53	2,000
Mackay	Good rain	46	2,300
Rannes	5 inches	70	3,500
Tiaro	18 inches	85	4,250
Wowan	Drought	9	450

The best plant reported bore 111 bolls. One acre of such plants as this would yield some £40.

Fourteen different growers noticed that if the root went straight down the plant would grow erect, as required for convenient and speedy picking; whilst branching surface roots gave low spreading branches, difficult to handle. This proves that deep cultivation is essential, except in open scrub soils in which the roots can easily get well down.

How much a man can pick in a day depends largely on how the plant is grown and upon the method adopted by the picker. The majority of last year's pickers have never seen an experienced picker at work, and had low branching bushes. Few claimed to have picked over 60 lb. in a day, and one put his daily tally as low as 10 lb. One novice, however, picked 150 to 170 lb. per day, and is confident he could easily pick over 200 lb. with a little more practice. Of course, his plants grew erect and his crop was good.

In connection with the question of picking, the Queensland Branch of the Commonwealth Institute of Science and Industry is already investigating the claims of various picking machines. These machines could travel from one grower's field to another's, and solve this difficulty of picking in Australia. At the same time, it must be remembered that in America, even where highly-paid white labour is employed, it pays to pick by hand. In previous years 350 and even 400 lb. has been picked in a single day from suitable crops, and it would be well if one of the few expert pickers at present in Queensland were engaged to visit growers at the next picking season, and show them how it should be done.

In order that cotton may be available for munitions it seems that it must be grown as a commercial crop. For this it has the attractions of a fixed price and a certain market. There are no middlemen to haggle with, and the farmer is not compelled to sell for a small fraction of the retailer's price. If the plants once get well established a crop seems certain, although, as with all other crops, there may be caterpillars and grasshoppers to contend with. Our other "safe" crops are usually painted in more rosy tints than they deserve. Maize, for example, is

shown by the Agricultural Department's year books to average the Queensland grower only £3 per acre gross. Deduct from this the cost of attention from seed time to harvest, and the price of bags and cartage and railway freights, and it will be seen why we so often hear of the "poor struggling farmer." It is usually unpayable to grow either maize or pumpkins, as they are usually grown in Queensland, so it behoves every farmer to find out from his own individual experience whether it would not pay him better to grow cotton. This from a purely personal standpoint; from a national standpoint it seems essential that every man, woman, and child in Queensland should become acquainted with the cotton bush and, if possible, produce a large quantity of cotton. The possible alternative is too hideous even to contemplate.

Most of the Mount Morgan members of the Munition Cotton League are not directly interested in farming pursuits; but it means much to each one of them that Australia should remain the country of the Australians, and we make our appeal solely from grounds of national urgency. No member of our League is seeking monetary gain from our efforts to get cotton grown in Queensland.

Last year our efforts failed. Climatic conditions and a lack of volunteer helpers were the chief causes; but better Britishers than we were driven back at Mons on account of unfavourable conditions and a lack of volunteers. Now it is a different story with them, for they have got their better conditions, and volunteers are numerous. May we, with confidence, depend upon a full quota of agricultural volunteers when our weather conditions improve sufficiently? We, too, are striving for the Empire's safety. We want the interest of every man and boy, and every girl and woman. There is no age limit; there is no medical examination; there is no question of leaving dependents unprovided for. Will you help us to settle once for all whether your part of Australia will grow cotton? Try from 1 to 5 acres, or a small patch; just a couple of bushes, according to the area of land at your disposal; and when your trial has been completed, tell us what you have found out. In the multitude of experimenters we shall find wisdom. At present the Queensland Government guarantees you 1¾d. per lb. for cotton as picked from the bushes, seed and all. You have merely to bag it up and consign it, freight paid, to Brisbane. The Agricultural Department will provide you with the best obtainable specially imported seed, delivered free at your nearest railway station. Later, when the crop succeeds, it might easily become possible to guarantee every grower a fixed minimum per acre of cotton planted, if he gave it the correct attention. How would a minimum income fixed at planting time suit our farmers? It would be more pleasing than a fixed maximum sale price for their produce, and would win more wealth to the State. And, apart from its commercial attractiveness, do not forget that the safety of Australia is bound up in cotton.

Remember, no cotton means no shells, and grow your own little munitions factory in some corner of your land.

And may Australian cotton-growing prove to be a source of prosperity and happiness to many in times of peace; and, in times of war, a means of sure defence.

MARKET GARDENING.

SIMULTANEOUS CROPS.

In the July issue of this Journal we mentioned that, in South Africa, a farmer raises two crops on the same land—one of potatoes, the other of maize—and both yield excellent returns. The simultaneous crop system is especially adapted to vegetable growing in the market garden, as our own experience has shown. Why raise crops on 3 acres which can be profitably raised on 1? All that is needed is, in the first place, to gain a knowledge of such crops as may be put in at the same season of the year, and of the length of time during which they occupy the ground. For instance, there are three vegetables—cabbage, lettuce, and radishes. Of these, radishes will mature in three or four weeks, lettuce in five weeks, and cabbages about twelve weeks, and we may add beetroot, which may be taken up in about six weeks. Taking the three first named. The radishes will mature first. When they are removed the lettuces will follow in due course, when the cabbages will have full possession.

This simultaneous cropping has its advantages and also its disadvantages. These are shown by Professor Watts in his valuable work on "Vegetable Gardening" as follows:—

Advantages.—(1) Economy of space, no ground being wasted; (2) economy of plant food, the surplus applied for one crop being utilised by another; (3) economy in tillage, the same ploughing, harrowing, and cultivation serving for two or more crops; (4) concentration of operations, the force of labourers being confined to 1 acre instead of to 2 or 3; (5) soil improvement, as when peas or beans are planted with other crops; (6) increased profits from the area planted.

Disadvantages.—(1) The necessity for an increased amount of hand labour in weeding and the use of hoes and hand-wheel hoes; (2) a greater demand or requirement for plant food and soil moisture; (3) the close attention and time required in looking after details. For these reasons, many commercial gardeners prefer to cultivate more acres, with perhaps less annoyance. Some plans of double cropping, however, are no more troublesome than that of single cropping.

Simultaneous or companion cropping is most advantageous under the following conditions:—(1) When the area of ground available is very much limited; (2) when land values, rentals, and taxation are high; (3) when liberal supplies of manure are easily obtainable; (4) when the necessary labour can be secured without much difficulty; (5) when good markets are easily accessible; (6) when irrigation is possible, or when the soil moisture can be readily conserved.

In making specific plans for companion cropping, the following factors should be carefully considered:—(1) The time when each crop will be planted; (2) the time when each crop will mature; (3) the required space for each vegetable at various stages of growth; (4) the habit of growth of the various plants; (5) the supply of soil moisture and plant food in their relation to time of maturity and the space required.

GROWING CABBAGES FOR SEED.

Most of the seed used by market gardeners is purchased from seedsmen who draw their supplies from well-known great seed houses, either home or foreign, and those gardeners who supply the city shops, hotels, and private houses say that it would not pay them to grow their own seeds, because, they argue, seeds may be purchased from commercial houses at less cost than they can be grown on the farm. The fact is that few market gardeners possess the necessary knowledge which would enable them to grow good seed. But this is a branch of the business which they should study if they wish to avoid the disappointments often resulting from purchasing seeds from any but well-known firms. It does not pay to take chances, and skilful breeding often produces better seeds than those which can be procured on the market, notwithstanding the fact that we have a Pure Seeds Act in operation in Queensland.

Take cabbages as a proof of what can be done in raising seed from any particular variety. Two things have to be attended to in the process. One is known as "roguing," the other as "burying." The first is one of the most important operations in growing high-class seeds. "A rogue," says Mr. R. L. Watts, Professor of Horticulture in the Pennsylvania State College, U.S.A., in his work on "Vegetable Gardening," "is a plant that is off type, and should not be allowed to produce seed." The discarding of such plants is called "roguing," and the ultimate crop depends mainly upon the thoroughness of this operation. Roguing is generally practised by seed raisers, but in too many cases it is not sufficiently severe. The right soil and climate cannot do everything. Scientifically conducted, breeding plots and rigid roguing are the two greatest needs of a seed farm.

A common practice in America among large growers is to sow so late in the season that only a small percentage of the heads will be well developed when the roguing is done. The plants should not be grown in excessively rich soils, as very large heads do not winter well.

When the plants are well developed, the "burying" process commences, and thorough protection must be given to both roots and heads. They may be buried where they were grown, and the covering removed in the following spring. In this way a crop of seed may be produced without two transplantings; but the more approved plan is to lift the plants and bury them before there is danger of very cold weather. Various methods are used in providing winter protection. One of the best is to place three plants side by side in long trenches made by ploughing a furrow each way. The plants may be placed erect with the roots down, but better protection will be given by placing them at an angle of 45 degrees. Two or 3 in. of soil is sufficient covering at first, although no injury will be done by 6 in. of soil if the weather is cool. When severe cold weather comes on, several inches of manure should be added.

As soon as the spring arrives the plants are removed from the trenches, and set in rows 3½ ft. apart. Rather deep furrows are required to give the plants proper support, and ridging or staking must be resorted to later in the season when the seed stalks are developing. To allow the seed shoots to push through the heads with ease, the tops are cut crosswise at the time of planting. When these have appeared, and the pods have turned yellow, the seed stalks are cut off and placed in rows to dry. From two to four days are generally required for drying. It usually takes 20 to 25 plants to make 1 lb. of seed, although frequently 2 oz. are obtained from a plant.

For preserving cabbages for a future market, various methods of burying or partial burying are in use in America. Where the winters are mild, little protection is necessary. The plants are pulled and stood upright in long shallow trenches 5 or 6 ft. wide, a furrow is thrown up on both sides, and hay is spread over the heads, the amount of hay being increased as the weather gets colder. With this plan, the heads become solid, and may be removed at any time during the winter. In Maryland, a favourite plan is to turn the heads where they grow to the north, and to cover the stems and the lower part of the heads with earth. On Long Island a very common method is to draw a furrow 6 to 8 in. deep, pull and place the plants heads downwards in the trench. A furrow thrown from each side completes the work of burying. This makes a covering of about 1 ft. of soil.

Another plan of burying cabbages for keeping purposes is used in all parts of the Northern United States. The crop is cut with sharp hatchets, stubs 4 or 5 in. long being left for convenience of handling. The heads are placed on top of the ground in long rows, three heads in width, side by side, the rows running up and down the slope of the land to provide drainage. The usual custom is to invert the heads. A layer of cabbages, one or two heads in width, may be placed on top. After the crop has been placed in this manner, a two-horse plough is used in drawing two furrows on each side of the windrows, as much soil as possible being thrown over the cabbage. The burying is finished with shovels, when care is taken to get 6 in. of soil over the cabbage. The soil will afford sufficient protection at least for a month, when 3 or 4 in. of manure should be thrown over the ridges. If the cabbage is sound when buried there should be no loss from this method.

Such are the methods of raising cabbage seed and preserving cabbage for a future market, as described by Professor R. L. Watts.

We are not aware whether any Queensland farmer has tried a plan for keeping cabbages for a rise in the market price. It would be interesting to know whether it would succeed in this State, if only as an experiment.

COTTAGE GARDENING AT GLADSTONE.

The accompanying photographs show what can be done by an energetic, healthy man, even when advanced in years, in the way of fruit and vegetable growing on a small area of land. Mr. Brotherton, of Gladstone, who has, as he says, passed the allotted span, became the owner, some two years ago, of what he describes as the most miserably poor bit of land in Queenland, with a gravelly soil, overlying stone and stiff clay, near a brickyard. He fenced it in and dug a well 12 ft. deep, only to find salt water. So he abandoned it and constructed a dam, which gives a supply of water all the year round. All this with his own hands. Mr. Brotherton arrived in Queensland in 1866 by the ship "Flying Cloud," and started farming at Doughboy Creek, afterwards taking up a selection at Bundaberg, and subsequently on the Kolan River, and was the first settler in the Mount Larcom Scrub, where he was seriously wounded in the head by the fall of a limb from a tree whilst clearing his land. He recovered from this, received the old-age pension, and has made a comfortable home for himself on his present location. Amongst the crops he raises are New Guinea butter beans, guada beans, tomatoes, onions, carrots, turnips, beetroot, lettuce, radish, English and sweet potatoes, a variety of herbs, such as sage, mint, thyme, marjoram, and lavender; and amongst fruits, granadillas, passion fruit, figs, persimmons, custard apples, grapes, oranges, lemons, and strawberries. Nor does he neglect flowers, of which he grows many kinds, as well as ferns and palms. All this he attends to single-handed, and his success should go far to show what are the possibilities awaiting those amongst our returned soldiers who wish to take up farming or gardening.

COTTON SEED FOR DISTRIBUTION.

Intending cotton-growers are notified that the Department of Agriculture and Stock now has cotton-seed for distribution, and applications should be sent to the Under Secretary, stating the area which it is proposed to plant. Full instructions as to the planting and after cultivation and harvesting of the crop may be obtained from the Department. Attention is drawn to the notification as to the disposal of the crop, on page VII. of the "Queensland Agricultural Journal."

PLATE 11.—COTTAGE GARDENING AT GLADSTONE.
1. Bush-house and the Rising Generation of Gladstone.
2. Twelve-months-old Papaw Tree on Mr. Brotherton's Selection. 3. Guada Beans.

PLATE 12.—ARRIVAL OF HIS EXCELLENCY THE GOVERNOR-GENERAL AT THE SHOW GROUND.
(INSET)—THE OFFICIAL OPENING BY HIS EXCELLENCY THE GOVERNOR-GENERAL, 16TH AUGUST, 1916.

EXHIBITION NOTES, 1916.

THE EXHIBITS OF THE AGRICULTURAL DEPARTMENT AT THE EXHIBITION OF THE QUEENSLAND NATIONAL ASSOCIATION, AUGUST, 1916.

The exhibit made by the Department of Agriculture and Stock this year, and briefly described in this issue, presents a number of new and interesting features.

In a general sense there is an entirely new caste in the arrangement and design of the Court, which in the latter respect may be attributed to the up-to-date ideas brought to this State from the Panama Exhibition.

The individual sections of the Court are so arranged as to serve to illustrate at least a part of the work of the Department and bring it before the public.

Whilst it is not altogether practicable to adequately represent the activities of the whole of the Agriculture and Stock Department and its staff, the numerous exhibits, as shown, have a very vital and intimate connection with production, and for this reason they have been made as educational in character as possible.

The Government Botanist and his staff have catered for the pastoral and agricultural section of the community by contributing a unique collection of "weeds and plants reputed poisonous to stock," weeds common to cultivated lands, native and introduced grasses, and a variety of specimen plants of economic value. The Agricultural Instruction and Field Staff, who are brought into immediate touch with agricultural production, have staged a comprehensive range of products, principally cereals, and have specialised in the direction of crop improvement and in methods to increase yields. Wheat, maize, and the grain-yielding non-saccharine sorghums are very fully dealt with.

The competition cobs entered in the Juvenile Corngrowing Competition are displayed in the Maize Section of the Court, and advantage has been taken of this fact to prepare a number of instructional exhibits and examples bearing on seed selection and improvement.

A very instructive exhibit of the "Pure Seeds Act" has been prepared, which illustrates in a graphic manner how weed seeds and foreign seeds are introduced in commercial seed samples, and the advantages to be derived from sowing only sound germinable seed, free from impurities.

The exhibit of economic entomology and plant diseases prepared by the Government Entomologist and Vegetable Pathologist deals with the life-history of a number of typical destructive insects and pests common to special crops, fruits, plants, seeds, and grain; also with remedies calculated to keep them in check and destroy them.

A number of large realistically coloured nature-prints of certain plant diseases are represented as unique, original work in portraying a highly technical subject.

PLATE 13.—ENTRANCE TO THE COURT OF THE AGRICULTURAL DEPARTMENT'S DISPLAY.

PLATE 14.—(A) AN OBJECT LESSON ON TRAINING AND PRUNING GRAPE VINES.
(B) TROPHY OF REPRESENTATIVE QUEENSLAND GROWN WOOLS AND SAMPLES OF STUD WOOLS.

The Sheep and Wool Expert has prepared an artistically-arranged display of Queensland-grown wools, the classification of which clearly demonstrates the potentialities of the State for the production of the highest quality staple. In this exhibit will be found a collection of fleeces and wool samples identical with those sent to the recent Panama Exhibition, where they secured the gold medal, the hall-mark of quality.

The Fruit Cultural Branch has staged a comprehensive pruning display, where several systems of training and pruning grape-vines are graphically shown. This exhibit should prove a source of never failing interest to vignerons, who can readily compare the different methods of pruning to suit certain kinds of grape-vines in order that maximum cropping results may be secured.

The Yeerongpilly Stock Experiment Station is represented by a most interesting display of laboratory products prepared at the Station for use by stockowners to effectively combat the diseases common to live stock in Queensland. Pure cultures of lactic acid bacilli, as supplied and used by the various cheese and butter factories, are also shown.

The part played by this institution in dealing with ticks and tick fever, tuberculosis, pleuro-pneumonia, &c., is generally recognised, and an endeavour has been made, in arranging the exhibit as a whole, to illustrate the various phases of work undertaken in the interests of the State.

In the Fibre Section there is a special trophy allotted to sisal fibre, and ropes and twines manufactured therefrom.

The Queensland Agricultural College is represented this year in the Court by a comprehensive display of saddlery and blacksmithing work, all of which has been carried out by the students. In the Stock Sections some excellent specimens of draught and dairy stock are entered in the various competitions.

SUGAR-CANE.

This section was to be represented by a collection of approved varieties of cane from the Mackay Sugar Experiment Station, but it was not possible to forward them in time. Mention should, however, be made of the fact that the Bureau of Sugar Experiment Stations is playing an important part in the distribution of new and proved cane varieties.

The practice in vogue is to carefully select, examine, and pack the cane plants so as to reach their destination in good order. These are all distributed free of charge to *bonâ fide* cane farmers. It is estimated that in this way upwards of 1,000 tons of cane plants have been sent out during the past ten years. Before the canes are allowed to leave the Stations they undergo chemical and commercial trials through plant, first, and second ratoon crops, each variety being tested at least four times during a season, so that records may be obtained giving farmers and millowners information as to their sugar contents at different times during the crushing period, and whether such canes may be regarded as early or late. They are also rigorously watched for evidence of disease, and no affected canes are allowed to go into general distribution.

NOTES ON EXHIBITS OF GRASSES AND WEEDS.

In the Agricultural Department's Court will be found an instructive exhibit of the weeds which have spread in this State from time to time, and the clause in the Pure Seeds Act which aims at the prevention of this sort of trouble must appeal strongly to all cultivators of the soil after a glance at the number shown, which is by no means exhaustive. It is a noteworthy fact that nearly all of these usurpers of the soil have their origin in foreign lands. Many of the worst have been brought in with a view of their usefulness without the introducers having a thought of their future career. For instance, the pastoralists who over fifty years ago grew the new hedge plant, *Opuntia inermis*, catalogued for this purpose by nurserymen in the South, little thought of the vast area of good land which would ultimately be covered by this troublesome pest known as the prickly-pear, neither did those desirous of enhancing the beauty of their flower borders by a plant of *Lantana camara* dream that it would overrun some of our finest scrub lands and grow with a luxuriance greater even than in its native land. Many of our worst weeds are of annual growth, and for their eradication the gardener's adage, "A year's seeding gives seven years' weeding," should be borne in mind. Some of these are Sidas, Medic Burr, and Thorn Apple; while in the case of perennials, such as Milky Cotton-bush, Docks, &c., the whole plant must be removed. To give an idea of the growth of some of the most troublesome weeds whole plants have been mounted. Such well-known usurpers as Stinking Rodger, Noogoora Burr, Thistle, Bathurst Burr, and Ink Weed are too familiar to need else but a passing notice, but attention might be drawn to an undesirable alien which has made its appearance during the last year or two and likely to become as great a pest as any. This is the prostrate-growing Khaki Weed, which, having found its way to South Africa from South America, was kindly passed on to Australia, which seems to have earned the reputation of being the dumping ground of numerous vegetable pests. The specimens shown are labelled in clear type with the systematic and (where known) vernacular names, and also information as to their character. For instance, we are informed that the Bitter Cress (*Senebiera didyma*) and the Hexham Scent (*Melilotus parviflora*) are known to impart a disagreeable flavour to butter when cows have browsed on them.

On the opposite side of the Court will be seen an exhibit comprising a century and a-quarter of our native grasses, in the possession of which Queensland is known the world over. Notice is drawn to the valuable Mitchell Grasses which have made our inland pastures so famous. Not only are they rich in nutritive properties but their tenacity of life enables them to withstand the severest droughts. The Downs country has earned distinction also for the presence of the well-known Blue Grass which is considered by stockowners as second to none for grazing purposes. Attention is drawn to a number of coarse-growing kinds, such as Scented Golden Beard, Kangaroo Grass, Oat Grass, Swamp Foxtail, and Blady Grass, which are valuable when in early growth, and we are told that the latter, under the name of Lalang, furnishes material for paper-making—a commodity at present occupying the thoughts of the commercial world. *Chloris barbat* will be seen to resemble the much-esteemed

PLATE 15.—PORTION OF COURT SHOWING PART OF THE EXHIBIT OF NATIVE GRASSES, WEEDS, AND PURE SEEDS, AND OF THE YEERONGPILLY EXPERIMENT STATION.

