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QUEENSLAND AGRICULTURAL JOURNAL

VOL. VI. JULY, 1916. PART 1.

Agriculture.

OIL SEEDS WHICH CAN BE PROFITABLY GROWN IN QUEENSLAND.

COTTON SEED.

The cotton plant, almost needless to say, thrives admirably in all parts of Queensland, except on the high lands of the Main Range, where heavy frosts occur, and even in districts subject to light frosts during the months of June, July, and August, cotton may safely be grown if sown from about the end of August to the end of October. In Central and Northern Queensland there is little to be apprehended from frosts, especially on the coast lands. When the crop has been harvested and ginned, there remains the oil-containing seed. Generally speaking, 600 lb. of cotton seed (the produce of one acre) will yield about 12 gallons of crude oil, saleable within the State at 3s. per gallon. Mr. Joseph Campbell, late Director of Cotton Culture to G.P.E., Ltd., Cairns, North

Queensland, in a letter to the "Brisbane Courier" of 24th May, 1916, makes the following statement giving his practical experience of the production of cotton lint, cotton seed, cotton seed oil, and oil-cake on the company's "Caravonica" plantation, near Cairns:—

"As one of the active workers in the cotton industry in North Queensland, especially in the variety known as Caravonica, I take this opportunity of saying that the industry is one of several affording light and lucrative employment for our (returning soldier) boys; and every effort should be made to encourage them to take it up. A good sandy loam—just such land as we have hundreds of thousands of acres of—not too far inland, will yield 1,000 lb. boll cotton per acre, of which 33 per cent. to 40 per cent. is lint (or ginned cotton), my last sales in Liverpool fetching 9½d. per lb. The 60 per cent. of seed is prepared and crushed for oil and oil-cake. My extraction with a hydraulic press of 500 lb. to square inch gives 30 gallons of crude oil per ton, which Kitchen and Son purchase at 3s. per gallon (equal to £33 12s. per ton reckoning 224 gallons of oil to the ton), and the oil-cake fetches £10 per ton. During the drought the price was higher, viz., £12 wholesale and £15 retail. From these facts—not theory—any one can determine whether or not it is worth while growing Caravonica cotton on the seaboard. My contention always has been that this is the crop for our hundreds of miles of waste land, and now that we must rally round and help our boys we shall, by doing so in this way, also develop a very important part of our vast State property, which hitherto has lain waste.

"Cotton growing in conjunction with vanilla—where the lands are contiguous to scrubs—papaws (for making papain)—which do splendidly in the cotton soil referred to—bananas, pines, fibre preparation, green burr, and native plants will offer suitable employment to 500 men to start with in North Queensland, and it will be found that ten times that number will, within a few years, be settled on these lands if a little encouragement is held out to them. Commend the matter to all sympathetic patriots."

During 1916, the price of cotton seed in Europe jumped to £13 per ton, and the oil was quoted at £46 5s. per ton.

The cultivation and after treatment of the cotton crop are simple operations which any able-bodied, willing man can soon master. The crop presents none of the difficulties such as have to be overcome by fruit-growers, sugar-growers, dairy farmers, &c.

We are constantly met by the question: "Whence is the labour to come in the picking season?" This is only a bug-bear to those who have never grown cotton in either the United States or Queensland. Take the cotton-growing districts of the former country. There picking by hand costs 1 dollar 10 cents per 100 lb., or about ½d. per lb. That is the cost also in Queensland with hired labour. An average picker can pick between 200 and 250 lb. of seed cotton in a day, although fast pickers often get as much as 400 to 500 lb. a day. Only white labour is employed, and if in isolated cases any coloured men are employed, they are paid at the same rate as white men. He must be a poor hand

who cannot pick 40 lb. of cotton in an hour in the height of the season, thus earning 1s. 8d. per hour. Again, the work is not so laborious that it cannot be undertaken by very young people, many of whom the writer used to employ in the boom times of cotton-growing in Queensland, and whose day's pay often amounted to as much as 10s. to 12s.

In a letter received in 1915 from Mr. E. E. Wood, a well-known cotton-grower and ginnery owner in Texas, U.S.A., who in May, 1914, visited Queensland, he gave reports of cotton-picking in Texas by young people.

Following are some instances:—

"Reports of good picking by the boys and girls are coming in right along. Dennis Sherrell, the eleven-year-old son of D. W. Sherrell, picked 350 lb. of cotton in one day. Claudie Scarlet, a ten-year-old girl, picked in Garden Valley 506 lb. This little girl only weighed 67 lb. herself. Pickers in our States are paid ½d. per lb. At this rate a family of four pickers like Miss Scarlet could earn £4 6s. per day, whilst eleven-year-old Sherrell would add 14s. 7d. per day to the family income."

It might be said: What about the school attendance of the boys and girls? This matter arose in the sixties by the then Board of Education which so arranged the school work that the usual school summer and early winter holidays were altered to the cotton-picking season, but the schools were kept going up to the regulation time for those children who were not engaged in cotton work, and for those who worked half-time at the business. Cotton-picking does thus not encroach on the children's education.

Now, if this matter of the cost of cotton-picking can be realised by farmers who can devote a few acres to a crop so easily grown, harvested, and marketed, there is no reason why Queensland, with its tens of thousands of acres, or, it is no exaggeration to say, hundreds of thousands of acres, coastal and inland, should not in time become one of the greatest cotton-producing countries in the world. The terrible pests of the United States, the weevil, the cotton-stainer, the boll worm, the leaf worm, have not made their appearance in this State, thanks to the careful measures adopted by the Agricultural Department, with the exception of the boll worm, which is really the maize cob worm, but this is easily controlled by means of top crops of maize. Cotton has the fewest enemies of all our staple crops.

But this is all by the way. What we wished to show was and is that a big trade in cotton seed oil and cotton cake is knocking at our doors, and now is the time to take advantage of the opportunity. Read the following article on "King Cotton." Reliable consular reports state that there is a market in Chile (S. America) for 100,000 lb. per month of cotton seed oil for edible purposes.

KING COTTON'S INDUSTRIAL ARMY.

At the meeting of the American Cotton Manufacturers' Association in Atlanta recently, says "Cotton and Cotton Oil News," one of the speakers said:

"If the cotton produced in this country were manufactured here into as fine a grade of products as is now produced from it in foreign countries, there would be created annually from the lint obtained from the cotton crop a total of 2,155,000,000 dollars instead of 665,000,000 dollars. Taking into consideration the number of persons employed in the 25,000 ginneries, required to gin the cotton from an average crop, the number of persons employed in the cotton seed oil mills, in the cotton seed oil refineries, in the manufacture of cotton goods, and in the production of hosiery and knit goods, as well as in the planting of the crop, its cultivation, care and picking, I am satisfied that there is no other agricultural crop of the world from which such a large number of persons, directly or indirectly, obtain a livelihood."

The industrial army of King Cotton outnumbers the people now in battle array on the bloody fields of Europe, and the industrial armies of King Cotton are engaged in far better work than those of the Kaiser.

SOJA BEAN OIL.

Raw soja boan oil is quoted in the London market and in Hull, England, at £41 per ton, and refined at £45. This legume does well in Queensland, but although the crop pays well in Europe for grain it is a question whether under our Australian labour conditions it would pay as it does in cheap-labour countries. A 1,000 lb. crop at the highest price for the beans would sell in Europe for £4 10s., or perhaps under present war conditions for double or treble that amount, but at present if we had a million pounds of beans it would be a losing game to ship them to Europe, even if ship space were available. So that since there would appear to be little in it to attract the attention of farmers, we do not advocate the cultivation of the soja bean except as a catch crop amongst cocoanut and rubber trees. We append, therefore, only some of the uses of the bean which are (with its products) :—For dynamite and high explosives, soap, linoleum, indiarubber substitute, margarine, paints and varnishes in place of linseed oil, various edible foods, salad oil, vegetable cooking oil in place of lard, &c., lamp and lubricating oil, artificial milk, cake for feeding cattle, manure, &c.