PLATE 16.—CORN-GROWING COMPETITION, AND EDUCATIONAL MAIZE EXHIBIT.

Rhodes Grass (*C. Gayana*) of South Africa, and is probably quite as nutritious as that species. It will be observed that several kinds which are looked upon in some quarters as weeds are included—Summer Grass and Crow's-foot, for instance; but in other parts of the world they are looked upon as useful fodders, and are commonly cultivated for that purpose. Panicum is the vernacular name generally applied to a grain by the seed merchants, but it will be seen to belong to a genus embracing many valuable species indigenous in this State. It is evidently not only the large-growing kinds that are valuable, the prolific Button Grass being equally relished by stock on the inland plains. A useful grass for cattle is shown in the Bunch Spear Grass, but it is very troublesome to sheep on account of the seeds, the awns of which penetrate into the flesh of the animals.

As in the case of the weeds an informative label is attached to each specimen.

MAIZE.

This exhibit has been prepared and arranged strictly as an educational factor and to illustrate the seed maize improvement work which the Department has in hand.

Something over four million bushels of the cereal are produced annually in normal seasons.

The choice of a variety to suit different soils and localities throughout the State is to be regarded as an all-important one, and a good deal of attention is being paid by the Department to methods of seed selection calculated to effect an improvement in crop production and in type of grain.

The essential features of seed maize selection are graphically illustrated in various ways.

The value of "ear to row" tests, as a basic system for effecting improvement in crop yields, is clearly demonstrated by the differences in yield, amounting to slightly over 30 bushels per acre, which have been experienced in field trials carried out during the past season.

Certain botanical characteristics of maize applicable to the subject under consideration have also been illustrated. This section should prove of unflagging interest to farmers and others who are associated with primary industries.

SISAL FIBRE.

Up to the present very little attention has been given to the production of sisal fibre in Queensland. The crop is generally regarded as one suitable to countries where cheap labour is obtainable. Owing to the shortage of binder twine in the United States last year the price of the fibre reached £60 per ton—more than double the usual price on the market. If Queensland is to be a self-supporting country there is every reason to expect that the growing of sisal fibre will be taken up in the near future, possibly not as a main crop but as a subsidiary one. The plant is extremely hardy, and is suitable for arid limestone soils and waste places where the raising of other crops would be impracticable. The exhibit of assorted ropes manufactured in Brisbane from Queensland-grown sisal fibre is also to be on view.

PLATE 17.—SISAL HEMP TROPHY, WITH ROPE AND TWINE, MANUFACTURED IN BRISBANE.

GRAIN SORGHUM.

A few varieties of the "grain" or non-saccharine sorghums have been grown in Queensland during recent years, but only in a haphazard way, simply because few persons have really any adequate comprehension of their worth compared with other grain crops. In countries where climatic conditions are similar to Queensland they have been tried and proven.

Two years ago the Department of Agriculture obtained seven high-yielding varieties, which were afterwards grown in both the Central and Southern portions of the State. The results obtained were highly satisfactory; so much so, that demonstration plots were established last season in ten districts, the objective being to find out varieties best adapted to give high yields, to test their value as a dry-district crop, and to improve the respective types by selection.

The results of the season's operations are displayed in detail. Groups from widely different districts are shown side by side for comparison; the variations in yields of green fodder and grain from the respective sorts are shown in graph form. Some very heavy yields of grain were recorded. In the Boonah district, when climatic conditions were favourable to growth, Cream Milo gave a return of 103 bushels per acre, whilst several varieties reached the 90 bushels mark. This season, in several localities where the maize crop was practically a failure, a number of these grain-producing non-saccharine sorghums yielded up to 50 bushels per acre, thus bearing out their reputation as dry weather resistant crops.

The heavy yields obtained may in a measure be attributed to careful selection of high-yielding types and their propagation in "ear to row" tests. Typical heads are selected, each being planted in a separate row. From the best row the following season's stud plot is planted. The results from last season's "ear to row" test are on view, together with graphs showing variation in yield, &c.; also a selection of heads from each of the ten varieties picked out for next season's operations.

The feeding value of the grain from a 100-bushel crop is of the greatest importance. Analyses made by the Agricultural Chemist show that the Milos, or dry-district sorghum, are equal to maize in this respect, being a most suitable grain not only for human beings but for poultry, pigs, and other farm animals. Samples of flour, bran, and pollard, and porridge meals made from Cream Milo and Feterita (*Soudan Dhoura*) are shown. The meal makes a very wholesome porridge, and several persons who have sampled it report that although the colour leaves something to be desired the flavour is delicious.

Several varieties of the well-known saccharine types of sorghum are also shown. These are grown for the purpose of improving the quality and yield of green fodder.

Excellent samples of broom millet are exhibited, which have been grown in different parts of the State; some of these have been raised from seed imported by the Department.

PLATE 18.—DISPLAY OF NON-SACCHARINE GRAIN-PRODUCING SORGHUMS.

WHEAT.

The principal feature in this section is the display of grain samples representative of the seed wheat distributed to farmers this year by the Department of Agriculture and Stock under the wheat distribution scheme.

Last year was a disastrous one for this State's wheat crop owing to the drought. All the available locally-grown seed was purchased, and a quantity secured from South Australia and a small amount from New South Wales, the whole being put through cleaning and dressing machinery before despatch to recipients; 98,228 bushels of seed were purchased, and 89,558 bushels sent out to 1,435 applicants.

If assistance had not been extended in this way it is certain that much of Queensland's wheat areas would have had to remain unsown.

Full descriptions of the characteristics of the several varieties of wheat have been given in concrete form, together with information as to their milling qualities.

Another section of this exhibit is devoted to a display of wheat, principally in sheaf form emanating from the Roma State Farm, as an illustration of a number of very promising varieties raised at that institution. Wheat-breeding and wheat improvement have been carried on at this farm for a number of years, and there are now several promising varieties which can be regarded as an improvement on those in general cultivation.

JUVENILE CORNGROWING COMPETITION.

The cobs entered in the competition will be exhibited in the Maize Section of the Departmental Court.

	Bushels per Acre.
Special Prize—	
Value £10, A. Gon Chee, Lake View, Killarney ..	133·6
Value £5, E. E. E. Burton, Booie, *viâ* Kingaroy ..	121·8
Value £3, H. Gon Chee, Lake View, Killarney ..	114·0
No. 1 *District*—	
Prize, value £5, W. E. Patterson, Glamorgan Vale, *viâ* Walloon	82·3
Prize, value £2, G. Osborne, Mount Alford, Boonah	69·5
Prize, value £1, F. A. Bade, Ebenezer, *viâ* Rosewood	61·5
No. 2 *District*—	
Prize, value £5, J. S. Bray, Lawnton, N.C. Line ..	75·5
Prize, value £2, S. Adcock, Eel Creek, Gympie ..	68·5
Prize, value £1, A. F. G. Pedwell, Samford, *viâ* Enoggera	66·4
No. 3 *District*—	
Prize, value £5, J. M. Maguire, Ropeley, Gatton ..	56·0
Prize, value £2, N. A. Smoothy, Pinelands, Crow's Nest	43·9

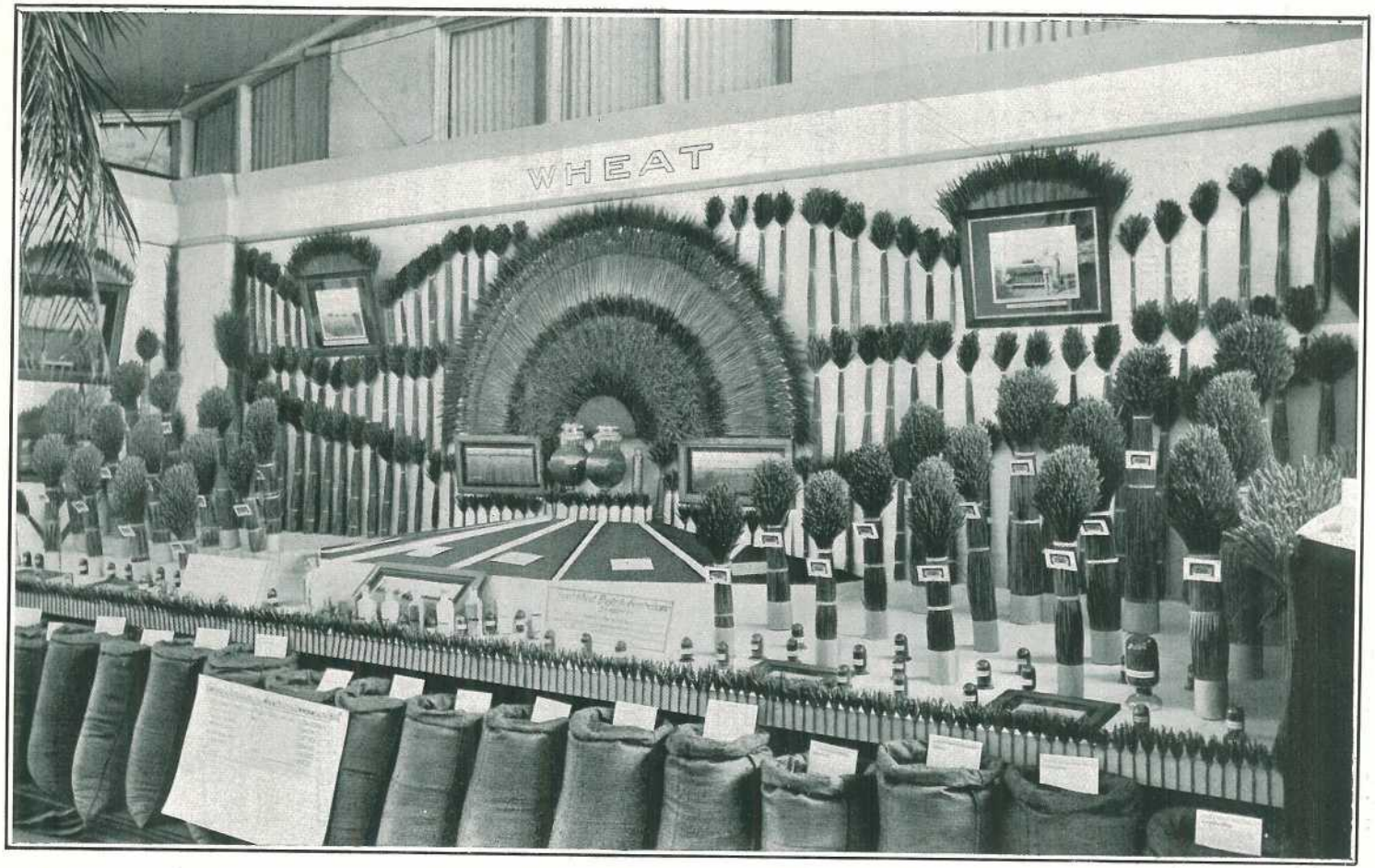

PLATE 19.—DISPLAY OF WHEATS SUITABLE TO QUEENSLAND, AND NEW CROSS-BRED WHEATS RAISED AT THE ROMA STATE FARM, BUNGEWORGORAI.

	Bushels per Acre.
No. 4 District—	
Prize, value £5, E. E. E. Burton, Booie, *viâ* Kingaroy	121·8
Prize, value 2, J. R. C. Hart, Ovingham, Blackbutt	54·8
Prize, value £1, E. V. E. Burton, Booie, *viâ* Kingaroy	40·7
No. 5 District—	
Prize, value £5, A. Gon Chee, Lake View, Killarney	133·6
Prize, value £2, H. Gon Chee, Lake View, Killarney	114·0
Prize, value £1, H. Gow, Fair View, Killarney ..	84·4
No. 7 District—	
Prize, value 5, J. S. Bullock, Pelican, Chinchilla ..	32·1
Prize, value £2, N. C. Bullock, Pelican, Chinchilla..	27·0
Prize, value £1, R. J. Bullock, Pelican, Chinchilla ..	22·3
No. 8 District—	
Prize, value £5, R. S. Laver, Riversleigh, Gogango..	33·4
Prize, value £2, R. V. Williams, Hawk's Nest, The Caves	31·9
Prize, value £1, F. Williams, Hawk's Nest, The Caves	30·7
No. 9 District—	
Prize, value £3, A. R. Vance, Barrine, Kulara, N.Q.	101·7
Prize, value £2, G. Gellweiler, Barrine, Kulara, N.Q.	84·4
Prize, value £1, J. D. Gellweiler, Barrine, Kulara, N.Q.	83·7

Two prizes only have been awarded for District No. 3. No prizes have been awarded for No. 6 District, as the yields were below 20 bushels per acre. In District No. 9 there were only five competitors. Rule 9 of the competition has been waived by the Minister for Agriculture, and three prizes allotted instead of one; the prize money in this instance being altered to £3, £2, and £1, for first, second, and third place, respectively.

The exhibit of agricultural seeds and seeds of weeds frequently found in commercial samples draws attention to the Department's work under the Pure Seeds Acts, so that farmers and others interested may be able to easily identify the impurities found in many samples. A collection of weeds and weed-seeds has been made and exhibited.

Under the Pure Seeds Acts samples may be sent to the Department for test, as to purity and germination, the fee being 2s. 6d. per sample; by which means the actual value of a sample may be determined before sowing.

It is, however, possible for the farmer to make a practical test of many seeds himself, and the simple method shown in the exhibit is one that could easily be adopted by buyers and sellers of seeds. Those interested would do well to interview the officer in charge of the exhibit, who will give information as to seed-testing, the identification of weed-seeds, and particulars as to the requirements under the Pure Seeds Acts and Regulations.

EXHIBIT OF ECONOMIC ENTOMOLOGY AND PLANT DISEASES.

The Division of the Government Entomologist and Vegetable Pathologist—Mr. Henry Tryon—is represented by two series of the objects used by him for educational purposes.

1. A series of nineteen showcases illustrating the life-history of typical destructive insects or the pests of special plants. These have been primarily designed for the preparation of wall diagrams, of which several are already in use in the form of large coloured photographs, with letterpress covering the subject of remedies, &c., constituting an attractive display at the different country shows served by the Department of Agriculture's travelling exhibit. They reflect the skilful and artistic work, under the above officer's direction, of Mr. E. Jarvis, Assistant Entomologist, and Mr. H. Jarvis, Technical Assistant.

The following subjects are illustrated:—

1. Potato—Ladybird—*Epilachna 28-punctata.*
2. Potato—Flea Beetle—*Haltica solani.*
3. Potato—Moth Worm—*Gelechia solanella.*
4. Sweet Potato Weevil—*Cylas formicarius.*
5. Sweet Potato—Web worm.
6. Bean Fly—*Agromyza phaseli.*
7. Pumpkin Beetle—*Aulacophora olivieri.*
8. Codling Moth—*Carpocapsa pomonella.*
9. The Bean and Pea Weevils—*Bruchus spp.*
10. The Maize Moth—*Dichocrocis punctiferalis.*
11. The Cabbage Cut-worm—*Agrotis,* and Army Worm—*Leucania unipuncta.*
12. Tryon's Fruit Fly—*Batracocera Tryoni.*
13. Injurious Insects of the Citrus Plants.
14. Branch-cutting Borer of Orange—*Uracanthus.*
15. Scale Insects (Coccidæ) of Citrus Plants.
16. The Grain Weevil—*Calandra oryzæ.*
17. Wheat and Maize Moth—*Sitrotroga cerealella.*
    The Mediterranean Flour Moth—*Ephestia Kuehniella.*
18. Potato-Green Caterpillar—*Plusia argentifera.*
19. Cattle-destroying Saw Fly—*Pterygophora.*

2. Illustrations of certain plant diseases. This section of the exhibit marks a new departure in educative display. It comprises two stands, each holding a score of large nature-prints, realistically coloured under Mr. Tryon's direction by Mr. H. Jarvis. This, the first series of a larger collection in preparation, contains ten illustrations of citrus diseases, five of banana, two of coffee, three of pineapple, three of grape-, one each of tomato and lucerne-, five of nematode rootgall-, and seven of potato-maladies.

It is proposed that this collection of pictures, whilst meanwhile forming part of the equipment of an economic museum, may serve also, at some future date, as the basis for the preparation of wall-diagrams, they being severally reproduced in all their faithfulness to nature by the three-colour process to this end.

TRAINING AND PRUNING GRAPE-VINES.

This trophy is quite an educational study, and includes a large number of examples of methods of pruning recommended by Mr. C. Ross, Instructor in Fruit Culture, as adapted for vine culture in this State.

Printed descriptive cards are in close proximity to each subject, and coloured pointers directing attention to explanatory details.

The group includes prepared cuttings, rooted yearling cuttings, trained vines of various ages, and unpruned vines with white ties attached showing where cuts should be made when pruning.

A collection of pruning instruments is also exhibited.

EXHIBIT FROM THE STOCK EXPERIMENT STATION, YEERONGPILLY.

TICKS AND TICK FEVER.

This section is illustrative of—

1. The Cattle Tick and its life-history.
2. Specimen showing the characteristic *post-mortem* appearances in the various internal organs.
3. Microscopic preparation of stained tick fever blood; coloured sketches made direct from the microscope showing blood from cases of tick fever with the organisms in the red blood cells.
4. Appliances used in connection with protective inoculation, and methods of preserving the blood.
5. Maps, charts, diagrams illustrative of the American method of tick eradication.
6. Maps showing the progress of the Cattle Tick in Australia since its first introduction at Port Darwin in 1872, and into the Gulf country of Queensland in 1894, and the whole of the tick-infested country at the present time.

TUBERCULOSIS.

Museum specimens showing manifestation of the disease in cattle, pigs, goats, sheep, horses, fowls, and some wild animals.

Drawing from the microscope showing tubercle bacilli in milk, lung of a bullock, udder of a cow, lymphatic gland of a pig, liver of a sheep, and liver of a fowl.

PLEURO-PNEUMONIA.

Lung of an ox showing characteristic marbled appearance; also enlarged bronchial glands.

Specimens of pleuro virus.

Methods of preservation.

MUSEUM SPECIMENS.

This collection is interesting. Pathological preparations illustrative of the various manifestations of disease in stock, including tuberculosis, actinomycosis, blackleg, malignant œdema, contagious mammitis, Johnne's

disease, swine fever, chicken cholera, fowl enteritis and diphtheria, carcinoma, papilloma, epithelioma, sarcoma, osteoma, adenoma, fibroma, dermoids, odontomes, &c.

Internal and external parasites, including flukes, hydatids, tapeworm, round worm, and worm nodules in beef.

Larvæ and pupæ of the English warble fly, bots, acari, lice, and various species of ticks.

Also a collection of hair balls removed from the stomach of apparently healthy cattle, horses, sheep, pigs, dogs, and cats.

LABORATORY PRODUCTS PREPARED AT YEERONGPILLY EXPERIMENT STATION.

Blackleg vaccin.

Pleuro-pneumonia virus.

Blood serum for tick fever.

Anto-vaccin for contagious mammitis and sepis.

Pure culture of lactic acid bacilli growing in milk are supplied to various cheese and butter factories throughout the State.

SPECIMENS ILLUSTRATING LABORATORY METHODS OF INVESTIGATION.

Plate and tube cultivations of micro-organisms illustrating the method of making a bacteriological qualitative and quantitive analysis of samples of water supplies for meatworks, butter and cheese factories, and varieties of fresh, preserved, and canned foods.

THE DISTRICT EXHIBITS.

"A" GRADE.

Additional interest attached to the competition in this class, owing to the fact that the Queensland Districts were challenged by the Western Districts of New South Wales. This is primarily due to energy and excellent organisation of Mr. and Mrs. G. Trevitt, who for several years had exhibits at Bowen Park Shows. The principal centres of population in this part of the State of New South Wales include Lithgow, Paramatta, Orange, Mudgee, Bathurst, Dubbo, and Penrith. Paramatta contributes examples of the woollen manufacturing industry, whilst Dubbo is represented by excellent samples of various kinds of citrus fruits, and Mudgee by dried fruits, vinegar, pickles, preserves, and other household incentives to appetite. From Penrith comes a collection of timbers, and coal, iron, and limestone are contributed by Lithgow. All these, as well as a great assortment of farm produce, are artistically displayed to the best advantage, and thus form a very pleasing and instructive exhibit.

SOUTH COAST, QUEENSLAND.

The South Coast District comprises a considerable area of the fine fruit-growing and grazing country from Wynnum to Redland Bay, Cleveland, Beenleigh to Beaudesert, and embraces generally the fertile lands of the Logan and Albert. It is noticeable that, amongst the beautifully arranged exhibits, wool is taking a larger place than it did last

year. This is probably largely owing to the energetic and successful efforts of Mr. W. G. Brown, Instructor in Sheep and Wool, to establish flocks of certain cross breeds of sheep suitable for the coast lands of the South. Many farmers have already many sheep on their selections, and, from all accounts, they appear to be satisfied that sheep on the coast have come to stay, and to increase rapidly. Many other industries are well represented. Dairy produce is well to the fore, and both the Kingston (on the South Coast Line) and the Beaudesert factories contributed fine samples of butter, and a ponderous trophy of cheese was shown by Mr. J. Wilson, Merrimac. The fruitgrowing industry was naturally well represented by magnificent collections of citrus fruits, besides various other fruits for which the district is justly celebrated. Sugar-cane was well represented, and quantities of splendidly grown cane demonstrated the recuperative powers of the soil and the plants, which had successfully recovered from the disastrous effects of long-continued drought. Samples of the rum made at the Beenleigh distillery and sugar locally manufactured were also amongst the exhibits. The agricultural produce was mainly collected, we were informed, from the Beenleigh and Beaudesert sectors of the district. Bacon exhibited by Messrs. Baynes Bros. and the Queensland Co-operative Bacon Company, preserved fruits, jams, pickles, &c., made a splendid show in the food section. In addition to various articles of woodwork contributed by Messrs. Lahey Bros. and J. D. Campbell and Sons, a number of toys made in the Southern district were shown by Messrs. Lahey Bros. This is, in effect, a most important feature of their exhibits, forecasting, as it does, the establishment of a new and important industry, which previous to the war was productive of great revenue and profit to German manufacturers. "Made in Queensland" should, ere long, take the place of "Made in Germany."

"B" GRADE.

In this grade there were four competitors in the Queensland Districts Exhibits and three one-man farm entries: Kingaroy, Gympie, Crow's Nest, and Fassifern (Boonah-Fassifern).

KINGAROY.

The various exhibits in this section were most artistically arranged, and the produce, &c., showed to best advantage. Kingaroy, we may state, is 120 miles from Maryborough, on the Kilkivan and Nanango Branch Line. It is practically the centre of a very large agricultural and dairying district, producing cereals such as maize, wheat, oats, and barley to perfection. Although some sugar-cane was shown, it appeared to be more intended for decoration than as an exhibit, since canegrowing, except as fodder for stock, is not a suitable paying crop for the district. Grasses, both natural and artificial, were conspicuous, and forty-two varieties were to be seen. Potatoes and vegetables were well represented, and amongst them was to be noticed a gigantic cauliflower which turned the scale at over 50 lb. The exhibit of seeds was excellently arranged. Quantities were contained in snow-white bags, and an endless variety of all kinds of garden seeds were tastefully laid out in small saucers. That the district is well adapted for cotton-growing is evidenced by the samples

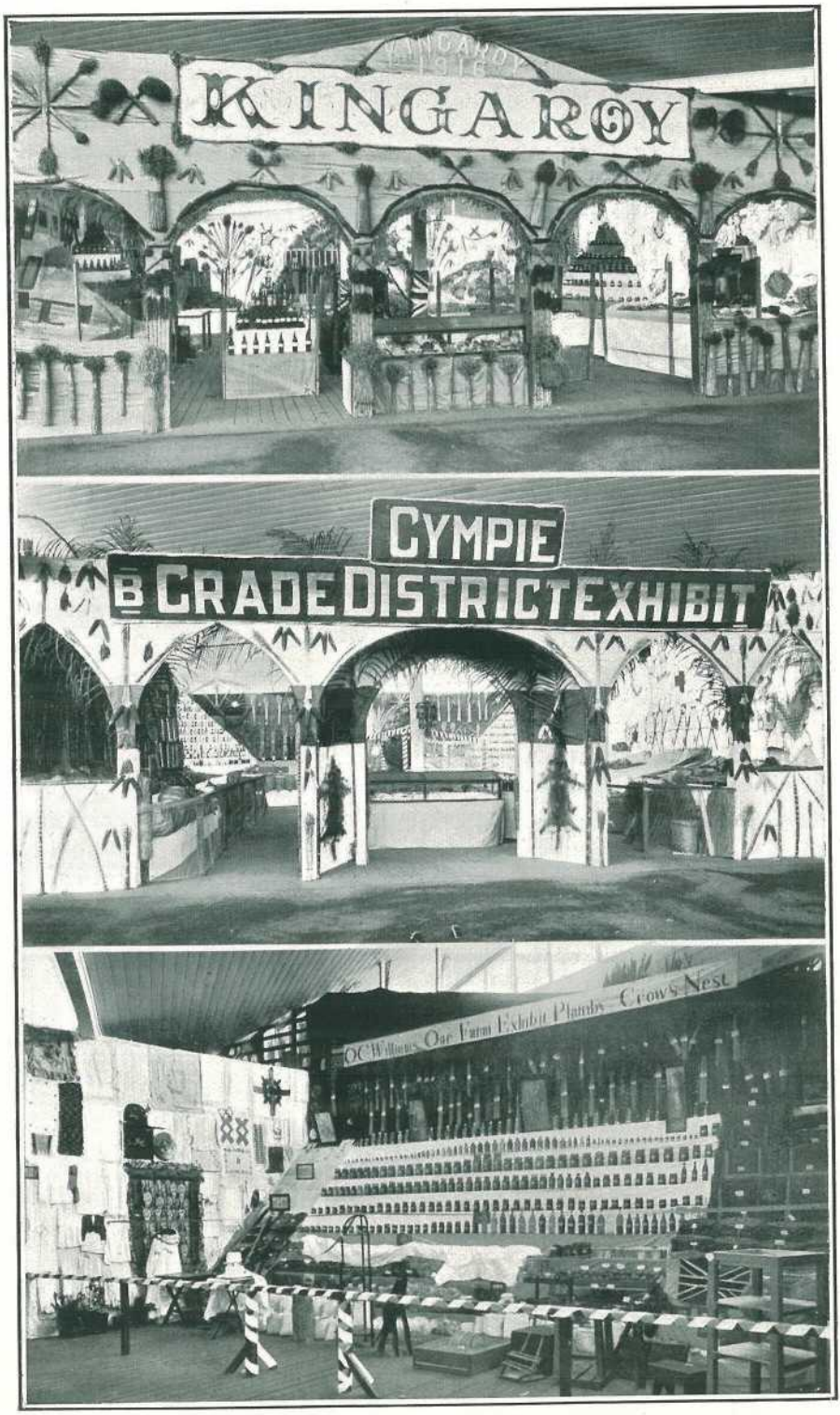

PLATE 20.—DISTRICT EXHIBITS: (*a*) KINGAROY DISTRICT EXHIBIT; (*b*) GYMPIE; (*c*) ONE-FARM EXHIBIT BY O C. WILLIAMS.

shown of cotton in the pod, in the seed, and ginned. Should cotton-growing again revive in Queensland, and reach the total area of 14,000 acres, as in the old days, Kingaroy should not be in the tail of the running. Various kinds of hay were arranged in neat, small bales, comprising oaten, wheaten, lucerne, panicum, &c. Some good specimens of fruit were shown, and woman's share in the industries was in strong evidence in the shape of jams, jellies, pickles, bottled fruits, cakes and lollies, and other confectionery, fancy work, and many useful comforts for soldiers in the shape of knitted articles. In the manufacturing line were several samples of well-made furniture, leather and leather goods, brushes, broom and basket ware, and the mining industry was represented by several minerals such as coal, copper, ironstone, limestone, granite, &c.

GYMPIE.

The long famous goldfield of Gympie has year by year gradually developed its agricultural industries, and to-day everywhere around the field are to be seen neat gardens, small farms, and market gardens, none of which were in existence during the palmy days of alluvial and reef mining. Many of the exhibits came from the now well-known agricultural sections of the district—Maroochy, Cooroy, Yandina, &c. Sugar-cane was much in evidence, as many as forty different varieties being furnished by Mr. Evans, of Maroochy, whilst much came from Cooroy and Chatswood. Cooran was represented by a display of citrus fruits; Gympie by bananas, pineapples, and papaw apples. Timbers in various forms announce the wealth and value of the forests of the surrounding country. Dairying is carried on to a large extent, and the fine exhibits of several dairy factories, supplemented by those of farmers, comprised butter, cheese, bacon, hams, and lard. Beekeeping appears to be successfully carried on at Gympie, as was evidenced by a good exhibit of honey. Potatoes, vegetables, and vegetable seeds appear to be a strong point with the market gardeners. Then, as in other district exhibits, there are strong evidences of the skill of the distaff side of the exhibitors, in the shape of jams, jellies, pickles, bottled and dried fruits, fancy work, and confectionery. Even the children vied with each other in exhibiting a number of very useful walking-sticks, obtained from the neighbouring scrubs. The Red Cross branches of Gympie and Lagoon Pocket showed a quantity of fancy work and useful articles.

The wool exhibit in this court was contributed by Mr. H. F. Walker, Traveston, and Mr. A. Francis, Kin Kin; forty varieties of sugar-cane by Mr. N. E. Evans, of Maroochy. Especial interest was taken by visitors in the fine collection of preserved fruits, jams, jellies, and women's work prepared by Mrs. Mathieson, of Skyring's Creek. The Montville district, as a fruitgrowing centre, was worthily represented by a special exhibit of a large variety of citrus fruits, which were a very fine feature of the court. This was contributed by the Montville Fruitgrowers and Farmers' Progress Association.

CROW'S NEST.

In the good old days, when the principal industry of this district was timber-getting, few people gave any thought to the possibilities of

agriculture; yet, where the great pine trees were cleared out, there remained a rich soil only awaiting the "tickling with the hoe" to transform the land into what it is to-day, thanks to the pioneer farmers who tackled the strenuous work of clearing the scrub and eventually the harder job of getting rid of the stumps to facilitate the use of the plough. The Crow's Nest District Exhibit at the Exhibition of 1916 is a standing monument to the pluck and energy of those who added this to the many other fine agricultural areas in the State. The whole of the arrangement of the exhibit, which was engineered by the Crow's Nest Agricultural, Horticultural, and Industrial Association, was most effective, with the white background, scored well in points on judging day. There is a very excellent exhibit of hay and chaff, maize and wheat, and natural and artificial grasses, the Soudan grass shown being over 6 ft. in height. Some very fine pumpkins (table and cattle), sorghum, millet, sisal hemp, &c., indicate the possibilities of the district beyond the ordinary farm crops. The Crow's Nest Butter Factory exhibit was very fine, as were the samples of bacon, hams, and rolled and smoked beef and mutton.

Vegetables of several varieties and very fine potatoes were a feature in the section. Besides all the above there were various fruits, fresh as well as preserved, jams, jellies, &c., and a good sample of cotton grown at Virginia. Timber specimens numbered 110 of different kinds. The manufacturing industries were represented by bricks, draining and roofing tiles, &c. As usual the exhibitors' families supplied an excellent assortment of jams and other comestibles, needlework and knitting, and the school children's work was also included.

BOONAH-FASSIFERN.

The organisers of this exhibit (the Fassifern Agricultural and Pastoral Association) had a very wide field to exploit. This extended from Ipswich to the border of New South Wales, and included a portion of the Logan district, with, of course, Boonah, Harrisville, &c. It is thus to be seen that it was quite possible to concentrate a vast quantity of the products of different soils and to some extent of different products in the constitution of the exhibit. To begin with, the decoration of the pavilion and the arrangement of the exhibits was admirable, the latter being all displayed to the greatest advantage. Of hay (20 varieties), chaff (20 varieties), grasses (120 varieties), were all got up in artistic manner. The cereals were strongly in evidence, as were green fodders and pumpkins (one of which weighed 125 lb.). Many varieties of millets and sorghums were shown; also ensilage and other prepared fodders. Amongst the roots and their products were to be found arrowroot, sweet-potato starch, and home-made cornflour. Fruits and vegetables were abundant, as were also exhibits of butter from the Boonah Butter Factory, cheese from Harrisville, hams and bacon and their by-products also from Harrisville, honey and wax, sugar-cane, and a singular exhibit was coffee made from beans, barley, maize, rye, and burnt peas, and even from bran and treacle. Other exhibits of interest were timber (dressed and undressed), stone, bricks, soils, &c., greasy and scoured wool and mohair from the Angora goat, together with needlework and knitting, school work, wines, and aerated waters.

WALLUMBILLA.

Our illustration gives a very fair idea of the comprehensive collection of vegetables and other farm produce, which afford good evidence of the fertility of the district, which is reached by the Western line, 294

PLATE 21.—NON-COMPETITIVE DISPLAY OF PRODUCTS FROM WALLUMBILLA, GROWN UNDER FIELD CONDITIONS WITHOUT IRRIGATION OR MANURE.

miles from Brisbane. The exhibit attracted much attention from the visitors to the Exhibition, who commented most favourably on the variety and excellence of this court.

The products from this farm were grown under field conditions without the aid of irrigation or manure.

ONE-FARM EXHIBITS.

For the One-Farm Exhibits there were three entries: Mr. O. C. Williams, of Rosevale Farm, Plainby, Crow's Nest District, who has twice before competed in this section, and was the winner of the first prize last year; Mr. J. A. Nystrom, of Booie, Kingaroy, who appears for the second time, and Mr. W. Allan, of Gympie. Mr. Allan also had charge of the Gympie District exhibit. He showed in his own exhibit most of the products of the land 5 miles from the town, and his exhibits, which were tastefully arranged, comprised such cereals as wheat, maize, oats, barley, and rye, many grasses, sorghums, millets, hay, and chaff.

As for vegetables, it would be hard to judge between those which he staged and the best of their kind in any section. To these were added cotton, tobacco, and flax. In fruits his bananas, pineapples, papaws, &c., were admirable from our point of view. Honey, preserves, jams, jellies, pickles, chutneys, sauces, and fancy work, were due to the work of Mrs. Allan.

Mr. Nystrom, to judge by his display, thoroughly understands how to make the most of the capabilities of his land, by judicious intense cultivation. His pavilion was replete with many varieties of cereals—maize, wheat, rye, and barley—and many grasses, millets, and sorghums. Fodder for cattle and horses was a great feature of the exhibits, as nothing appeared to be wanting in this line. There were nearly a dozen different varieties of potatoes and three different kinds of sweet potatoes. Garden produce, cotton, and wool formed no less important exhibits of the industries which are increasingly engaging the attention of farmers, not only at Kingaroy but in most agricultural centres in the State. The preserves and many household comestibles indicate the skill and industry of the lady members of his family.

Mr. O. C. Williams, who, as above stated, succeeded in winning the first prize last year, has once more, with the aid of his industrious family succeeded in getting together an exhibit which enabled him to again come out a winner. We understand that this exhibit consisted of over a thousand articles produced on his farm. There were eighteen varieties of chaff, and fourteen of hay, besides forty-three varieties of native grasses. The rest of the collection is made up of potatoes, vegetables, fruit, foodstuffs, an assortment of fruit drinks, wines, and samples of women's and children's work. The exhibit attracted much attention from the visitors to the Exhibition.

Of the three farmers who competed in this section, the winner was Mr. O. C. Williams, who scored a win last year. In nearly each department in the competition he was ahead of the other competitors. His total score was 371 points, Mr. Allan coming second with 332, and Mr. Nystrom third with 328 out of a possible 600. The following are the details:—

	Possible Points.	Williams.	Allan.	Nystrom.
DAIRY PRODUCE—				
Butter	25	14	18	10
Cheese	20	10	..	16
Eggs	5	3	4	4
	50	27	22	30
FOODS—				
Hams	20	12	15	10
Corned beef, mutton	10	8	6	6
Honey	10	5	6	7
Beeswax	5	2	3	4
Bread	5	4	4	3
Confectionery	5	4	3	3
Lard, tallow	5	4	3	3
	60	39	40	36

	Possible Points.	Williams.	Allan.	Nystrom.
FRUITS, VEGETABLES—				
Fresh fruits	25	14	20	14
Dried fruits	10	7	5	7
Preserved fruits	15	12	9	9
Fresh vegetables	15	12	8	10
Pickles	15	8	10	12
Potatoes	25	18	18	14
Pumpkins	10	8	6	6
Cocoanuts, nuts	3	2	2	2
Seeds	5	4	2	2
Arrowroot	5	4	3	3
Cassava	5	..	..	..
Ginger	5	..	2	3
Sugar beet	5	2	3	3
	143	95	90	82
GRAIN—				
Wheat	25	20	5	16
Maize	20	16	5	12
Barley	10	8	6	8
Oats, rice	15	8	12	8
	70	52	28	44
TROPICAL PRODUCTS—				
Sugar-cane	30	..	20	..
Cotton	10	3	9	6
Coffee	15	..	12	..
	55	3	41	6
Tobacco	10	7	6	8
HAY, CHAFF—				
Hay	20	15	12	15
Grasses	10	9	3	5
Chaff	20	15	10	15
Ensilage	15	10	2	10
Fodder	15	10	10	10
Sorghum	10	8	6	7
Hemp	5	4	1	..
Flax	5	4	2	..
Cowpea	7	5	2	5
Broom millet	10	6	9	6
	117	86	57	73
WOOL—				
Greasy	20	6	12	18
Mohair	5	3	4	2
	25	9	16	20
Drinks	10	6	4	1
WOMEN'S AND CHILDREN'S WORK—				
Needlework	10	9	8	6
Schoolwork	10	8	6	4
Fancy work	10	8	8	8
	30	25	22	18
Miscellaneous articles	5	4	2	4
Plants, flowers	5	2	3	..
Labour-saving articles	10	7	3	..
Effective arrangement	10	9	8	6
TOTALS	600	371	332	328

FRUIT EXHIBITS.

The competing districts were—Montville, Landsborough, Buderim, and Gympie. The winning exhibit, that of the Montville Fruitgrowers' and Farmers' Progress Association, as will be seen by the list of points awarded, led the way in citrus fruits and pineapples, and was especially strong in grading, packing, and general display. The points were allotted as follow:—

	Possible Points.	Montville.	Landsborough.	Buderim.	Palmwoods.	Gympie.
Bananas	25	12	18	20	16	12
Pineapples	25	17	20	10	16	12
Citrus fruit	25	22	10	16	13	13
Custard apples	10	7	..	8	..	3
Papaws	10	9	8	7	8	6
Strawberries	10	6	3	..	3	7
All other fruits	15	10	9	3	5	10
Grading, packing, and general display	30	28	22	26	20	12
TOTALS	150	111	90	90	81	75

Special certificates were awarded as follows:—Pineapples, Landsborough and Glass House Mountains; bananas, Buderim Mountain; citrus, Montville; fruit packed for market, Montville.

DISTRICT EXHIBIT AWARDS.

"A" GRADE.

There were two entries for this competition, the Western District of New South Wales, and the Queensland South Coast District. The judges awarded the prize to the former, which scored 874 points out of a possible 1,390. The South Coast exhibit made a very creditable display, and was only 22 points behind the winner.

	Possible.	South Coast.	Western N.S.W.
DAIRY PRODUCE—			
Butter	80	72	70
Milk	30	6	15
Cheese	40	34	33
Eggs	10	7	5
	160	119	123
FOODS—			
Hams and bacon	50	43	40
Beef and mutton	20	8	12
Sausages	10	10	4
Fish	10	4	4
Canned meats	25	20	12
Lard	15	13	13
Butchers' by-products	10	8	6
Honey	15	12	10
Confectionery	10	6	8
Bread	10	6	8
	175	130	117

	Possible.	South Coast.	Western N.S.W.
FRUITS—			
Fresh	60	50	40
Preserved	30	30	20
Dried	5	..	4
Vegetables	20	15	5
Preserved vegetables	10	7	10
Potatoes	20	17	10
Roots	14	8	4
Cocoanuts	6	3	..
Vegetable seeds	10	6	7
	175	136	100
GRAINS—			
Wheat	50	5	40
Maize	50	44	30
Barley	20	7	15
Oats	10	4	6
	130	60	91
MANUFACTURES—			
Woodwork	20	18	14
Ironwork	20	12	14
Leatherwork	20	14	15
Woollens	20	..	16
Tinwork	10	6	10
Manures	10	7	9
Brooms	10	8	10
Other manufactures	10	8	..
	120	73	88
MINERALS, ETC.—			
Gold	20	..	..
Coal	24	6	10
Stone	16	12	13
Woods	20	16	10
	80	34	33
TROPICAL PRODUCTS—			
Sugar-cane	60	40	..
Sugar	20	10	..
Spirits	10	7	..
Coffee	10	4	4
Cotton	30	7	8
Rubber	10	..	..
Oils	10	..	6
	150	68	18
WINES—			
Wines	15	5	15
Aerated waters	6	6	3
Cordials	9	7	4
Rum	10	10	..
	40	28	22
Tobacco	20	6	6

—	Possible.	South Coast.	Western N.S.W.
HAY AND CHAFF—			
Hay	40	12	36
Grasses	10	5	9
Chaffs	40	15	35
Ensilage	20	8	12
Sorghum	10	5	8
Fibres	10	4	6
Pumpkins	10	8	6
Hemp	10	..	..
Millet	10	7	7
	160	64	119
WOOL—			
Scoured	40	33	35
Greasy	60	40	60
Mohair	10	5	5
	110	78	100
LADIES' WORK—			
Needlework	10	9	9
Schoolwork	10	5	4
	20	14	13
Effective arrangement	50	42	44
TOTALS	1,390	852	874

"B" GRADE.