COTTON-GROWING.

Next spring from August to October will be the cotton-planting season for Southern Queensland, in the North August to November and March and April. The Department of Agriculture and Stock has ordered Uplands cotton-seed to arrive here in time for spring sowing, and farmers who propose to sow cotton during the coming season should make early application for seed, stating what area they propose to plant. The quantity of seed available for individual distribution will depend on the amount of the consignment. Only the very best and most prolific varieties have been ordered, and we would ask farmers throughout the State to note the following paragraphs on

cotton-growing published last March in the "Journal of the Jamaica Agricultural Society." The Sea Island cotton mentioned in the above extract thrives admirably in North Queensland, preferably near the coast. In the South it is better to grow Uplands, some varieties of which have yielded 2,000 lb. of seed cotton per acre. The Caravonica, long-staple cotton is also more suited to North Queensland than to Southern districts.

"COTTON.—The war disturbed the cotton market perhaps more than all products we in Jamaica are interested in. Prices fell, there was less demand for cotton goods; woollen goods on the other hand could not be made quick enough by the mills.

"Yet it has to be taken into account that for five years before the war, the world's consumption of cotton goods was actually in excess of the world's crops.

"The result of the downward rush of prices immediately after the outbreak of the war, was the curtailment of planting of cotton. Prices of cotton, however, have recovered; the world (outside of Germany, Austria, and Turkey) at present must have cotton goods; also there is a special demand for gun cotton used with explosives. Whenever the war is over, it is now calculated, there will be a shortage of cotton. We in Jamaica should plant Sea Island cotton where conditions suit, in August, and we shall try to supply good seed then.

"After the war, cotton must be grown within the Empire, and we here are in the position to help the British Fine Cotton Spinners' Association, by growing Sea Island cotton which, carefully treated, always sells at a good price. This market is a special one, and our conditions suit the growth of the finest of all cottons—Sea Island.

"From 15th August to 15th September is the best planting season. Make ready to plant then.

"We have not much faith in any other cotton for Jamaica than Sea Island, although we should be glad to see any kind grown rather than none at all, as we need such an industry; and as the coarser cotton called Cauto is being grown also, those planting either kind should do so *only* from selected seed, guaranteed pure, otherwise there will be danger of a nondescript cotton being grown. This might not matter for Cauto cotton, but it would be ruinous for cotton intended for Sea Island.

"Prices for Sea Island cotton at present are high, the quotations being 1s. 3d. to 2s. per lb."

The Department of Agriculture and Stock, Queensland, has republished a pamphlet which gives full directions as to the treatment of a cotton crop from start to finish. All growers are offered 1¾d. per lb. for their seed cotton, which will be ginned, baled, and marketed, and any profit over and above the cost of preparing and marketing will be distributed to growers on receipt of account sales.

THE LATEST COTTON-PICKING MACHINE.

The Angus Campbell (or later, Price-Campbell cotton-picking machine) was first noticed in the Journal in August, 1911, and subsequently a demonstration of the work of the machine was given in London in 1914, and the Queensland Executive Engineer reported on this trial which he witnessed, stating that he was satisfied that it could discriminate between ripe and unripe cotton-bolls, finger over the delicate plant, get the lint, and leave the rest unharmed. Strange to say, although Mr. Price's assistant, who was conducting the experiment, assured the Engineer that he would supply him with export prices in the course of a few days, the former went gadding back to the United States. Later on, a letter was received from New York, by the Engineer, signed by Mr. Price, in which he stated that "he regretted to report that he was not yet in a position to name an export price on the machines, or to offer them for shipment abroad, as the inventors had all they could do to meet the American demand." Thus although apparently the machine does all that is claimed for it, cotton-growers outside the United States will not be afforded an opportunity of purchasing one.

In Queensland, Mr. Daniel Jones has invented a cotton-picking machine which, from hearsay, we understand acts very efficiently. We hope this is so and that Mr. Jones' machine will come to the front and relieve Queensland cotton-growers of the necessity for depending on selfish outside manufacturers.