Competition in "B" Grade was very keen and the running up very close, Crow's Nest winning with 808 points, Fassifern coming second with 761, and Kingaroy third with 733 points, thus beating Gympie by only one point. The awards were as follow:—

—	Possible.	Fassifern.	Crow's Nest.	Gympie.	Kingaroy.
DAIRY PRODUCE—					
Butter	90	81	80	78	80
Cheese	50	41	45	37	30
Eggs	10	6	9	5	6
	150	128	134	120	116
FOODS—					
Hams and bacon	50	35	35	33	30
Fish	10	6	6	5	7
Lard	15	10	12	6	5
Honey	15	10	10	8	9
Confectionery	10	8	8	8	8
Bread	10	9	9	8	10
	110	78	80	68	69

	Possible.	Fassifern.	Crow's Nest.	Gympie.	Kingaroy.
FRUITS—					
Fresh	40	15	14	25	15
Preserved	40	35	30	30	30
Dried	5	3	4	2	3
Vegetables	20	15	14	14	7
Preserved vegetables	10	5	5	5	6
Potatoes	30	15	22	20	18
Roots	14	8	5	6	6
Cocoanuts	6	3	3	3	3
Vegetable seeds	10	6	6	5	5
	175	105	103	110	93
GRAINS—					
Wheat	60	15	54	10	49
Maize	60	53	52	52	42
Barley	20	6	14	9	12
Oats	10	6	6	5	8
	150	80	126	76	111
Bark	20	15	14	17	12
MINERALS, ETC.—					
Gold	20	3	15	15	10
Coal	10	5	7	5	5
Stone	10	4	6	4	7
Woods	20	18	12	14	15
	60	30	40	38	37
TROPICAL PRODUCTS—					
Sugar-cane	75	15	10	40	5
Coffee	10	..	3	5	..
Cotton	30	12	5	8	8
Oils	10	5	4	..	2
	125	32	22	53	15
WINES—					
Wines	15	10	15	5	11
Aerated waters	9	5	5	6	5
Cordials	6	6	4	5	4
	30	21	24	16	20
Tobacco	20	5	5	5	7
HAY AND CHAFF—					
Hay	50	30	20	26	28
Grasses	10	8	8	7	8
Chaffs	50	44	41	25	40
Ensilage	20	12	16	8	40
Sorghum	10	9	9	6	7
Fibres	10	7	4	5	4
Pumpkins	10	9	8	8	7
Hemp	10	4	4	4	3
Millet	10	9	7	8	8
	180	132	117	97	119
WOOL—					
Scoured	40	30	31	32	26
Greasy	60	48	46	47	46
Mohair	10	6	10	8	8
	110	84	87	87	80

—	Possible.	Fassifern.	Crow's Nest	Gympie.	Kingaroy.
OSTRICH FEATHERS—					
Natural	10	..	10	..	3
Prepared	10	..	10	..	3
	20	..	20	..	6
LADIES' WORK—					
Needlework	10	8	8	6	7
Schoolwork	10	7	3	4	5
	20	15	11	10	12
Effective arrangement..	50	36	25	35	36
GRAND TOTALS	1,230	751	808	732	733

HOME MILKING TESTS.

THE RESULTS.

The following are the results of the different home milking tests conducted by the National Association for the various breeds. The conditions in each class were the same, namely:—Cow or heifer averaging the greatest daily yield of butter for forty-eight hours under Babcock test, milk to contain not less than 3 per cent. of butter fat. The test to be conducted on the farms by officers of the Department of Agriculture and Stock:—

AYRSHIRES.

—	—	Milk. Lb.	Test.	Commercial Butter.	Total, 48 Hours.
					Lb.
F. A. Stimpson's Rosette 3rd of Hilltop Plain ..	M.	26	3·28	1·00	
	E.	32	3·65	1·37	
	M.	33	4·65	1·80	
	E.	37	4·0	1·74	5·91
Jonas Holmes's Thelma of Myrtleview	M.	25	3·8	1·11	
	E.	24	4·0	1·12	
	M.	27½	3·6	1·15	
	E.	25½	3·9	1·16	4·54
Jonas Holmes's Tidy B. V. of Invercauld	M.	26	3·8	1·16	
	E.	22	4·4	1·13	
	M.	25	3·7	1·08	
	E.	21	4·4	1·08	4·45
John Anderson's Jeanette R. 2nd of Invercauld ..	M.	22½	4·9	1·29	
	E.	16½	5·3	1·03	
	M.	19	4·6	1·03	
	E.	18	5·0	1·06	4·41
W. F. Hammel's Sweet Marie	M.	28½	3·4	1·14	
	E	30	3·2	1·13	
	M	26	3·4	1·04	
	E	25½	3·6	1·08	4·39

AYRSHIRES—*continued.*

—	—	Milk. Lb.	Test.	Commercial Butter.	Total, 48 Hours.
					Lb.
J. H. Paten's Jeanette of Wanora	M	20½	4·0	·95	
	E	17	4·8	·96	
	M	21⅛	3·8	·96	
	E	16	4·6	·86	3·73
Jonas Holmes's Peggy..	M.	18	3·7	·78	
	E.	17½	4·2	·86	
	M.	20½	4·0	·95	
	E.	17	4·3	·85	3·44
F. A. Stimpson's Affection of Gowrie Park ..	M.	17	3·8	·76	
	E.	18½	3·6	·77	
	M.	19½	3·95	·89	
	E.	20½	3·3	·78	3·20
F. A. Stimpson's Model	M.	20	4·2	·98	
	E.	18	3·4	·72	
	M.	18½	3·7	·79	
	E.	19	2·9	·63	3·12
Jonas Holmes's May Mischief of Invercauld ..	M.	20	3·0	·69	
	E.	18½	3·4	·72	
	M.	22½	3·6	·94	
	E.	17	3·7	·73	3·08

The Ayrshire Herd Society's test is the same as above, with the exception that "Sweet Marie" did not compete.

MILKING SHORTHORNS.

Nestle and Anglo-Swiss Condensed Milk Co.'s Butterfly	M.	26	4·0	1·21	
	E.	17	4·8	·96	
	M.	23	3·6	·96	
	E.	16	4·9	·92	4·05
M. Lawrence's Dairymaid of City View	M.	20	2·4	·55	
	A.	17¼	3·5	·70	
	N.	14	3·5	·57	
	M.	18	3·1	·65	
	A.	16	4·5	·85	
	N.	16	3·0	·55	3·87
McIntyre Bros.' Lark 2nd	M.	22½	3·0	·79	
	E.	20	3·6	·84	
	M.	22¾	3·0	·80	
	E.	22	3·4	·88	3·31
Nestle and Anglo-Swiss Condensed Milk Co.'s Necklace	M.	15	3·5	·61	
	E.	10	4·5	·53	
	M.	14	3·8	·62	
	E.	10	4·1	·48	2·24

ILLAWARRAS.

E. D. Dunn's Blossom 3rd	M.	22	3·4	·88	
	A.	17½	4·2	·86	
	N.	14½	4·8	·82	
	M.	20	3·0	·70	
	A.	20½	4·2	1·01	
	N.	16¼	4·6	·88	5·15
H. Marquardt's Champion	M.	27	3·0	·94	
	E.	28	4·2	1·38	
	M.	26	3·2	·97	
	E.	27	5·0	1·59	4·88

ILLAWARRAS—*continued.*

—	—	Milk. Lb.	Test.	Commercial Butter.	Total, 48 Hours.
					Lb.
A. T. Waters's Tulip of Railway View	M.	19¾	3·2	·73	
	A.	16½	3·8	·73	
	N.	15½	4·4	·79	
	M.	19¼	3·5	·78	
	A.	14¼	4·2	·70	
	N.	12¾	5·6	·83	4·56
H. Marquardt's Shamrock	M.	22½	3·3	·855	
	E.	23½	4·4	1·205	
	M.	27	3·8	1·20	
	E.	23	4·4	1·18	4·44
P. Biddle's Laurel	M.	15½	5·6	1·02	
	E.	17½	5·2	1·07	
	M.	16½	5·5	1·07	
	E.	17½	5·2	1·07	4·23
S. Mitchell's Pendant	M.	25	3·8	1·11	
	E.	16	4·8	·90	
	M.	24½	3·8	1·09	
	E.	17	4·6	·92	4·02
S. Mitchell's Plum	M.	24	3·6	1·00	
	E.	18¼	4·4	·95	
	M.	23	3·8	1·03	
	E.	18	4·3	·90	3·88
D. Dunn's Jemima 3rd	M.	21	3·0	·74	
	A.	13	3·2	·49	
	N.	14	3·8	·62	
	M.	20½	2·8	·67	
	A.	17½	2·9	·58	
	N.	16	4·1	·77	3·87
H. Dickfos's Beauty of Booie	M.	27½	2·7	·855	
	E.	24¾	3·4	·98	
	M.	30	2·8	·97	
	E.	23¾	3·5	·97	3·775
Nestle and Anglo-Swiss Condensed Milk Co.'s Charm	M.	17	3·8	·76	
	E.	11	5·8	·75	
	M.	17	4·0	·79	
	E.	12	4·8	·67	2·97
HOLSTEINS.					
S H. Hocking's Psyche of St. Gwithian	M.	30	3·1	1·08	
	E.	27½	3·6	1·15	
	M.	28	3·0	·97	
	E.	26	3·6	1·09	4·29
Nestle and Anglo-Swiss Condensed Milk Co.'s Nolly 2nd of Kabibinska	M.	24½	2·4	·70	
	E.	20	3·3	·74	
	M.	24	2·6	·74	
	E.	20	3·4	·79	2·97
S. H. Hocking's Fraulein 3rd of St. Gwithian ..	M.	18½	3·45	·725	
	E.	13	3·6	·54	
	M.	18	3·5	·73	
	E.	14	3·3	·54	2·535
F. C. Gratton's Lunta 7th of Brundee	M.	16	3·2	·602	
	E.	14	3·2	·527	
	M.	17	3·1	·620	
	E.	14	3·5	·576	2·325

ADVANCE RESULTS.

On the night of the 17th instant the following results were declared in connection with two of the milking competitions conducted by the National Association. The other competitions for which lactation points had to be considered were not disclosed. The figures may be open to correction:—

COW, 4 YEARS OLD AND OVER, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

—	Milk.	Commercial Butter.
	Lb. oz.	Lb. oz.
D. Dunn's Blossom III.	100 13	4 $6\frac{3}{4}$
W. F. Hammel's Sweet Marie	111 1	4 $4\frac{4}{5}$
A. T. Waters's Tulip of Railway View	98 11	4 $3\frac{1}{10}$

COW YIELDING THE LARGEST SUPPLY OF MILK IN 48 HOURS.
W. F. Hammel's Sweet Marie, 111 lb. 1 oz.

BUTTER AWARDS.

The entries for the butter competition were far more numerous this year than at any previous show at Bowen Park, and competition was very keen. The special prize for the greatest aggregate number of points in all classes fell to the Toowoomba factory of the Darling Downs Co-operative Dairy Company, which scored 468 out of a possible 500 points.

In the unsalted class the first prize went to the Downs Co-operative Dairy Company, with 95 points, and the Logan and Albert Company was only half a point behind. The Boonah Factory of the Queensland Co-operative Dairy Company and the Wide Bay Co-operative Company were very highly commended. They scored 93½ and 93 points respectively. Ninety-five points were also gained by the Downs Company in the fresh class, the Grantham factory of the Queensland Co-operative Company and the Logan and Albert Company filling the places, with 94½ and 92½ points respectively. The Texas factory of the Warwick Company was successful in the export class (30 days' storage), with 95 points. The Downs Company came next with 93, and the Maleny Company with 92½. The Warwick Company also gained the special prize. With 94 points the Downs Company won the eight weeks' storage class, beating the Allora factory of the Warwick Company by 1½, and the Oakey Company by 2 points. The awards were made on the following scale of points:—Flavour, mild, mellow, nutty, 65; texture, even, granular, 20; colour, light, straw, or biscuit, 7; salting, should be sufficiently salted without destroying the natural flavour peculiar to butter, 4; packing and finish, non-vacuous; package also to count, 4. Total, 100.

UNSALTED, FACTORY MADE.

Box butter made at farm dairy, C. Bloss, Gympie, 90 points.

—	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Queensland Co-operative Dairy Company—						
Booval	57	18	7	4	4	90
Boonah	59	19½	7	4	4	93½
Grantham	57½	19½	7	4	4	92
Laidley	57½	19	7	4	4	91½
Gayndah Co-operative Dairy Company	56	19	7	4	3	89
Marburg Butter Factory	57	19	7	4	3½	90½
Stanley River Co-operative Dairy Company	57	19	7	4	3	90
Goombungee Co-operative Dairy Company	57	18½	7	4	3½	90
Oakey District Co-operative Dairy Co.	57	19	7	4	3	90
Kin Kin Co-operative Dairy Company	56½	18½	7	4	3	89
Caboolture Co-operative Dairy Company	56	18½	7	4	3	88½
Maleny Co-operative Dairy Company	56	18½	7	4	3	88½
Warwick Butter and Dairying Company—						
Millhill	57½	19	7	4	2½	90½
Allora	58½	19	7	4	3	91½
Mount Bismarck Co-operative Dairy Co.	57	18½	7	4	3½	90
Esk Co-operative Dairy Company	57½	19½	7	4	3½	91½
Atherton Tableland Co-operative Company	57	19½	6	4	3½	90
Killarney Dairy Company	54	18½	7	4	3	86½
Silverwood Co-operative Dairy Company—						
Terror's Creek	57	18½	7	4	2½	89
Gatton	57½	19	7	4	2½	90
Downs Co-operative Dairy Company—						
Dalby	54	18½	7	4	3½	87
Toowoomba	61	19½	7	4	3½	95
Maryborough Co-operative Dairy Co.—						
Maryborough	57½	19	7	4	3½	91
Kingaroy	55	20	7	4	3½	89½
Biggenden	56½	19	7	4	3½	90
Mundubbera	56	19½	7	4	3½	90½
Wide Bay Co-operative Dairy Company	60	19	7	4	3	93
Logan and Albert Co-operative Dairy Co.	59½	19½	7	3½	3	93½

FRESH, FACTORY MADE.

Queensland Co-operative Dairy Company—						
Booval	56	18½	6½	4	3½	88½
Boonah	57	19	6½	3½	4	90
Grantham	60	19½	7	4	4	94½
Laidley	56	18	7	3	4	88
Gayndah Co-operative Dairy Company	57	18½	6	4	3	88½
Marburg Butter Factory	55	18½	7	3	3½	87
Stanley River Co-operative Dairy Co.	57	19	6½	3½	3½	89½
Goombungee Co-operative Dairy Company	55	18½	6½	4	3	87½
Oakey District Co-operative Dairy Co.	57½	18½	6½	4	3	89½
Kin Kin Co-operative Dairy Company	58	18½	7	4	3	90½
Caboolture Co-operative Dairy Company	57	19	7	4	3	90
Maleny Co-operative Dairy Company	58½	18½	7	4	3½	91½
Warwick Butter and Dairying Company—						
Millhill	56½	19	6½	3½	3½	88
Allora	57	18½	6½	3½	3½	89
Mount Bismarck Co-operative Dairy Co.	56½	19	7	3½	3	89
Esk Co-operative Dairy Company	56½	19	7	4	3	89½
Atherton Tableland Co-operative Company	54	19	5½	4	3½	86
Killarney Dairy Company	55	18½	6½	3½	2½	86
Silverwood Dairy Farmers' Company—						
Terror's Creek	57½	19	7	4	3½	91
Gatton	59	18½	6½	3½	3	90½
Downs Co-operative Dairy Company—						
Dalby	56½	18½	6½	4	3½	89
Toowoomba	61	19½	7	4	3½	95

FRESH, FACTORY MADE—*continued.*

—	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Maryborough Co-operative Dairy Co.—						
Maryborough	54	18	7	4	3½	86½
Kingaroy	55	18½	7	4	3½	88
Biggenden	57	18½	6½	3½	3½	89
Mundubbera	57½	19	6	4	3½	90
Wide Bay Co-operative Dairy Company	57½	19	6½	4	3½	90½
Logan and Albert Co-operative Dairy Co.	59½	18½	7	3½	3	93½
THIRTY DAYS' STORAGE, SUITABLE FOR EXPORT.						
Queensland Farmers' Company—						
Booval	55	18½	5½	4	3½	86½
Boonah	56½	19	6½	4	4	90
Grantham	57	19½	6½	4	4	91
Laidley	56½	18½	5	4	4	88
Gayndah Co-operative Dairy Company	57	19½	7	4	3½	91
Marburg Butter Factory	56	18	6	3½	3½	87
Bundaberg Co-operative Dairy Company	56	18½	6	3	3½	87
Stanley River Co-operative Dairy Company	54	19	6½	4	3	86½
Goombungee Co-operative Dairy Company	57	18½	6	4	3	88½
Oakey District Co-operative Dairy Company	53	19	6½	4	3½	86
Kin Kin Co-operative Dairy Company	57	18	6	4	3½	88½
Caboolture Co-operative Dairy Company	55	20	7	4	3½	89½
Maleny Co-operative Dairy Company	59½	19	6½	4	3½	92
Warwick Butter and Dairying Company—						
Mill Hill	55	18½	6½	4	3½	87½
Allora	58	19½	7	3½	3	91
Texas	61	19½	7	4	3½	95
Mount Bismarck Co-operative Dairy Co.	57	18½	7	4	2½	89
Esk Co-operative Dairy Company	56	19½	7	4	3½	90
Downs Co-operative Dairy Company—						
Dalby	57	19	6½	4	3½	90
Toowoomba	60	19	6½	4	3½	93
Silverwood Dairy Farmers—						
Gatton	55	19	7	4	2½	87½
Terror's Creek	56½	18½	6½	4	3½	89
Atherton Tableland Company	55	19	6	4	4	88
Killarney Dairy Company	54	18½	6	4	4	86½
Logan and Albert Co-operative Dairy Co.	57	20	7	4	3½	91½
SPECIAL PRIZE, THIRTY DAYS' STORAGE.						
Queensland Farmers' Company—						
Booval	52	18	6	3½	4	83½
Boonah	54	19	7	4	4	88
Grantham	58	19½	7	4	4	92½
Laidley	55	19	6	4	4	88
Gayndah Co-operative Dairy Company	55	19½	7	4	3	88½
Marburg Butter Factory	54	18½	6½	3½	3½	86
Stanley River Co-operative Dairy Company	52	19	6	4	3	84
Oakey District Co-operative Dairy Co.	51	19	6½	4	3½	83½
Kin Kin Co-operative Dairy Company	54	19	6½	4	3½	89
Caboolture Co-operative Dairy Company	53	19½	6½	4	3½	86
Maleny Co-operative Dairy Company			(Disqualified)			
Warwick Butter and Dairying Company—						
Mill Hill	54	19	7	4	3½	87½
Allora	57½	19½	7	4	3½	91½
Texas	60	19	6½	4	3½	93
Mount Bismarck Co-operative Dairy Co.	54	19½	7	4	4	88½
Esk Co-operative Dairy Company			(Disqualified)			
Downs Co-operative Dairy Co., Toowoomba	57	19½	6½	4	3½	91
Silverwood Dairy Farmers—						
Gatton	52	19	6	3½	3½	84
Terror's Creek	54	18½	6½	3	3	85
Atherton Tableland Company	54	19	6	4	3½	86½
Logan and Albert Co-operative Dairy Co.	52	19½	7	4	3	85½

EIGHT WEEKS' STORAGE, SUITABLE FOR EXPORT.

—	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Queensland Farmers' Company—						
Booval	56	18½	5½	4	3½	87½
Boonah	57½	19	6½	4	4	91
Grantham	51	19½	7	4	4	85½
Laidley	57	19½	5½	4	4	90
Gayndah Co-operative Dairy Company	57	20	7	4	3½	91½
Marburg Butter Factory	58	18½	6	3½	3½	89½
Bundaberg Co-operative Dairy Company	55	18½	6	4	3½	87
Stanley River Co-operative Dairy Company	52	19	6½	4	3½	85
Oakey District Co-operative Dairy Co.	58½	19½	6½	4	3½	92
Caboolture Co-operative Dairy Company	54	19½	7	4	3½	88
Warwick Butter and Dairying Company—						
Mill Hill	53	18½	5	4	3½	84
Allora	59½	19½	6½	4	3	92½
Texas	52	19½	7	4	3½	86
Mount Bismarck Co-operative Dairy Co.	57	19½	7	4	3	91
Esk Co-operative Dairy Company	56	19½	7	3½	3½	89½
Downs Co-operative Dairy Company—						
Dalby	55	19	6½	4	3½	88
Toowoomba	60½	19	7	4	3½	94
Silverwood Dairy Farmers—						
Gatton	53	18	6	3½	3	83½
Terror's Creek	56	18½	6½	4	3	88
Atherton Tableland Company	53	19	6½	4	3½	86
Logan and Albert Co-operative Dairy Co.	52	19	6	3½	3½	86

CHEESE.

There were 146 entries of cheese this year. Space will not allow of the publication of the details of the award, but the results were as follow:—

In the export classes, white and coloured cheeses respectively, the Downs Dairy Company, Limited, was successful in gaining premier honours, with 93 points in each. The Biddeston Co-operative Dairy Company, Limited, followed in the former with 91 points, with Kooroongarra Co-operative Dairy Company, Limited, 90½, third. In the latter (coloured) the Lauriston Co-operative Dairy Company, Limited, secured second place with 91½, and the Pittsworth Dairy Company, Limited, third with 91. No fewer than twenty-six exhibits were displayed in the class medium cheeses, matured, and the blue ribbon went to the Greenmount Dairy Company, Limited's, No. 2 factory, with 92½ points, the Rosalie factory, Glencoe, securing 92, and the same company's Jondaryan factory 91½. In the two medium cheeses, under two months old, there was also a remarkably large entry. The distinction of first place was gained by the Pittsworth Dairy Company, Limited, Springside, with 92½ points, the Rosalie Cheese Factory, Glencoe, being only half a point behind, while a similar margin separated the Jondaryan factory of that company for third place. The honours in the loaf cheeses, matured class, went to the Rosalie Cheese Factory, Glencoe, with 93 points, the Warwick Butter and Dairying Company, Bony Mountain, 92½, was second, and the Mount Bismarck Dairy Company, Limited, followed closely with 92.

The under two months old loaf cheeses also attracted a big display, and the Rosalie Cheese Factory, Jondaryan, headed another very close contest with 93½ points. The Glencoe factory was runner-up with 93, and the Southbrook Dairy Company—last year's winner—was third with 92½.

PIG AWARDS.

Mr. Shelton, the judge, in speaking to a "Daily Mail" representative, said:—"The quality of the prize-takers at this year's show is excellent. Those that have not scored," he added, "have lost point either because they had not the quality or had not been properly prepared. Something more than a drop of oil is required to bring an animal up to show condition. One wants to commence weeks, or months, beforehand, if the animals are to be in tip-top condition, and though it is not necessary to over-fatten an animal, and so impair the breeding capacity, it is necessary that some preparation should be given. The Show Committee appears to have done its part, but exhibitors are not as numerous as they ought to be, and to make the show of more educational value something should be done for those who are unsuccessful in order that they may be better informed and prepared for future shows."

Improved Berkshires.—Boars: 2 years and over, Macfarlane Bros.' Onward 1 and champion; 1 to 2 years, Goodna Hospital for Insane's Goodna Serang; under 1 year, same owner's Kitchener 1, W. J. Warburton's Thunderbolt 2; under 6 months, Goodna Hospital for Insane's Daniel 1, W. J. Warburton's Tricky 2; family group, Macfarlane Bros.' Onward and progeny. Sows: 2 years and over, Macfarlane Bros.' Miss Request 1 and champion; 1 to 2 years, W. J. Warburton's Topsy; under 1 year, Goodna Hospital for Insane's Kitchen Maid 1, J. B. Freney's Bedmont 2; under 6 months, Goodna Hospital for Insane's Topsy 1, W. J. Warburton's Northgate Beauty 2; any age, with litter not over 6 weeks old, W. J. Warburton's Florence.

Yorkshires.—Boars: 2 years and over, W. J. Warburton's Rupert's Pride 1 and champion; 1 to 2 years, Gatton College's Adventurer of Wharfdale; under 1 year, W. J. Warburton's Northgate Boy 1, Gatton College's Pride of the Manor 2; under 6 months, W. J. Warburton's Northgate Rambler. Sows: 2 years and over, W. J. Warburton's Northgate Choice 1, same owner's Northgate Nell 2; 1 to 2 years, W. J. Warburton's Rose Flack; under 1 year, W. J. Warburton's Northgate Duchess 1, Gatton College's Laura Lass 2; under 6 months, W. J. Warburton's Snowdrop 1, same owner's Curley 2.

Tamworths.—Boars: 2 years and over, Dunwich Asylum's Stradbroke Sunrise; 1 to 2 years, D. W. Evans's Royal King 1 and champion; under 6 months, Dunwich Asylum. Sow, under 1 year, D. W. Evans's Indian Queen 1 and champion.

Miscellaneous.—3 bacon pigs, 100 lb. to 150 lb., W. J. Warburton; 3 bacon pigs, any breed or cross, 120 lb. to 150 lb., W. B. Osborne. Sow, with litter not over 6 weeks old, not fewer than 6 suckers, any breed, E. Vinter's Stella and progeny.

Pastoral.

A NEW PARASITE ON SHEEP MAGGOT FLIES.

Notes and Description of a Chalcid Parasite.

(*Chalcis calliphoræ.*)

BY W. W. FROGGATT, F.L.S., Government Entomologist, in the "Agricultural Gazette of New South Wales."

An important discovery in the economy of blowfly maggots was made at the Government Sheep-fly Experiment Station at Wooloondool, near Hay, in the early part of April. While in charge of the laboratory work, during the temporary absence of the officer-in-charge, Mr. T. McCarthy, entomological assistant, reported the discovery of a new parasite attacking blow-fly maggots.

He says: "Some fresh meat was placed in a tin with some soil outside the laboratory, where it was soon blown by the common yellow blow-fly (*Calliphora ocearia*). The maggots were left outside until they began to pupate, when they were brought inside and placed in the breeding cage with the small parasites (*Nasonia brevicornis*) for them to parasite. Later on, I was surprised to find two large hymenopterous parasites in the cage with the smaller ones, breeding out of the pupæ. On examining the remaining pupæ, I found that instead of them containing a number of the small Nasonia pupæ, many contained a single large pupa, evidently that of the new parasite. Thinking it might be a case of hyper-parasitism, both the new and the old parasites were placed in a glass cylinder with a supply of fresh fly pupæ, but while the little Nasonia wasps as usual set to work and parasitised the fly pupæ, the new Chalcis parasite took no notice of them. I then obtained some fresh full-grown active blow-fly maggots, and placed them in another glass cylinder, and introduced the new Chalcis parasites, which immediately went for the active maggots, and clinging to them with their stout legs punctured the skin and inserted their sharp needle-like ovipositors."

These parasitised maggots soon afterwards pupated without any apparent difficulty, and later on Mr. McCarthy bred out a large number of the new Chalcis parasite, and with them parasitised a large quantity of blow-fly maggots, which have since pupated, and are now hibernating in the fly pupal cases.

Mr. McCarthy made further experiments by placing the fly pupæ that had been previously parasitised by the large Chalcid wasp in the maggot state in a glass cylinder with some Nasonia wasps, but they refused to puncture them though freely parasitising the fresh uninfected pupæ mixed with them.

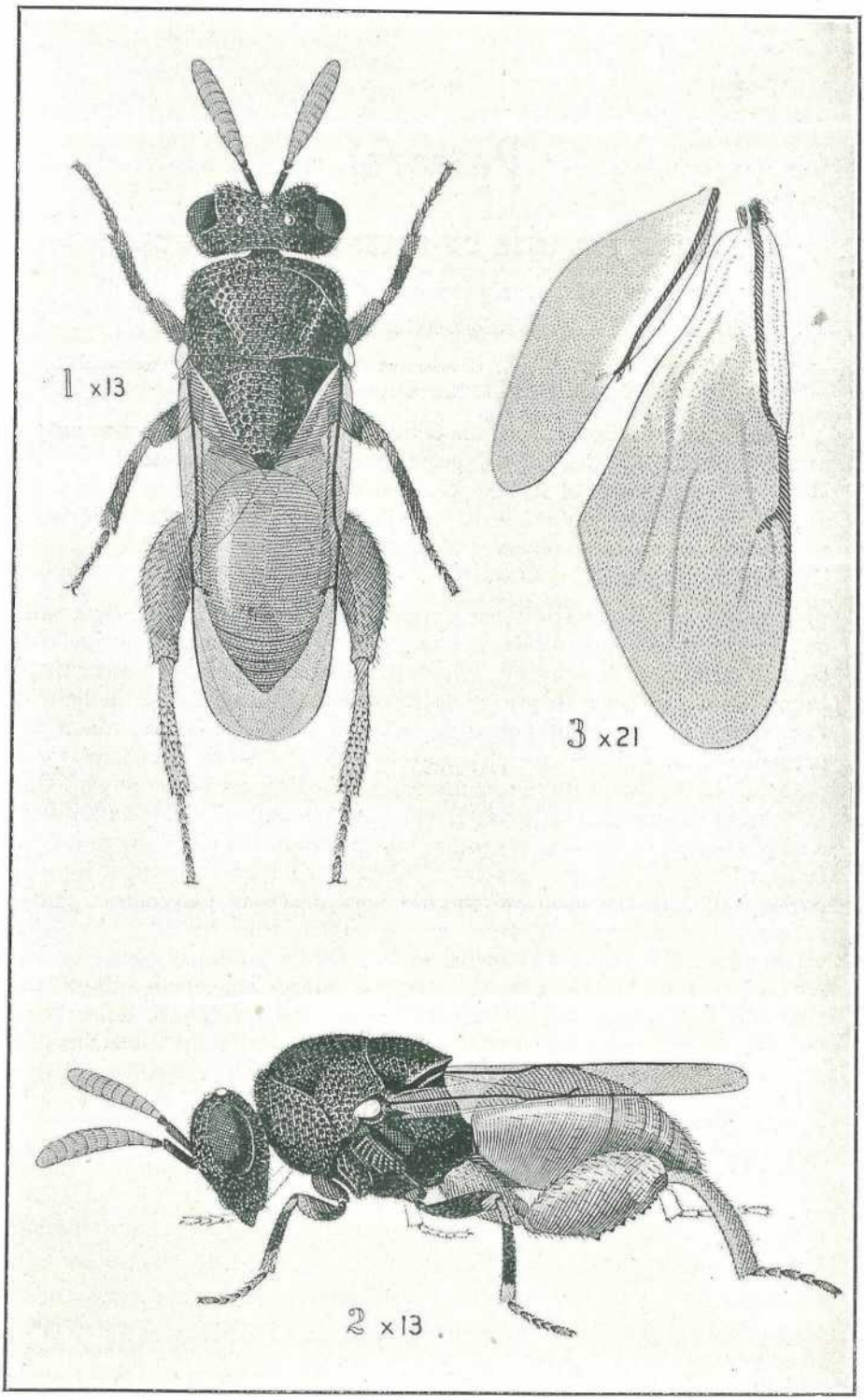

PLATE 22.—A NEW PARASITE ON SHEEP MAGGOT FLIES.
1. Dorsal view of *Chalcis calliphoræ*. 2. Side-view of same.
3. Enlarged view of one of the wings.

The discovery of a parasite which attacks the blow-fly maggots before they pupate may be another important factor in the control of these pests, and, though only a single Chalcid wasp emerges from each fly pupa, and the increase is not so rapid as the more prolific Nasonia, yet finding out the maggots before they seek cover, or have time to pupate, may be a great advantage in fighting the blow-flies.

The new parasite is quite as hardy, and as easy to handle and breed as the former one, will feed in captivity, and will stand a long journey by post in a packet.

This handsome little, thick-legged, black wasp belongs to the typical Genus Chalcis, and is very distinct in markings and coloration from any species known to the writer. It is about the size of the common house-fly, with the antennæ reddish yellow, and the thickened hind legs and oval abdomen shining reddish brown. Nearly all the members of the Genus Chalcis are parasitic on the caterpillars of small moths, and are seldom found parasitising the larvæ of other orders of insects.

The following is a technical description of this fine parasite, which is quite distinct from any name species known to the writer, and for which he proposes the following distinctive name:—

CHALCIS CALLIPHORÆ, N.SP.

Male.—Head, thorax, the two basal joints of the antennæ, basal portion of the femora and central portion of the tibia of the forelegs, black. The ten terminal joints of the antennæ are dull reddish brown. Wings hyaline, covered with short, fine scattered hairs, nervures black, tegulæ pale yellow to almost white. Legs: Fore and second pair of legs mottled with yellow at the apex; hind legs and abdomen bright, shining, light reddish brown, the former blotched with yellow on the apex of the femora and tibia.

Female.—Head broad, rugose and deeply punctate, face clothed with fine scattered hairs; the antennæ springing from a cavity in the front of the head, scape long, second joint small, third to tenth fusiform, thickened, and the terminal one longest and rounded at the apex; the eyes large, projecting; ocelli large. Thorax broad, very rugose and deeply punctate, apex of the scutellum terminating with two blunt pointed projections. Wings normal. Legs clothed with fine scattered hair; fore and second pair with the femora short, cylindrical, and swollen in the centre; tibia slender, tarsi long, very hairy; hind legs; trochanter large, femur large, swollen, oval, furnished on the outer margin of the under side with a row of eight short, black-thorn shaped spines, a ninth nearer the apex, and the apex terminating in a longer spine; the tibia of a uniform thickness curved round and fitting close against the under-surface of the femora, the tip on the inner margin produced into a curved thickened spine. Abdomen with a very short stalk (almost sessile), broadly rounded at the base, oval, and tapering to the apex; ovipositor, when at rest, hidden. Length from front of head to tip of abdomen $\frac{1}{6}$th of an inch. Locality, Wooloondool, near Hay, New South Wales.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JULY, 1916.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Queen Kate	Ayrshire	15 June, 1916	1,116	4·0	52·41	
Nina ...	Shorthorn... ...	24 June ,,	1,079	3·5	44·18	
Thornton Fairetta	Jersey	26 May ,,	729	4·9	42·14	
Bluebelle ...	,, ...	22 June ,,	786	4·5	41·65	
Princess Kate	Ayrshire	21 June ,,	803	4·2	39·64	
Lady Melba	Holstein	28 Oct., 1915	726	4·5	38·47	
Cocoatina ...	Jersey	17 Mar., 1916	526	5·3	32·94	
Auntie's Lass	Ayrshire	4 April ,,	615	4·4	31·85	
Lady Margaret	,, ...	14 Oct., 1915	594	4·5	31·48	
Lady Loch II.	,, ...	17 Mar., 1916	568	4·7	31·47	
Iron Plate ...	Jersey	20 Jan. ,,	526	5·0	31·04	
Mistress Bee	,, ...	21 Jan. ,,	484	5·3	30·32	
Constancy ...	Ayrshire	24 Nov., 1915	448	5·6	29·67	
Belinda ...	,, ...	27 Feb., 1916	594	4·1	28·61	
Rosine ...	,, ...	5 July ,,	547	4·4	28·32	
Miss Mischief	,, ...	15 June ,,	501	4·7	27·76	
Charity ...	Jersey	28 May ,,	483	4·7	26·75	
LadyMitchell	Holstein	3 June ,,	488	4·6	26·44	
Lady Spec...	Ayrshire	6 Jan. ,,	511	4·3	25·85	
Lady Lark...	,, ...	24 June ,,	494	4·4	25·58	
Netherton Belle	,, ...	23 April ,,	428	5·0	25·25	
Violette's Peer's Girl	Jersey	8 Dec., 1915	390	5·3	24·42	
Twylish's Maid	,, ...	22 Oct. ,,	329	6·2	24·16	
Lady's Maid	Shorthorn... ...	26 Jan., 1916	504	4·0	23·67	
La Hurette Hope	Jersey	17 Nov , 1915	342	5·6	22·64	
Lowla II. ...	Shorth'rn-Ayrshire	6 July, 1916	517	3·7	22·41	
Jeannie ...	Ayrshire	1 Nov., 1915	444	4·0	20·84	
Lerida II. ...	,, ...	12 June, 1916	426	4·1	20·51	
Red Lark ...	,, ...	21 June ,,	459	3·8	20·44	

During the early part of the month the cows were fed on lucerne chaff and Soudan grass, but during the latter part of the month they were fed on maize silage and Cape barley.

THE AGRICULTURAL BANK.

COMMISSION OR PROCURATION FEE BEING CHARGED ON ADVANCES OBTAINED FROM AGRICULTURAL BANK.

It having come to the knowledge of the trustees of the Agricultural Bank that certain agents have charged clients of the bank a procuration fee or commission for obtaining an advance from the bank, the trustees desire it to be known that as an agent or any other person has no influence whatever in obtaining an advance from the bank, a procuration fee or commission should not be paid by clients for assistance from the bank.

The Horse.

THE MULE FOR AUSTRALIA.

The great value of the mules in modern warfare, especially for transport work in mountainous country, has been amply demonstrated during the course of the present war. Some time ago a very good article appeared in "The Agricultural Journal," of Victoria, the gist of which we give in these notes on mule-breeding. The mule, which is greatly prized and valued in many countries of the old and new world, either for riding, traction, general farm purposes, or as a pack animal, has never been adopted, except in very isolated cases, by Australians for any of these purposes.

Mules were employed many years ago by Messrs. Cobb and Company for their coaches between Ravenswood and Townsville, and proved very satisfactory, although the leaders sometimes took it into their heads to turn back and look into the coach to see how many passengers there were, or else they would wait until the most precipitous and narrowest part of the range road was reached, when they would incline to the very edge of the precipice and scratch themselves against trees, resisting all the blandishments of the driver until they had finished their scratch.

In North and South America the mule is universally recognised as a most reliable animal for farm work, and it there almost completely usurps the place of the horse. It is the reverse in Australia, although why this should be so is not very clear. We hear a great deal about the number of light mares and horses running on Australian pastures, which have cost as much to produce as £20-horses, and yet are dear at £5. Could these mares not be put to some profitable use? It was stated in "The Agricultural Journal of Victoria" for October, 1905, that many of these could be used for breeding mules. The raising of mules in the United States and in other countries is a very extensive and profitable industry. At a recent sale of donkeys in America, at Limestone Vale Farm, 59 of these animals were sold. Of them, 29 were jacks and 30 jennets. They averaged £96 10s. A jack, foaled in 1901, brought 280 guineas, and the average for the 29 jacks was something under £150. The jennets averaged £45 each, and some went as high as 170 guineas. How do our Queensland horse sales show against this? In connection with this particular sale, the "Breeders' Gazette" says:—"It was a square deal auction from start to finish. Every known defect of the animals was mentioned by the proprietors before the auctioneer asked for bids. Every animal in the catalogue was sold." Whether these defects refer only to unsoundness or to structural defects and vices we know not, but we can hardly imagine a horse-owner or any other owner in this country pointing out to intending exhibitors the faults of their animals. There seems, however, to be a moral in this sale, for it is also mentioned that the sale was conceded to be the most successful public sale of this class of stock ever held in Missouri. It would be a distinct innovation to hear before an auction in this country some such announcement as this: 'Gentlemen,

lot 1, as you may observe, is an oldish mare. She may or may not breed again, but it really does not matter much. She has bred a few things—mostly weeds, which never paid the service fee and their board. You may also observe that her feet are none too good, but she is well provided with sidebone, and that splint is fairly prominent. Her wind might be better. She is much too narrow, and looks much like a gelding at the head. You should also notice that her action leaves something to be desired. I might mention, however, she is particularly active when anyone is within striking distance of her heels, and there are one or two other trifles, such as crib biting, &c. Now, gentlemen, start me.' ''

In what are mules preferable to horses?

In the first place, a mule is not bred for speed, but for endurance. He does not make a good roadster, he is not stylish, but what he lacks in speed and beauty he makes up in actual usefulness on the farm. A few of the good points about a mule are: He is easy to raise. He eats very little as compared with a horse. Owing to his persistent uniform gait, long-sustained, a good mule will beat a horse on a journey. With respect to sickness, few people have ever seen a sick mule. He is proof against diseases which usually attack a horse. Even the African tsetse fly gives the mule best. In proportion to size, he will pull more than a horse and ''stay'' longer. He will endure hardships which would kill the best horse foaled. He does not seem to be injuriously affected by heat or cold. He is much easier to break in than a horse, and, once broken in, is more reliable, being dogged and persevering. His doggedness is usually called stubbornness. ''As stubborn as a mule'' has become a byword, but this stubbornness is one of the mule's best characteristics, because it is the trait which impels him to effort after effort to do the work imposed on him. He is occasionally vicious, but, as in the case of many vicious horses, this is a result of bad training. The ''Tennessee Farmer'' says that, if a mule team bolts, the mules all look after themselves. They will dodge and turn and avoid obstacles, whereas horses would run blindfold into any obstacle and kill or impale themselves in their blind madness. The Victorian journal quotes Mr. J. L. Jones, of Columbia, Tennessee, a well-known authority on mule-breeding, who says:—''There is no kind of labour to which a horse can be put for which a mule may not be made to answer, while there are many for which mules are more peculiarly adapted than horses; among the rest, that of mining, where the mule is used, and many of them need no drivers. The mule is better adapted for carrying burdens, for the plough, and agricultural machinery, for building railroads, and, in fact, for all kinds of heavy work. I have driven a 16-hand mule, out of a thoroughbred mare, in a buggy with two men and baggage 32 miles in four hours, and she was quite fit and ready to go on.'' The same journal says, in an article on ''Mule-breeding,'' by W. T. Kendall, M.R.C.V.S.:—

KINDS OF MULE.

There are two kinds or classes of mule—viz., one the produce of the male ass, or jack, and the mare; and the other the offspring of the stallion and female ass or jennet. The cross between the jack and the mare is properly called the mule, while the other, the produce of the stallion and

jennet, is designated a hinny. The mule is the more valuable animal of the two, having more size, style, finish, bone, and, in fact, all the requisites which make that animal so much prized as a useful burden-bearing animal. The hinny is small in size, and is wanting in the qualities requisite to a great draught animal. This hybrid is not supposed to breed, as no instance is known to us in which a stallion mule has been prolific, although he seems to be physically perfect, and shows great fondness for the female, and serves readily. There are instances on record where the female has produced a foal, but these are rare.