HUMOGEN.

In the February issue of this Journal we made reference to the reported discovery by Professor W. B. Bottomley of the not possible but certain promotion of plant growth by inoculating the soil with a culture of bacteria obtained from the root nodules of leguminous plants, under the name of Humogen, and we ventured to suggest that this discovery was on a par with that of Colonel Halford Thompson, F.R.H.S., of Teignmouth, England, which resulted in the invention of Jadoo fibre, which was some years ago imported into Queensland by Mr. Thos. Wood, nurseryman, George street, Brisbane.

In the April (1916) issue of the "Mark Lane Express" a paragraph appeared as follows under the caption

THE VALUE OF HUMOGEN.

"Humogen is the name given to the preparation of bacterised peat invented by Professor Bottomley, and such glowing accounts have been given of the fertilising value of the substance that much attention has been drawn to it. Perhaps it is a pity that the preparation should have been so 'boomed,' because the effect has been to raise among some people great expectations, and if those sanguine hopes are not fully realised, a reaction will set in, and the possible value of the substance may not be fairly estimated.

"During this season it will be on its trial, and we hope the verdict at harvest time will be in its favour. If so, a new home industry of economic importance will be opened up, and agriculturists will have the benefit to be derived from a cheap and powerful fertiliser.

"At present it does not seem possible to express a definite opinion as to its value. A recent report on the subject from the Midland Agricultural and Dairy College is certainly not encouraging. According to this report bacterised peat is sent out in two forms, viz.:—(1) As a fibrous material for incorporating with the soil, and (2) as a powder for top dressing.

"The powder was applied as a top dressing to wheat and 'seeds' hay at the rate of 7 cwt. per acre, but produced no result whatever on either crop.

"The fibre was tested with potatoes, 5 cwt. per acre being used. The results were again entirely negative."

The "Mark Lane Express" appears to be still doubtful of the value of the bacterised peat. To settle the question, it would be worth the while of our Queensland nurserymen to do as did Mr. Wood in past years, *i.e.*, import some of the material and of the liquid, put it to the proof, and let the public interested in agriculture and gardening know either its value or its uselessness.

THE PATRIOTIC ACRE SCHEME IN CANADA.

For the purpose of contributing grain supplies to Great Britain and the allies, the Saskatchewan Grain Growers' Association hit upon a splendid idea, which apparently has proved a wonderful success. Mr. S. W. Yates, a member of the association, gives the following account of "The Patriotic Acre Scheme" and its results in the issue of the "Agricultural Gazette" of Canada for March, 1916:—

"The Patriotic Acre Scheme of the Saskatchewan Grain Growers' Association is undoubtedly one of the biggest things ever carried through by the farmers of the West, and is attracting attention not only throughout this vast continent, but also in the motherland for which this great gift is intended. It is indeed one of the finest expressions of loyalty that one can conceive, being as it is an absolutely voluntary gift, in many cases by men who for the last year or two have suffered heavy losses by drought, hail, and other natural causes, and who had thus a legitimate excuse, had they cared to seek it, for declining to carry out their promises. To their honour, however, many of these men have not only given their acre, but they have even given more than their acre has yielded, in order to be even with their more fortunate neighbours.

"The idea originated with Mr. T. M. Morgan, a director of the association, who communicated it to Mr. J. B. Musselman, central secretary of the Saskatchewan Grain Growers' Association, by whom it was brought to the notice of the executive; meeting with their approval, it was brought before the delegates at the annual convention at Regina in February, 1915, and was adopted with the greatest enthusiasm.

"For the better carrying out of the scheme, a form was drafted, of which 30,000 copies were printed, each in duplicate, and these were sent out in large numbers to local associations in all parts of the province. These forms bear the union jack and ensign in colours with the emblem of the association—a wheat sheaf in the centre, surrounded by the words, 'Saskatchewan Grain Growers' Association.'

"The form of pledge ultimately adopted was drafted with the greatest care, it being distinctly stated that the form is not a promissory note, so that no farmer need fear any form of compulsion being applied in case circumstances render it impossible to carry out his pledge.