The mule partakes of the several characteristics of both its parents, having the head, ear, foot, and bone of the jack, while in height and body it follows the mare. It has the voice of neither, but is between the two, and more nearly resembles the jack. It possesses the patience, endurance, and sure-footedness of the jack, and the vigour, courage, and strength of the horse. It is easily kept, very hardy, and no path is too precipitous or mountain trail too difficult for one of them with its burden. The mule enjoys comparative immunity from disease, and lives to a comparatively great age. Pliny gives an account, taken from Græcian history, of one that was 80 years old, and, though past labour, followed those that were carrying material to build a temple. Dr. Reese mentions two that were 70 years old, in England. Mr. J. L. Jones knows of a mule in Middle Tennessee that, when young, was a beautiful dapple grey, but is now 30 years old, and is as white as snow. This mule is so faithful and true, and has broken so many young things to work by its side, that he bears the name of "Counsellor." The last time he was seen by Mr. Jones he was in a team attached to a reaper, drawing at a rate sufficient to cut 15 acres of grain per day.

THE KIND OF SIRE TO BREED FROM.

There are two kinds of jacks—the mule jack and the jennet jack, or combined jack, that is good for either mares or jennets, and is used chiefly in breeding jacks for stock purposes. It is only with the mule jack that we will deal, as the jennet jack is too costly to breed to mares, as a rule, unless the mares are of extra quality.

A good mule jack ought not to be less than 15 hands high, and have all the weight, head, ear, foot, bone, and length that can be obtained, coupled with a broad chest, wide hips, and with all the style attainable with those qualities. Smaller jacks often produce good mules, and when bred to large roomy mares show excellent results. Black with light points is a favourite colour, but many grey, blue, and even white jacks produce good mules. In America many varieties are to be met with—viz., the Catalonian, Andalusian, Maltese, Majorca, Italian, and Poitou, as well as a native jack. Of these, the Catalonian is considered the best. He is of good colour, possesses clean bone, and runs from 14½ to 16 hands, though he rarely reaches the latter. The Andalusian is about the same size, but of worse colour. The Maltese rarely exceeds 14½ hands, but is of fine quality. The Majorca is the largest, and frequently grows to 16 hands. The Italian is small, but a remarkably good breeder. The Poitou runs about 15 hands, and has heavy bones, long hair, and a good foot. The Kentucky jack, on account of the good grass and limestone formation, grows to a large size, and is preferred by many breeders to any of the imported varieties. These would probably form the best sires for Australia.

THE KIND OF MARE TO BREED FROM.

As already pointed out, the better the mare the better the mule, for it is found that the latter partakes very largely the body and shape of its mother. But, while always preferable to have a sound sire and a sound dam, there are many mares, and especially farm mares, with slight side-bones, or a tendency to ring-bone, or flat-footed, which, though unsuitable to breed to a draught or weedy thoroughbred stallion, would breed good useful mules, for these would not appear in the mule. As the mule is required for draught rather than speed, and increases in value with every inch of his height, and every pound in weight, it would be undesirable to use too weedy mares. It has been stated that the reason that farmers dislike breeding light horses, and prefer draughts, is that the latter can be put to work at two and a-half years old, and the mares worked at slow farm work while in foal, whereas this cannot be done with the lighter breeds, which are a continual source of expense, and earn no part of their livelihood until sold. What applies to draught horses equally applies to mules if the right sort of mares are used.

REARING THE MULE.

While the mule is capable of foraging for himself where an ordinary horse would starve, it is equally true that, with good feeding and kind treatment, he grows into a finer and more valuable animal. The young mule can be weaned at four months old, and will do well for himself if grass is plentiful, so that the dam need not be idle more than half the year; in fact, if well cared for, and only used for slow work, she may be almost worked the year round. At 2 years old the mule is easily broken. When accustomed to the feel of the harness, if he has already been broken to lead, he will take his place alongside a broken mule or horse, and go to work, and, if well fed, will do his share.

MARKET FOR MULES.

When speaking on this subject at the Farmers' Convention at Colac two years ago, I was asked by a farmer if I thought anyone would buy a mule if he bred one. My reply was that if he bred one and worked him he would not want to sell him, but would lose no time in breeding more for himself or for sale. With proper encouragement to start it, mule-breeding will soon take care of itself; and whenever the local demand that will arise, when the true value of the animal is known, becomes supplied—and that will not be for many years to come—there is a ready market in India and other countries for all we can supply.

CONCLUSION.

In making comparisons between the horse and the mule, I do not wish to disparage the former, which I think the most beautiful as well as the most useful animal that has ever been domesticated by man. My only desire is to show that the patient, plodding mule possesses potentialities that are little dreamt of by the majority of Australians. For the explorer, the gold-seeker, the pioneer selector in the Gippsland or Otway Ranges, where vehicular traffic is impossible, or the struggling wheat-grower in the innermost Mallee fringe, the trusty mule is the animal *par excellence* to share his toil, and will well repay a trial.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1916.

Eight thousand three hundred and forty-one eggs were laid during the month. Most of the birds are now doing good work. Cowan Bros.' Black Orpingtons win the monthly prize with 153 eggs. The following are the individual records :—

Competitors.	Breed.	July.	Total.
*T. Fanning	White Leghorns ...	141	470
*J. Zahl	Do.	147	444
*Mrs. J. Jobling, N.S.W.	Black Orpingtons ...	131	426
A. Howe, N.S.W.	White Leghorns ...	134	411
*Miss M. Hinze	Do.	139	402
*A. T. Coomber	Do.	126	402
*Dixie Egg Plant	Do.	124	394
G. H. Turner	Do.	135	389
*J. M. Manson	Do.	133	377
Dr. E. C. Jennings	Do.	136	376
W. Meneely	Do.	119	371
T. B. Hawkins	Do.	119	359
Geo. Tomlinson	Do.	129	354
J. R. Wilson	Do.	146	344
W. Lyell	Do.	111	338
J. M. Manson	Black Orpingtons ...	129	337
*E. A. Smith	White Leghorns ...	123	337
S. B. Tutin	Do.	107	335
*A. E. Walters	Do.	118	334
Geo. Prince	Do.	125	333
*E. F. Dennis	Do.	110	330
A. W. Bailey	Do.	113	327
*J. F. Dalrymple, N.S.W.	Rhode Island Reds ...	117	326
T. E. Jarman, N.S.W.	White Leghorns ...	114	317
Mrs. Munro	Do.	86	317
H. Jobling, N.S.W.	Black Orpingtons ...	108	312
C. P. Buchanan	White Leghorns ...	113	311
T. Taylor	Do.	116	310
Mrs. W. D. Bradburne, N.S.W. ...	Do.	117	309
A. F. Camkin, N.S.W.	Do.	130	308
H. W. Broad	Do.	101	303
*C. Knoblauch	Do.	121	303
*J. Anderson, Victoria	Red Sussex	93	303
*W. L. Forrest	White Leghorns ...	120	303
*Kelvin Poultry Farm	Do.	94	301
Mrs. C. Davis	Do.	119	297
*J. H. Gill, Victoria	Do.	123	296
*E. West	Do.	111	295
Cowan Bros., N.S.W.	Black Orpingtons ...	153	295
P. Brodie	White Leghorns ...	88	293
F. Clayton, N.S.W.	Do.	119	292
Kelvin Poultry Farm	Do.	102	292
R. Burns	S. L. Wyandottes ...	143	289
J. Gosley	White Leghorns ...	128	285
A. H. Padman, S.A.	Do.	100	283

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	July.	Total.
Mars Poultry Farm	White Leghorns ...	111	278
*W. H. Knowles, junr.	Do.	130	270
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	117	264
King and Watson, N.S.W.	White Leghorns ...	109	257
T. Fanning	Black Orpingtons ...	121	257
E. Pocock	White Leghorns ...	119	256
J. Anderson, Victoria	Do.	128	251
R. Burns	Black Orpingtons ...	139	248
W. H. Forsyth, N.S.W.	Do.	119	246
W. Hirst, N.S.W.	White Leghorns ...	108	241
W. Purvis, S.A.	Do.	126	237
*J. W. Macrae	Black Orpingtons ...	124	231
F. Clayton, N.S.W.	Rhode Island Reds ...	116	231
E. F. Dennis	Black Orpingtons ...	126	226
J. G. Richter	White Leghorns ...	112	218
Cowan Bros., N.S.W.	Do.	104	212
W. Becker...	Do.	105	211
G. W. Holland	Do.	75	202
L. K. Pettit, N.S.W.	Do.	96	186
Mars Poultry Farm	Black Orpingtons ...	114	182
Harveston Poultry Farm	White Leghorns ...	109	157
W. Lindus, N.S.W.	Do.	95	146
A. T. Coomber	Sicilian Buttercups ...	43	141
F. Leney	White Leghorns ...	84	141
H. Hammill, N.S.W.	Do.	85	130
E. F. Dennis	White Wyandottes ...	71	106
Moritz Bros., S.A.	White Leghorns ...	91	104
F. W. Leney	Rhode Island Reds ...	53	92
Totals	...	8,341	20,851

* Denotes engaged in single pen test.

RETURNS FROM SINGLE PEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
T. Fanning	83	90	84	84	72	57	470
J. Zahl	72	72	80	68	73	76	444
Mrs. Jobling	87	96	49	74	50	70	426
Miss Hinze	71	55	87	60	67	62	402
A. T. Coomber	76	79	68	53	59	67	402
Dixie Egg Plant	95	83	78	70	0	68	394
J. Manson	47	86	59	56	77	52	377
E. A. Smith	79	52	51	78	39	38	337
A. E. Walters	61	87	49	38	70	29	334
E. F. Dennis	54	77	30	69	56	44	330
J. F. Dalrymple	57	43	77	20	63	66	326
C. Knoblauch	59	48	38	44	56	58	303
J. Anderson	71	40	71	0	83	38	303
W. F. Forrest	52	58	38	67	54	34	303
Kelvin Poultry Farm	47	33	57	39	70	55	301
J. H. Gill	24	73	27	79	45	48	296
E. West	74	61	32	37	28	63	295
W. H. Knowles	55	34	51	29	50	51	270
J. H. Madrers	26	57	57	66	40	18	264
J. W. Macrae	9	68	58	29	30	37	231

The Orchard.

THE PECAN NUT.

Although the walnut and the pecan tree thrive well in the cool districts of Queensland, particularly on the Main Range, near Toowoomba, and bear profusely, very few people on the land have ever taken the trouble to plant them. Yet quantities of walnuts are regularly imported, and meet with ready sale. The reason for this apathy is nut-tree planting could easily be accounted for if it were a question of planting an orchard of such trees, waiting some years for a crop, and creating or finding a market for the produce. But there is no need to devote any large area of land to an exclusive plantation of nut-bearing trees. Large numbers of trees can be planted along the boundary fences of the land without in the least interfering with the production of the usual farm crops. They would be beneficial, irrespective of their fruit, as breakwinds, and eventually as furnishing a supply of mill-timber and firewood. Very little attention is needed in the case of walnuts, chestnuts, pecans, &c. They continue to grow whilst the farmer devotes his labour to the production of the usual crops, or to dairying, sugar-growing, &c.

How many years does it take the pecan to bear? Competent authorities in the United States of America are all in accord in assigning the limit of from five to ten years, but, singular to say, the age limit does not apply to the pecan as to most other fruit trees—size alone determines the period elapsing between planting and harvesting a first crop. Congeniality of soil and reasonable attention at the outset determine the size more than time, and bring about the bearing period. Whenever this size and height are attained, if only in five years, the young tree will bear; if not reached in 100 years, it will not bear. Hence the importance of promoting quick growth by every means possible in selecting the most congenial soil, and planting that which gives the best send off of nut or scion. The size of the tree in bearing often varies. Thus, no young tree is apt to bear until it reaches the height of 8 ft., and has a well-grown trunk and a heavy top, and every tree is apt to bear by the time, or before it attains 15 ft. in height, unless the trees are so crowded as to run up like scaffold poles.

The first fruits are very scant, two or three nuts to a handful on a tree. But after the tap-root strikes water or permanent moisture and congenial soil, the growth is very rapid, as well as the increase in bearing.

A convenient distance at which to plant the nuts is from 24 to 30 ft. We have mentioned the Main Range as a suitable locality for pecan growing. Some years ago (1901) Mr. H. L. Pentecost had 37 pecan trees. Some received proper attention and averaged at that time 9 ft. in height. In the year after that height was attained the trees bore, although Mr. Pentecost did not expect any fruit before they were 20

years old. Care has to be exercised in transplanting young trees, as it is necessary to dig down nearly 3 ft. to get to the bottom of the tap-roots before getting any fibrous roots. Professor E. N. Plant, Kansas, relates that, when engaged in making a botanical survey of the State of Kansas, he had frequent opportunities to study the peculiarities of the pecan tree, "that prince among the hickories, indeed, of American nut-bearing trees."

Kansas has most of the North American hickories.

The pecan is the most beautiful and symmetrical tree of the genus. Its range extends about 100 miles north from the southern boundary of the State, and 200 miles west from the line of Missouri.* Throughout that district it is abundant. Its favourite station is the rich bottom lands of our creeks and rivers.

There, individuals are found 2 or even 3 ft. in diameter, and rivalling in height the tallest of our forest trees. The pecan is very much disposed to come in and occupy the ground to the exclusion of other trees, where the original forest has been cut off. A second growth of hundreds of individuals of this species may be frequently seen growing along our watercourses. The tree grows rapidly. It bears young. It is generally healthy and free from the attacks of insects. It is worthy of far more general cultivation than it has yet received. The nut of this tree commands a high price in the markets. The demand for it that is likely to increase largely in the future will render its cultivation profitable. Few better investments of capital could be made, even in this favoured State, than in planting out orchards of pecan trees on our rich bottom lands.

TRAPPING THE FRUIT-FLY AND MOTHS.

Various suggestions have been made as to methods of destroying or trapping the fruit-fly. Here is one we have just come across—the following idea:—

Get a number of pieces of board and tin and paint them with luminous paint; then hang them in the fruit trees, and cover them with some sticky matter, such as honey or treacle. The flies, moths, &c., will be attracted, and will stick on the boards. When pretty well covered with insects, they can be washed or again painted.

SOCIETIES.

We must again draw the attention of Hon. Secretaries of Agricultural and other Societies to the frequent neglect of retiring or incoming secretaries to notify us of any change in the office. As an instance, we were just lately advised that a certain Association, which has had a place in our list to date, was defunct seven years ago.

* That is, from 37° to 39° degrees north latitude and about 94° to 98° west longitude.

Horticulture.

WHEN AND HOW TO PRUNE ROSES.

In a very excellent article on "Planting and Pruning Roses," the "Garden and Field," Adelaide, points out that while the time for pruning roses is now approaching for South Australia, in New South Wales and Queensland the work is done much earlier than in the Southern State, the reason being chiefly that the warmer the climate, and, consequently, the earlier the spring, the sooner the roses must be prepared for it. In the Southern States pruning is generally later, and even in New South Wales, in the colder districts with their late springs, the pruning may be much later than in the warmer coastal parts.

"As a general rule, to prune very late means to get a fairly early bloom; and if it has been done severely, as some gardeners do, leaving not a leaf on the stems, the result is a brief period of very full bloom. This is not a good garden system, as it gives us only two or three crowded weeks of blossom, during which period the bushes are covered, and then leaves them incapable of putting forth any more effort until the autumn. The time for pruning, therefore, must be varied according to the particular districts and its seasons, and with a due regard for the desired result.

"How to Prune.

"Perhaps a few rules for the guidance of the amateur pruner will be of value; and if the veteran should happen to glance over them, and find that the writer's ideas differ from his, he must be charitable, for in gardening, as in everything else, there are frequently two opinions, if not more.

"First of all, the old dry worn-out looking wood should be cut out. Sharp secateurs and a pruning knife for getting at the difficult places are required for this. Weakly looking shoots must also be cut out to give their better favoured fellows a chance. The shoots that are still young and immature at pruning time should also go, leaving only the well-developed and plump stems.

"As a general rule, the thorns are an indication of what to leave and what not to leave. The red thorns show the young undeveloped wood, the brown thorns are a sign of vigorous prime, and the sparse dead thorns are an indication of worn out stems. The work outlined, however, is only getting ready for pruning, as almost anyone can tell what should be cut away as useless. The real toil comes into play after this part of the work has been completed.

"PRUNING FOR BLOOMS.

"Having decided what stems are to be left, the next work is to trim these so that they will give the best possible results in the matter of bloom. Unpruned roses bloom, it is true, and often for several seasons, notwithstanding our neglect, but the flowers become smaller and poorer each time, and appear in a straggling way without much regard for season. Judicious pruning brings the best qualities of the rose into play and results in the production of buds at a time and in a manner that will give them the best possible chance of developing into fine flowers.

"The same rules do not apply to all kinds of roses alike, as some run to a free woody growth far more than others, and this exuberant growth must be checked.

"In cutting short a stem, the cutting is done as cleanly and sharply as possible, just above a bud. Always remember that the buds that point outward have the best chance of developing well. The buds referred to, of course, are the little shoots just showing out, not the flower buds. If the gardener is pruning to obtain a few special blooms, as for exhibition, very few of these buds are left, but for general purposes a much larger number are allowed to mature.

"Stems that have borne freely in the previous year may have worn themselves out, and, though large and well grown, they should be removed in favour of newer growth. A certain amount of care is needed also to shape the bush, not too severely, yet neatly. If the plants are young ones, they should not be checked too severely, but should be given a chance to form a certain amount of wood, before anything is done to bring out their blooming qualities.

"In planting roses in lawns or other situations other than in prepared beds, the holes should be dug at least three days before the planting is done. The holes should be dug about 2 feet deep and 18 inches in diameter. Make a mound of made-up soil at the bottom of the hole (in the shape of a cup or a basin turned upside down), so that the roots will train down the sides and be spread out to obtain all the sustenance within reach. Then cover in, water, and tread firmly."

MANURE FOR ROSES.

A good manure for roses is stated by the English National Rose Society to be:—"Basic slag, which contains lime and phosphorus, may with advantage be used in the proportion of 3 oz. to 4 oz. per square yard, whilst nitrogen may be afforded by a dressing of dried blood or fish guano, followed by applications of nitrate of soda. A good general manure for roses consists of two parts of dissolved Peruvian guano containing 8 per cent. of ammonia, one part bone meal, half-part sulphate of potash, one part of dried blood, half-part nitrate of soda. The whole should be well mixed, and applied in early spring at the rate of 5 oz. per square yard."

Tropical Industries.

COMMERCIAL CANE SUGAR IN SUGAR-CANE.

By J. C. BRÜNNICH, Agricultural Chemist.

A payment for sugar-cane based on analysis has always been considered the fairest method from both farmers' and manufacturers' point of view; the utilisation of the analytical figures for the calculation of the monetary value of a sample of cane, however, is not so easy as it appears on first view.

To estimate the value of cane either from the density of the juice (° Brix or Beaumé), or from the amount of sucrose or cane sugar in the juice alone, is obviously out of question, and it has therefore become customary to calculate from the analysis of the juice the amount of sugar in the cane, which is sought to be obtained during manufacture, after taking into account various interfering factors, and which may be called "available sugar," "Pure obtainable cane sugar," or "Commercial cane sugar" of the cane.

A large number of factors have an influence in the recovery of the sugar from the cane in the course of manufacture, and it is quite impossible to establish a mathematical formula which could take all the factors into account, and therefore no formula of commercial cane sugar can express the absolute value of a sugar-cane to the miller.

We may have two samples of cane with absolutely identical values of commercial cane sugar and containing even the same amount of fibre, and still the actual value of the canes, as found by practical experience in the mill, from the yield of sugar in the bags, may be very different. Not only the total amount of fibre in the cane, which by itself is easily taken into calculation, but the arrangement or rather distribution of the fibre in the structure of the cane stalk is of utmost importance to the miller, but cannot be allowed for in any simple formula.

The stalk itself is made of joints, of various length and thickness, separated by much harder nodes, to which the buds or eyes are attached. The stalk itself consists, broadly speaking, of three parts: a hard outer rind and a mass of soft tissue, which is interspersed with numerous bundles of harder fibre. In the cells of the soft tissue, or parenchyma, the sugar is stored up, whereas the fibres or fibro-vascular bundles transmit water and all food materials from the roots to the leaves, and assimilated products from the leaves back to the stalk. In each variety of cane the size, shape, and arrangement of these fibre bundles vary, and not only the actual crushing quality of the cane variety, but also the extraction of the sugar and impurities, due to easier or more difficult diffusion of the maceration water into the cells, must depend on the structure of the cane stalk.

The impurities in the cane juice, roughly indicated by the difference between the total amount of soluble solids in the cane juice (° Brix) and the amount of sucrose, have an important bearing on the manufacture and recovery of sugar. Only part of these impurities can be removed in the course of manufacture, and the part remaining contributes largely to the production of molasses in preventing certain amounts of the sugar to crystallise. A great number of chemical compounds make up the non-sugars of the cane juice, and all act differently, and an ideal formula of commercial cane sugar should take at least each of the most important compounds into calculation. This is, of course, quite unpractical, as no complete analysis of every cane juice could possibly be made.

The impurities or non-sugars in the juices of certain cane varieties are often fairly constant and characteristic, and therefore differentiate the milling quality of the numerous cane varieties, so that the same amount of commercial cane sugar (C.C.S.) in two varieties of cane may not have the same value to the miller.

A formula for C.C.S. can make no difference between unripe, ripe and over-ripe cane, but the difference in the working of juices is well known to every manufacturer, and more particularly the high density juices of over-ripe cane, with a comparatively high amount of C.C.S., yield generally very viscous and refractory juices, and are therefore of much less value than a juice of a normal healthy cane which may actually contain a smaller amount of C.C.S.

Season, locality, and variety of cane should therefore be taken into account in the calculation of the C.C.S. of a cane, and as this is not possible, allowance should be made when translating the value of C.C.S. into monetary value or fixing of prices.

The analysis of burnt cane is frequently very misleading in fixing its value. A cane freshly burnt will often show an increase in the percentage of sucrose by ordinary analysis, but still the recovery of the sugar in the mill is seriously diminished when treating large quantities of burnt cane. Here, again, the formula of the C.C.S. is at fault, and for this reason a justified but quite arbitrary deduction in the price is generally made. The apparent increase of sucrose is sometimes due to loss of moisture during burning, but is frequently due to dextro-rotary bodies formed, the presence of which is detected by determining the sucrose after Clerget's method. But even if the composition of burnt cane is apparently normal, due to the more or less severe heating of the juice in the cane, some subtle change has taken place which places the sugar into a kind of unstable condition, so that during crushing, maceration, and clarifying, inversion of the sugar proceeds much more rapidly than in normal cane juice.

For the purpose of the calculation of the commercial cane sugar in cane, laid down by regulation under "*The Regulation of Sugar Cane Prices Act of* 1915," in the front roller juice the amounts of total soluble solids (° Brix) and the cane sugar or sucrose are determined, and in the sample of cane the amount of fibre has to be determined. The analysis of the juice is a comparatively simple matter, but the determination of fibre is rather difficult, as it is not easy to get a true average sample

of canes from the trucks and to disintegrade the sample into a fine pulp suitable for analysis. The total soluble solids in the cane are calculated as follows:—

$$\text{Total soluble solids in cane} = \text{Total soluble solids in juice} \times \frac{100-(3+\text{fibre})}{100}$$

and

$$\text{Sucrose in cane} = \text{sucrose in juice} \times \frac{100-(5+\text{fibre})}{100}.$$

The difference in the calculation of the two constituents is due to the fact that the slight extraction between front roller and top roller of the first mill yields a purer juice than actually existing in the cane.

The impurities in the cane are the difference between the total soluble solids and sucrose in the cane, and for the calculation of the C.C.S. half of these impurities are deducted from the sucrose in the cane, so that we have the following formula:—

$$\text{C.C.S. in cane} = S\frac{100-(5+F)}{100} - \frac{B\frac{100-(3+F)}{100} - S\frac{100-(5+F)}{100}}{2}$$

or simplified for calculation—

$$\text{C.C.S.} = 1\tfrac{1}{2} \times \frac{S\,(95-F) - \frac{B}{3}(97-F)}{100}$$

A difficulty in the determination of C.C.S. arises in those mills where part of the juice is expressed by special crushing rollers before the cane enters the mill, in which case neither the juice from the crushing rollers nor the juice from the front roller could be used by itself directly for analysis, and special instructions will have to be made for each individual case.

THE BRITISH NEW GUINEA DEVELOPMENT COMPANY'S ANNUAL REPORT.

In the year 1911, the pioneers of the company visited Port Moresby with the object of taking over certain lands in different parts of the territory. The representatives of the company were Messrs. C. Darling, South Australia, Mr. C. Jenkins, who was previously Premier of South Australia, Mr. John Macdonald, Superintendent of Public Works, and the writer, Editor of the "Queensland Agricultural Journal." These gentlemen, whom it was our privilege to accompany in the capacity of adviser as to the acceptance of land selections offered to them in various districts of Papua, both on the coast and inland as far as Sogeri, and on the coast, in Cloudy Bay and the Baubaguina River, Galley Beach and the Brown River, made an exhaustive examination of all the properties offered to them. In that year, nearly the whole of these properties were still in their pristine state of dense standing scrub. Passing over the years intervening between the date of the first landing at Port Moresby, we to-day publish the latest annual report of the company who, by the way, are deeply indebted to Mr. John Macdonald, the present Superintendent of Public Works, to whose long, intimate knowledge of the native question in the State is to be attributed the present favourable position of the company.

The final call of 2s. per share on the 7 per cent. participating preference shares has now been made, and from our advices from authentic sources in Papua we conclude that the British New Guinea Development Company is in a very thriving position, both as regards rubber, tobacco, and general trade.

The writer remembers the many difficulties under which the above-named explorers worked in the preliminary investigations. On one occasion, the members travelled on foot during heavy rains from Port Moresby to Sogeri, about 35 miles, and returned on the next day to Port Moresby.

The result of the explorations by sea, river, and land has been an unexampled success, and the results to date here follow:—

The British New Guinea Development Company, Limited, has found it necessary to make a final call of 2s. per share on the 7 per cent. participating preference shares. The general manager estimates the production of copra for the year ending 31st January, 1917, at 78 tons. The first shipment of 4,000 lb. of rubber recently arrived in London, and smoked sheet realised 3s. 5½d. per lb. The output of rubber for the current year is estimated at 26,880 lb. The preliminary report states that the Australian Government has done a good deal of survey work in the Papua oil district, and it is hoped that permission will ultimately be obtained to proceed with the development of the oil lands originally discovered by this company's representatives. Trading continues to be an important part of the undertaking. The general manager estimates the profit for this year, including tobacco, at £10,000, and next year £12,000, subject to war conditions. Apart from the plantations, the company has various assets, consisting of town property, ships, plant and machinery, live stock, stores and produce on hand to the estimated value of over £100,000. In the directors' opinion, the cash resources will be sufficient to bring the plantations to maturity.

A surveyor has measured the plantations, and the actual surveyed areas will probably be: Cocoanuts, 5,000 acres, rubber, 1,000 acres; sisal hemp, 1,000 acres. Copra for the year ending 31st January, 1917, is estimated at 78 tons only, but should rapidly increase. In 1918 there should be about 1,400 acres in bearing, and in 1919 about 2,500 acres. At a conservative estimate, copra from mature trees should be half a ton per acre. Para rubber trees ready for tapping in December last totalled 15,761. The general manager estimates 26,880 lb. this year, and 89,600 lb. next year. Sisal hemp this year is estimated at 120 tons. There are 7,000 acres of planted land, and there are 48,000 acres of selected land still available.

A NEW FIBRE AVAILABLE IN CUBA.

The article below is from the "Textile Mercury" of 29th April:—
There are eleven known varieties of the so-called "malva" in Cuba, but that locally designated as "malva blanca" (*Urena lobata*) has been determined to be a very promising source of fibre, from which may

eventually be woven the supply of sugar sacks for the Cuban market, while the finer varieties can undoubtedly be used in the manufacture of new fabrics for wearing apparel.

According to Mr. Garrard Harris, the United States special agent there, experiments have been conducted in Cuba for several years, with the idea of utilising the malva fibres, but only in the last two years have the processes of extraction been elaborated on a basis that makes the extraction a commercial possibility. Malva fibre is now being manufactured and sold on the market at Habana, principally to the makers of alpargatas, or cloth shoes, worn by the labouring classes. The fibre is mixed with jute and used for soles. The persons producing it claim that they can profitably produce and ship it for less than 1½d. per lb. with present crude methods, and that the cost would be considerably reduced with proper labour-saving machinery and equipment. It is, however, as the fibre from which to make the 20,000,000 sugar sacks needed in Cuba annually that the owners of the process have the greatest hope for it. They assert that sacks of malva of 2½ lb. each can be placed on the market at 3½d. to 5d. each and still leave a profit, and at current prices for jute sacks the profit would be larger. Normally, the Calcutta or Dundee sacks sell, delivered in Habana, at 8d. to 9d. each, and in war times have been selling at considerably higher prices. The malva fibre is claimed to have about the same textile strength as Dacca jute, and its fineness is between jute and flax. It is believed that by seed selection and cultivation the fibre can be improved in both strength and quality. Sufficient results have already been achieved to demonstrate that the cultivated plant responds to good treatment, and comparisons with the wild plant show a better fibre from cultivated plants only one year removed from the wild seed. Seed is now being obtained from selected plants with a view to further tests.

Malva blanca is generally regarded as a troublesome weed by the tobacco planters of Pinar del Rio, where it grows best. In its wild state it attains a height of 20 ft. under favourable conditions, but usually averages between 6 and 10 ft. on ordinary soil. During the growing season, it is claimed, it will make two crops of 6 to 10 ft. where it is cultivated, and, according to the method of planting it, will produce a stalk ½ in. to 1½ in. in diameter. From the bark on this stalk the fibre is obtained. The plant requires a good soil. It grows wild under ordinary conditions, and the more rain and moisture it gets the better the growth. Wind-storms do not injure it, and it is thoroughly hardy in the Cuban climate. To cultivate it the ground is ploughed and seeds are sown from March until May. The ground is thoroughly harrowed, and the rows are put four to the yard. About 1,200 lb. of seed is required to sow a caballeria (33⅓ acres). The young plants are thinned until they stand on an average of 44 to the square yard. By planting thickly and growing in this manner the tendency to throw out lateral branches is checked; the growth is forced upward, thus making a long, clear stalk; the leaves and branches grow on top of a tall switch, so to speak. After thinning out, intercultivation would probably be necessary to prevent growth of weeds.

In three and a-half months, when the plants have reached a height of from 6 to 8 ft., cutting is commenced, this being the best age at which to harvest. It is claimed that two cuttings may be made in a year without the necessity of replanting, new sprouts being thrown up from the stumps left in the ground. The present method of cutting is by hand, the men using "machetes," or cane knives, and striking a downward blow at the root. This frequently cuts below the buds and destroys the ability of the plant to throw out other stalks, thus curtailing the second crop. It is purposed to use on the next crop a corn cutter and binder, not only to reduce expenses of gathering, but for the protection of the roots. Modifications in the cutter and binder will probably be necessary to adapt it to the harvesting of this fibre. Cutting may be continued until the end of November. In December the plant normally begins to put on seed, and the fibre is more difficult to work then.

Plants cut after a three or three and a-half months' growth show only one layer of fibre. Old plants that are allowed to go to seed without having been cut, it is claimed, show as many as eight layers of varying degrees of fineness, thickness, and strength; but it is difficult to extract them separately. For commercial purposes the three or three and a-half months' growth has been found best as a result of continued experimentation.

At the experimental grounds several miles from the town of Vinales, in the province of Pinar del Rio, Cuba, two methods of handling malva have been evolved. Both require the use of water. The cost of cutting under the present hand methods is about 12s. 6d. per 10,000 green stalks, or the labour of three men at 4s. 2d. each per day. The average amount cut by three men equals the above figure. They work with "machetes" or cane knives. The stalks are loaded upon wagons and taken to the "retting tank," or steeping pond. A wagon can carry only 100 arrobas of 25 lb. each at a load, and 4s. 2d. for each load is charged. It is purposed to use a movable bark-stripping machine, gasoline power, which will handle the crop as it is cut and piled by the harvester. The 2,500 lb. of stalk would yield 20 arrobas (500 lb.) of bark; of this bark, 5 arrobas (125 lb.) would be fibre. As much as 200 arrobas of bark could be piled on a wagon at one load, so that the initial cost of transportation from fields to processing vats could be reduced to about one-tenth of what it now is. Moreover, fewer men would be required than where the brush only is handled. Possibly other economies in this line could be effected under adequately capitalised business. The experimenters claim to have devised and patented an economical bark stripper.

The stalks or the bark is placed in the rectangular wooden "retting pond," which is about 25 by 60 ft. and 4 ft. deep. The crude product is then weighted down in a solution of weak sulphur water, to which a small quantity of potash has been added. The potash hastens the elimination of mucilaginous matter in the stalks, adds whiteness to the fibre, and does not injure either strength or texture, so it is claimed. The bark or stalks remain in the solution from 6 to 40 days, depending upon the temperature. The higher the temperature the more rapidly the process is completed. Steam pipes in the tank, it is asserted, would hasten the chemical

action, make the results certain, and enable the workers to be independent of climatic conditions.

The other method is simply to place the stalks or bark in one of the running sulphur streams in the Vinales district. The fibre from the stream is much whiter than that from the pond or tank. Possibly the sulphur water has a bleaching effect, and, on the other hand, it is very likely that being in clear running water instead of the stagnant and none too clean water in the "retting pond" has something to do with this feature. On taking the bark, or stalks, from stream or retting pond, when examination has disclosed that it is ready to be worked, the process is slightly different for each method of treatment. The bark from the retting pool is then hung in the air and sun, and atmospheric action loosens the remaining particles of mucilage and bark, which are largely removed by vigorous shaking. On the other hand, the stalks removed from the sulphur streams have to be dried out. Women strip off the loosened fibre and tie it in "hands," or small bundles. The fibre is then ready for shipment, and is packed in open, rope-bound bales of about 400 lb. each.

A RAPIDLY VULCANISING RUBBER.

WARNING TO RUBBER PLANTERS.

The Rubber Growers' Association, London, 12th April, 1916, draws the special attention of members to the following report by the association's consulting chemist:—

In a recent issue of the "Agricultural Bulletin of the Federated Malay States" (Vol. IV., No. 2, of November, 1915, p. 30), there appears an article by one of the staff, entitled "Preliminary note on a new rapidly vulcanising rubber." This article deals with experiments in which the coagulated rubber is treated with caustic soda, sodium carbonate or lime. It is stated that the rubber so treated cures rapidly, and the writer concludes, "It is possible that a rubber of this type may be of considerable value commercially, in view of the remarkably rapid rate at which it vulcanises."

It is, however, a known fact that even small quantities of alkalies or lime have a profound effect on the vulcanisation of rubber, and the North British Rubber Company have addressed a letter to your association to this effect. They state that the use of alkali might result disastrously for those planters who might adopt it, on account of the changes which ensue in a short period of time in the vulcanised samples to which alkali has been added. They state that, sooner or later, perishing almost invariably sets in, and, in fact, the whole practice is an extremely dangerous one. The North British Rubber Company fear that the publicity of the bulletin amongst planters and the remarks at the end of the paper that the addition of alkali may give a type of rubber of considerable commercial value might prompt certain planters to adopt the use of alkali on their estates, and that this at a later date would come home to them to their discredit.

Members of the association who have subscribed to the research fund will already have been informed of the danger of treating rubber with caustic soda. A reference to the 17th Malaya Report, p. 13, will show that we stated that manufacturers would certainly take objection to rubber in the preparation of which caustic soda and lime were employed. Further tests we have made prove the deterioration referred to by the North British Rubber Company, and details of these tests will be published in our report to the association. Members are therefore advised on no account to treat their rubber with caustic soda or other strongly alkaline substances.—"Clayton Beadle and Stevens."

QUEENSLAND SUGAR CROP—SECOND ESTIMATE.

Since the last approximate estimate of the 1916 sugar crop was published in March last, Mr. Easterby, General Superintendent of Sugar Experiment Stations, states that conditions have improved to some extent, and it is now probable that about 186,000 tons of sugar will be manufactured, providing all conditions remain favourable. This output, at the price of £18 for raw sugar, will be worth some £3,348,000, and, apart from this value, it shows the enormous benefit of the sugar industry as a means of retaining wealth in the country, for, as recently pointed out by the president of the Australian Sugar Producers' Association, the importation of the above amount of sugar would mean many millions of pounds being sent to other countries which take little or nothing in return from us.

A NEW HYBRID YELLOW WHEAT.

A new wheat, named "Ceres," has been obtained by crossing Yellow Briquet with Autumn Victoria in the experiment fields of Messrs. Denaiffe at Carignam. Having been grown for some ten years under very variable conditions of soil and climate, it has always shown great constancy together with strong constitution; it is perfectly hardy, and has remarkable rust resistance. This hybrid is, in nearly every point, clearly intermediate between its two parents; it is semi-late, tillers well, producing fairly long and firm straw, quite white when ripe.

Its characteristics are as follows:—Ears white, rather elongated, semi-compact, not tapering at the summit; spikelets arranged somewhat in the form of a fan with short, much inflated glumes, completely filled by the grain, which is medium-sized, short and very full, and bright yellow in colour.

This wheat, while giving a heavy crop of straw and grain, and extremely regular in its growth, is not exacting, and suits all moderately fertile soils. The great strength of its straw also allows of its being grown on rich soils. Ceres seems from its pedigree and parentage likely to be one of the varieties that are really resistant to straw blight.—"Bull. Int. Inst. of Agric."

Viticulture.

WINE GROWERS' CO-OPERATIVE WINE CELLARS.

By C. A. GATTINO, Charleville.

Owing to the poor conditions of the wine market here in Australia, it is absolutely necessary for all wine grape growers to devise some action to prevent the falling off of this great agricultural industry.

The excellence of the produce, its uniformity, the qualities corresponding with the wants of a certain market, the right and honest advertising, are the means that can and must bring about the increase of the wine consumption.

If not all, certainly most of these means could be brought into action by a Wine Growers' Co-operative Cellar, and they could then all be effectuated by a union of these co-operatives.

These cellars would seem something new for the Australian farmer, but they are really not a novelty, and must not be considered so new as to prevent their acceptance.

Although the association's principle here is strongly felt in political matters, it is not yet well accepted in the economical sense. The good farmer generally thinks: "How should I associate myself with others who do not hold soils, fields, or crops as good as mine? Why should I bring them profits that would, perhaps, result to my disadvantage?" "Every one for himself and God for all." That is their argument.

And so, not being able to apply the progress of the science, to know how and where to place the produce to better advantage, the slowly developing agriculture will always be exposed to suffer the slightest economical adversity of the markets and never ready to take advantage of the favourable periods.

All this is the result of not recognising the great principle that "Union makes strength."

These cellars are the right co-operatives of production, as they constitute a first material property of the associates.

It is not necessary for a number of farmers to form the co-operative. I think, instead, that the cellar should start by working the produce of a few only, as an easier beginning. The other farmers would join after recognising its usefulness, and the increase of production would then bring the maximum advantages and afford a better chance of applying all Oenology's dictates.

As you see, the co-operative wine cellars are particularly made for small proprietors of vineyards. These small farmers are the ones that,

in years of good harvest, fill the market with cheap grapes and generally make wines that cannot be classified and which are difficult to market except by local merchants.

It is, therefore, specially for them that the cellars are useful; but it is not from them that we have to expect the constitution.

Amongst all land proprietors they take better care of their farms, but they are certainly not the most learned or the most capable of taking the initiative.

Others, then, should willingly put their work and activity and knowledge into forming such co-operatives.

The purposes of the co-operative wine cellars will essentially be the following:—

(1) To obtain wines of constant type.

(2) To save all possible in the expenses of production.

(3) To gain a reputation for a certain district or State.

(4) To facilitate the trade of the produce through suitable advertising.

(5) To give to the members of the association means of getting advances on their crops, thus preventing the necessity for making forced sales.

(6) To be enabled, by an understanding with the other wine cellars, to sustain the prices of the wines.

Each of the abovementioned purposes needs some words of explanation.

First, with the co-operative cellars we can obtain produce of constant type; and, in fact, as you well know, in working different qualities of grapes, it is easy to compensate or destroy, by manipulation, the good qualities or the faults, and it is also possible for the technical person managing the cellars to introduce to the raw material all the modifications that his knowledge and judgment think opportune.

There are still people who do not believe in the importance of the uniformity in type; this is only because they often see some buyers going to their cellar wishing one quality, and some others wanting another. This, however, is caused partly by the buyer's lack of commercial tact, and partly by the grower's inability to make wines such as are required.

The wine merchants often, not being able to find what they want, have to make the wines required by their trade, and, for the sake of saving a few pence per gallon, do not always buy the produce of the same vineyard, and not even the one of their own State.

If the wine merchants knew the harm they succeed in bringing to the growers and also to themselves, they would certainly look for a more proper method of trading, and if the wine merchants would be more faithful, they could obtain better prices and consistency in quality.

Therefore, the co-operative cellars, being able to prepare wines as required by the consumers of a certain district or State, and to approach the wine merchants better than a single grower, will assist in the development of the wine industry and bring it to a firmer and more flourishing condition.

With these co-operatives the cost of production would be cheaper; in working at the same time the grapes of several proprietors some of the labour and material expense would be proportionately reduced.

It would bring reputation to the produce of the district or State, because every one would know that in a co-operative cellar, where the technical direction is in the hands of a competent man, there will be applied all enological means to produce good wines, only, however, in the proportions allowed by the numbers and the financial strength of the cellar itself.

The advertising that a wine-grower can make for his own wines, especially if a small proprietor, will always give a minimum result and hardly would touch more than his nearest market. A co-operative cellar, with a smaller expense to each associate, can reach more distant markets and obtain what the wine-growers cannot get for themselves.

None of the small wine-growers can make known his wines in all the markets of our State or other States.

Another of the most economical results which can be realised through the co-operative cellars for the benefit of a certain district and of the small proprietors is represented by the advances on the value of the produce.

In opening a bank account for the members of the association, the latter could, draw by endorsement of the co-operative, the amounts they require for their cultivations at a low rate of interest, thus saving them from the hands of usurers.

The cellars could also issue warrants and make them circulate in the district instead of money; this, of course, when the wine-growers co-operative will have acquired the solidity and the credit that could not fail, if established and managed with proper method and honesty. Another useful advantage would be that these cellars could organise the institution of wine shops selling direct to the consumer, increasing the consumption of wine, by supplying at cheaper prices good, hygienic, pure juice of grapes, eliminating the profits and the handling by middle speculators.

All the abovementioned advantages should stimulate, in a grape farming district, the institution of one of these co-operative cellars, and very probably the Government would encourage these useful institutions by way of formation subsidies, for the interest and the development of this great agricultural industry and the economical benefit of the State.

[We shall be pleased to receive any correspondence bearing on the above subject.—Ed. "Q.A.J."]

Entomology.

GRUB PEST OF SUGAR CANE.—REMEDIAL MEASURES SUGGESTED.

The Bureau of Sugar Experiment Stations has just issued a Bulletin (No. 4 of the Division of Entomology), "The Value of Poison Bait for Controlling Cane Grubs," by Mr. Edmund Jarvis, Acting Entomologist to the Bureau at Gordonvale, near Cairns.

"Any method likely to be successful in coping with the most serious pest sugar-cane has to contend with is of the most urgent importance," states the General Superintendent, hence the early publication of this Bulletin, which deals with experiments on a laboratory scale only. The means advised of destroying grubs is by planting cowpea on each side of the rows of young cane, dusting over with arsenical poisons and then ploughing this bait under against the roots of the cane. The cost per acre is reasonable and the work can be expeditiously carried out. As thousands of pounds worth of damage is yearly done by grubs in North Queensland, farmers are asked to adopt the methods on fields where grubs are prevalent in those cases where cane will be planted in August and September next. Mr. Jarvis states that the proper time to sow the cowpea would be about three weeks after the first general appearance of the Greyback beetles, as the soil would then be disturbed after oviposition and probably many egg chambers would be broken. The emergence of beetles generally takes place at the end of the year. Copies of the Bulletin are being sent to all cane farmers' associations in Queensland, but any farmer unable to obtain a copy may secure one by applying to the General Superintendent of the Bureau of Sugar Experiment Stations.

CONTROL OF INSECT ENEMIES OF THE SUGAR-CANE.

By E. JARVIS, Entomologist.

The following report has been received from the Entomologist of the Bureau of Sugar Experiment Stations by the General Superintendent:—

The past month has been devoted mainly to the study of two phases of natural control affecting the economy of certain insect enemies of cane, viz.:—(1) Meteorological conditions, with relation to their influence on the distribution and numerical increase of cane-beetles; and (2) predaceous insects, with special reference to a species presumed to be predatory on some of our minor pests of cane.

Field investigations regarding the latter form of control have led to the discovery of a most beneficial orthopterous insect that is evidently an inveterate foe of the sugar-cane plant-louse (*Aphis sacchari* L.).

This interesting species is none other than a small arboreal earwig that has attracted considerable notice in these parts, owing to its habit of flying very plentifully around acetylene lights, &c., on warm evenings, and often crawling over one's face.

It was mentioned in a previous monthly report ("Australian Sugar Journal," vol. VII., p. 449) as being possibly predaceous and having been observed on light-traps used for catching cockchafers.

The adult insect—which varies in length from one-half to five-eighths of an inch—is of a general dark reddish-brown colour, with thorax, tegmina, and legs light yellow, and a conspicuous brown stripe down the centre of wing-covers. Its body is polished in appearance, and the anal cerci or forceps of the male are longer and more slender than those of the opposite sex, and much widened at the base internally in the form of an obtuse triangle.

This pretty earwig is most likely a species of the genus Labia, but seems, up to the present, to have escaped the notice of systematists, as specimens submitted to the Australian Museum in 1915 were returned to me unnamed.

Although excessively abundant throughout forest country, it habitually frequents canefields in the vicinity of Gordonvale, where numbers may be met with at all times of the year, either crawling over the foliage of stools or hiding behind withered leaf-sheaths and between the young unfolding leaves.

Whilst studying our bud-moth of sugar-cane in 1915, I found that its larvæ during confinement were devoured by this earwig, but results then obtained were not conclusive, as no experiments were carried out under natural conditions.

The following evidence, however, resulting from both laboratory and field tests, affords substantial proof as to its carniverous tastes and great fondness for aphides.

When confined separately in large test tubes containing a portion of cane leaf infested with plant-lice, four of these earwigs consumed between them 120 specimens in seven hours—an average of about seventeen per hour.

Upon being introduced into the cages they pounced without loss of time on the defenceless prey, seizing an aphis with their sharp mandibles and holding the succulent morsel aloft while engaged in chewing it.

Each capture was generally followed by a quick backward movement of a few paces, the insect then standing motionless until ready for another mouthful.

It was amusing to watch these operations with the help of a powerful reading-glass, and observe how little colonies of aphides scattered in consternation as the enemy walked into their midst and started to snap them up one after another with relentless indifference. The first victims were usually vivaparous females of the wingless class; but larvæ, nymphs, and winged adults were also eaten with equal relish. The time occupied in devouring individual specimens varied from fifteen to twenty seconds. An earwig was next allowed to run up the leaf of a large growing cane plant on which aphides had been established and were breeding, its preliminary movements being closely studied with a magnifying glass.

In about a minute after release, having travelled ten or twelve inches, it encountered an assemblage of plant-lice and at once started to clear them off, eating a dozen or more with scarcely a pause, and in a manner that left little room for doubt regarding the nature of one of its favourite foods under natural conditions.

When examined four days later the foliage of this plant was perfectly clean, and not an aphis could be found.

As far as I am aware, the only earwig hitherto known to science as being to some extent carnivorous is a common European species, which, however, like most members of the family Forficulidæ, is a general feeder, subsisting chiefly on fruit and miscellaneous vegetable matter.

The occurrence in Queensland of an additional predatory earwig of decided economic value should prove a matter of interest to sugar-planters generally, both here and in such countries as Porto Rico and Hawaii, where Aphis sacchari occasionally causes noticeable damage to cane crops.

In all probability we are largely indebted to the insect now brought under notice for the efficient control of our plant-lice, which being always more or less in evidence at Gordonvale, would, if unchecked, multiply to an alarming degree.

THE OUTLOOK FOR COTTON.

"Cotton and Cotton Oil News," Dollar, Texas, U.S.A., 12th June, writes thus hopefully on the position of the cotton market after the war:—

"If the boll weevils destroy as much of this year's cotton as they did last year, the remnant that escapes the weevil will not adequately supply the world's demands, even if the war should continue, and should the war cease this fall (autumn) the price of the staple will go 'sky-rocketing.' The prudent farmer, however, will be prepared for either contingency by growing his own food and food supplies. The farmer who does this, year in and year out, loses no sleep over the ravages of the weevil, or over wars and rumours of war. His ways are ways of pleasantness, and all his paths are peace."

General Notes.

A NEW TANNING PROCESS.

A new rapid tanning process, which has been patented in France by M. J. Boilley, is described by the "Leather Manufacturer." It consists essentially in subjecting the skins to the preliminary action of a special mordant, with the object of fixing the tanning substances in the fibres of the skins more rapidly and permanently. The process can be applied either to the so-called "rapid tanning" or to slow tanning—that is, by the use of barks or extracts. This mordanting action is practised on skins that have been previously unhaired and delimed, and is obtained by the action of different mordants used in dyeing, such as alum, certain salts of iron or aluminium, &c., but also frequently with acetate of aluminium diluted in an equal weight of water, and free, as far as possible, from sulphuric acid, salts of iron, and pyroligneous substances that might discolour the leather.

The skins are immersed in this bath and allowed to remain from twenty-eight to forty-eight hours, so as to become thoroughly impregnated with the mordant, and prepared to retain the tanning substances employed later.

After the above bath the skins are taken out and allowed to drain off, and are then placed in a tan liquor composed of water and tanning extracts, in the same proportions as used for the rapid tanning process. They are left in this liquor for eight or ten days, until tanning is complete, after which they are removed and again set to drain off, when they are dried as usual.

In case it is desired to change the rapid tannage for the slow process, the skins are treated in the pits in the usual way.

Owing to the mordanting action they have undergone, the skins swell and absorb the tanning matter rapidly through all their substance. On the other hand, as this matter is not held in suspension in the skins as in present methods of rapid tanning, but are thoroughly fixed in the fibres, subsequent washing removes only the excess of tanning material used, without touching those that have been assimilated with the fibres.

To effect properly the fixing of the tannin, the skins should be frequently suspended and the liquor kept in a constant slow rotary movement, but not violently agitated, which would have the effect of injuring the skins. For this purpose a suction pump is used in the lower part of the tank and the liquor is discharged at the top.

The above process is applicable to all kinds of skins, varying the time of immersion according to their nature, thickness, &c.—"Leather Trades' Review."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR AUGUST, 1916.

Article.		AUGUST. Prices.
Bacon	lb.	9d. to 11d.
Barley	bush.	...
Bran	ton	£7
Broom Millet	„	£18 to £25
Butter	cwt.	140s.
Chaff, Mixed	ton	£5 5s.
Chaff, Oaten	„	£5 to £5 10s.
Chaff, Lucerne	„	£4 10s. to £6 10s.
Chaff, Wheaten	„	£3 15s.
Cheese	lb.	9½d to 10d.
Flour	ton	£12 5s.
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£7 7s. to £7 10s.
Hay, Lucerne	„	£3 10s. to £4 10s.
Honey	lb.	6d.
Maize	bush.	3s. 5d. to 4s.
Oats	„	3s. 6d. to 4s.
Onions	ton	£5 15s. to £6 6s.
Peanuts	lb.	3d. to 4d.
Pollard	ton	£5 15s.
Potatoes	„	£10 10s. to £12
Potatoes (Sweet)	cwt.	3s. to 4s. 6d.
Pumpkins (Cattle)	ton	£1 15s.
Eggs	doz.	8d. to 11d.
Fowls	pair	5s. 6d. to 7s. 6d.
Ducks, English	„	4s. to 6s.
Ducks, Muscovy	„	5s. to 8s.
Geese	„	10s.
Turkeys (Hens)	„	10s. to 13s.
Turkeys (Gobblers)	„	15s. to 22s.
Wheat	bush.	5s. to 5s. 3d.

VEGETABLES—TURBOT STREET MARKETS.

Cabbages, per dozen	1s. to 3s.
Beans, per sugar bag	3s. 6d. to 7s.
Beetroot, per dozen bunches	9d. to 1s.
Carrots, per dozen bunches	9d. to 1s.
Cauliflowers, per dozen	6s. to 12s. 6d.
Chocos, per quarter-case	1s. 6d. to 1s. 9d.
Celery, per bundle	1s. 3d. to 1s. 9d.
Custard Marrows, per dozen	3s.
Vegetable Marrows, per dozen	3s.
Lettuce, per dozen	4d. to 9d.
Peas, per sugar bag	3s. to 8s.
Sweet Potatoes, per sugar bag	1s. 6d. to 1s. 9d.
Table Pumpkins, per cwt.	1s. to 1s. 9d.
Tomatoes, per quarter-case	1s. to 4s.
Turnips, per dozen bunches	4d. to 6d.
Rhubarb, per dozen bundles	8d. to 1s.

SOUTHERN FRUIT MARKETS.

Article.	JULY. Prices.
Bananas (Queensland), per case	7s. to 9s.
Bananas (Fiji), per case	13s. to 14s.
Bananas (G.M.), per case	10s. to 16s.
Custard Apples, per tray	4s. to 6s.
Mandarins, per case	10s.
Shaddocks, per bushel case	5s. to 6s.
Oranges (Navel), per case	15s. to 16s.
Oranges (other), per case	7s. to 9s.
Passion Fruit, per half-case	4s. to 4s. 6d.
Lemons (Local), per bushel case	9s.
Papaw Apples, per double-case	7s. to 10s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	4s. to 9s.
Pineapples (Ripleys), per double-case	5s. to 7s.
Pineapples (Common), per double-case	5s. to 7s.
Tomatoes (Queensland), per quarter-case	2s. to 4s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	AUGUST. Prices.
Apples, Eating, per case	7s. 6d. to 11s. 6d.
Apples, Cooking, per case	6s. to 8s.
Bananas (Cavendish), per dozen	1½d. to 6½d.
Bananas (Sugar), per dozen	1½d. to 6½d.
Cape Gooseberries, per quarter-case	5s. to 10s.
Citrons, per cwt.	12s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. to 3s. 9d.
Custard Apples, per quarter-case	2s. 6d. to 4s. 6d.
Lemons (Lisbon), per case	6s. to 10s.
Limes, per quarter-case	...
Mandarins, per half-case	6s. to 10s.
Mangoes, per case	...
Oranges, (Navel), per case	9s. to 11s.
Oranges (other), per case	5s. to 8s. 6d.
Oranges (Seville), per cwt.	10s.
Papaw Apples, per quarter-case	1s. to 2s. 6d.
Passion Fruit, per quarter-case	4s. to 6s.
Peaches, per quarter-case	...
Pears, per half-bushel case	7s. to 11s.
Peanuts, per pound	3d. to 4d.
Persimmons, per quarter-case	...
Plums, per case	...
Pineapples (Ripleys), per dozen	1s. 9d. to 2s.
Pineapples (Rough), per dozen	9d. to 2s.
Pineapples (Smooth), per dozen	1s. 6d. to 3s.
Quinces, per case	...
Rockmelons, per dozen	...
Rosellas, per sugar-bag	1s. to 2s.
Strawberries, per dozen boxes	2s. to 6s.
Tomatoes, per quarter-case	1s. to 4s.
Piemelons, per cwt.	7s.
Watermelons, per dozen	...

TOP PRICES, ENOGGERA YARDS, JULY, 1916.

Animal.	JULY. Prices.
Bullocks	£16 2s. 6d. to £18 7s. 6d.
Bullocks (Single)	...
Cows	£8 10s. to £11 10s.
Merino Wethers	31s. 6d.
Crossbred Wethers	32s. 3d.
Merino Ewes	23s. 6d.
Crossbred Ewes	31s.
Lambs	29s.
Pigs (Porkers)	...
Pigs (Slips)	...

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY, 1916 AND 1915, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	July.	No. of Years' Records.	July, 1916.	July, 1915.		July.	No. of Years' Records.	July, 1916.	July, 1915.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·82	15	2·68	0·40	Nambour	2·75	20	3·41	1·86
Cairns	1·52	34	2·59	3·19	Nanango	1·75	34	3·62	1·20
Cardwell	1·43	44	2·96	0·88	Rockhampton ...	1·47	29	2·68	0·02
Cooktown	0·96	40	2·07	1·91	Woodford	2·67	29	2·60	1·19
Herberton	0·55	29	3·03	0·22					
Ingham	1·45	24	6·48	0·71					
Innisfail	4·66	35	8·42	5·79	*Darling Downs.*				
Mossman	1·84	4	2·60	3·07					
Townsville	0·50	45	3·37	0·14	Dalby	1·84	46	2·50	1·48
					Emu Vale	1·46	20	1·88	2·38
Central Coast.					Jimbour	1·78	28	2·14	1·54
					Miles	1·81	31	3·43	1·99
Ayr	0·47	29	3·84	0·45	Stanthorpe ...	1·97	43	2·40	1·12
Bowen	0·93	45	2·64	Nil	Toowoomba ...	2·05	44	2·29	2·38
Charters Towers ...	0·56	34	1·38	0·61	Warwick	1·84	29	1·97	3·04
Mackay	1·59	45	5·22	1·72					
Proserpine	0·88	13	4·20	1·14					
St. Lawrence ...	1·25	45	3·09	0·10	*Maranoa.*				
South Coast.					Roma	1·43	42	2·56	0·82
Biggenden	1·27	17	3·26	1·09	*State Farms, &c.*				
Bundaberg	2·04	33	2·15	1·03					
Brisbane	2·31	65	2·00	1·74	Bungeworgorai ...	1·24	4	2·75	0·66
Childers	1·72	21	3·10	1·64	Gatton College ...	1·42	17	1·57	1·25
Crohamhurst ...	3·06	22	3·23	2·16	Gindie	1·01	17	4·44	0·38
Esk	2·03	29	2·12	1·12	Hermitage ...	1·50	10	2·05	3·17
Gayndah	1·51	45	3·14	0·58	Kairi	0·99	4	2·51	0·50
Gympie	2·17	46	3·46	1·66	Kamerunga ...	1·35	26	3·64	2·71
Glasshouse M'tains	2·49	8	3·60	1·54	Sugar Experiment Station, Mackay	1·23	19	5·08	0·94
Kilkivan	1·75	37	3·19	0·95	Warren	1·04	3	2·99	Nil
Maryborough ...	2·01	45	2·79	1·60					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year and for the same period of 1915, having been compiled from telegraphic reports are subject to revision.

GEORGE G. BOND,
Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON FOR THE THIRD FOUR MONTHS OF 1916.

Date.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·29	5·47	4·59	6·5	4·46	6·28
2	6·2	5·33	5·28	5·48	4·58	6·6	4·46	6·29
3	6·1	5·34	5·27	5·48	4·57	6·7	4·46	6·29
4	6·0	5·34	5·26	5·49	4·56	6·8	4·46	6·30
5	5·59	5·35	5·25	5·49	4·55	6 8	4·46	6·31
6	5·58	5·36	5·24	5·50	4·55	6·9	4·46	6·31
7	5·57	5·36	5·23	5·50	4·54	6·10	4·46	6·32
8	5·56	5·37	5·22	5·51	4·54	6·10	4·46	6·33
9	5·55	5·37	5·20	5·51	4·53	6 11	4·47	6·34
10	5·54	5·38	5·19	5·52	4·52	6·11	4·47	6·34
11	5·53	5·38	5·18	5·52	4·52	6·12	4·47	6·35
12	5·52	5·39	5·17	5·53	4·51	6 12	4·47	6·36
13	5·51	5·39	5·16	5·53	4 51	6·13	4·47	6·36
14	5·50	5·40	5·15	5·54	4·50	6·13	4 48	6·37
15	5·48	5·40	5·14	5·54	4·50	6·14	4·48	6·38
16	5·47	5·41	5·13	5·55	4·50	6·15	4·48	6·38
17	5·46	5·41	5·12	5·56	4·49	6·16	4·49	6·39
18	5·45	5·41	5·11	5·56	4·49	6·17	4·49	6·40
19	5·43	5·42	5·10	5·57	4·48	6·18	4·49	6·40
20	5·42	5·42	5·9	5·57	4·48	6·19	4·50	6·41
21	5·41	5·43	5·8	5·58	4·47	6·20	4·50	6·41
22	5·40	5·43	5·7	5·58	4·47	6 21	4·51	6·42
23	5·38	5·44	5·6	5·59	4·47	6·22	4·51	6·42
24	5·37	5·44	5·5	5·59	4·47	6·23	4·52	6·43
25	5·36	5·44	5·5	6·0	4·47	6·23	4·52	6·43
26	5·35	5·45	5·4	6 1	4·46	6·24	4·53	6·44
27	5·34	5·45	5·3	6·1	4·46	6·25	4·53	6·44
28	5·33	5·46	5·2	6·2	4·46	6·25	4·54	6·45
29	5·32	5·46	5·1	6·3	4·46	6·26	4·55	6·45
30	5·30	5·47	5·0	6·3	4·46	6·27	4·55	6.46
31	...	...	5·0	6·4	...	...	4·56	6·46

The Phases of the Moon commence at the times stated below in Queensland, New South Wales, Victoria, and Tasmania.

			H.	M.	
5	Sept.	☾ First Quarter	2	26	p.m.
12	,,	○ Full Moon	6	31	a.m.
19	,,	☽ Last Quarter	3	35	p.m.
27	,,	● New Moon	5	34	,,

The moon will be nearest the earth on the 9th at 11·24 p.m., and farthest from the earth on the 21st at 7·36 p.m.

4	Oct.	☾ First Quarter	9	0	p.m.
11	,,	○ Full Moon	5	1	,,
19	,,	☽ Last Quarter	11	8	a.m.
27	,,	● New Moon	6	37	,,

The moon will be nearest the earth on the 7th at 8·30 a.m., and on the 19th, at 3·12 p.m., at its farthest distance.

3	Nov.	☾ First Quarter	3	50	a.m.
10	,,	○ Full Moon	6	18	,,
18	,,	☽ Last Quarter	8	0	,,
25	,,	● New Moon	6	50	p.m.

The moon will be nearest the earth on the 1st at 4·48 a.m., and on the 28th at 5·42 a.m.; it will be farthest from the earth on the 16th at noon.

2	Dec.	☾ First Quarter	11	55	a.m.
9	,,	○ Full Moon	10	44	p.m.
18	,,	☽ Last Quarter	4	6	a.m.
25	,,	● New Moon	6	31	,,
31	,,	☾ First Quarter	10	7	p.m.

The moon will be farthest from the earth on the 14th at 6·48 a.m., and nearest on the 26th at 10·30 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, November, and December may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

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 somewhere 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.

Farm and Garden Notes for October.

FIELD.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway; earth up any growing crops requiring the operation; sow maize, imphee, setaria, kafir corn, teosinte, sorghum, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

KITCHEN GARDEN.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy; the Chinese gardeners supply the towns with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants; otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines; they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c.; and transplant for succession in calm cloudy weather.

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the

garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

Orchard Notes for October.

THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off-season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple, Mussel, Circular Black, and Glover Scales. Fruit-fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oïdium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South; far too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in a good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening the soil.

THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if the fruit-fly makes its appearance, it is systematically fought.

Look out for Codling Moth, and continue the sprayings with Kedzie's mixture.

Look out carefully for any San José Scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to the tree or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José Scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oïdium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oïdium or Black Spot. Lood out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit-fly in the early-ripening fruits, and gather and destroy all that may be so affected.