"Many interesting features have been brought to light as these forms have been returned to the central office. The nationalities of the contributors, for instance, are most varied, forms having been signed by Englishmen, Americans, Scandinavians, Russians, Roumanians, Austrians, Frenchmen, Germans, and others, and in this connection it may be stated that from one district there came forty forms all of which, with one exception, were signed by natives of Eastern Central Europe, the majority being Austrians. It is also interesting to note that the first actual contribution received was from a German.

"Each farmer, under this scheme, was invited to contribute the proceeds of one or more acres. As a matter of fact, however, each farmer has been left free to make any contribution he desires, and as a consequence, the amounts promised have varied from as low as 50 cents in cash to the product of 10 acres of wheat. The largest contribution is that of Isaac Sterling, of Nashlyn, who contributed 400 bushels of wheat, the product of 10 acres at an average of 40 bushels per acre. The next largest contribution is that of Chas. McCarthy, of Prairie Star local, who gave the produce of 5 acres—viz., 189 bushels, an average of 38 bushels per acre. The largest cash contributor is Wm. A. Kennedy, of Conquest, who sent in a contribution of 154 dollars; the second largest being Clarence Heron, of Ogema, with a contribution of 135 dollars.

"Up to the present time, the actual contributions, as distinct from promises, amount to 56,000 bushels of grain and over 15,000 dollars in cash, which is equivalent to nearly 3,000,000 lb. of flour.

"All wheat contributed to the fund is being handled by the various elevators free of charge, while the milling of the flour will also be done by one of the largest mills in Saskatchewan at practically cost price. The banks are also co-operating by putting through all cheques at par. The flour will be put up in sacks bearing the emblem of the association, and, when milled, will be transported to the coast, it is anticipated, at a minimum cost to the fund.

"The co-operation of the Dominion Government has been secured and Sir Geo. E. Foster, Minister of Trade and Commerce, has guaranteed free transportation across the Atlantic to Great Britain.

"Far as the season has gone, circumstances are such as to make it impossible to forecast with any degree of certainty what will be the total contribution to this great fund. At the present time we are making an effort to get in all forms so as to arrive at the number of acres promised. At the time of writing we have promises of 6,000 acres, nearly one-half of which have been actually redeemed. It is now certain, however, that the result will be one which will bring honour to the farmers of Saskatchewan, and prove to the world that these sons of the soil are doing their duty to the Empire as truly as though they had offered their lives for their country in the trenches of Flanders or Gallipoli."

CORAL SAND IN THE NORTH.

Last March, in response to a request from the Australian Sugar Producers' Association, Limited, that some competent person be instructed by the Minister of Agriculture and Stock to inspect and report upon the deposits of coral sand that are known to exist on the coral islands adjacent to Cairns and Innisfail, the Department asked that as a preliminary a bag of coral sand be obtained and forwarded to the Department for examination and analysis. A sample was accordingly received, and an analysis made by the agricultural chemist, who reported as follows:—

"The sample of coral sand forwarded was in a very fine state of division, and, containing the high percentage of calcium carbonate that it does, would be very suitable for application to soils requiring lime.

Analysis.

Lime	50.40 per cent.
Equivalent to calcium carbonate ..	90.00 per cent.
Insoluble matter	.11 per cent.

MARKET GARDENING.

ASPARAGUS.

It has often been asked why Queensland farmers, who grow in large quantities market garden produce such as cabbage, cauliflower, parsnips, carrots, marrows, &c., whilst they neglect such marketable crops as asparagus, rhubarb, and Jerusalem artichokes. We have frequently given advice as to the cultivation of these latter. Perhaps the following note on Asparagus, from the "Town and Country" Journal, Sydney, may induce some to start growing this vegetable, not as an experiment, for it is well known how it thrives on our coast lands, but on a commercial scale:—

"In normal times of peace, France exports large quantities of tinned and bottled asparagus to Sydney. The Californian preserved asparagus has a good name here. Some of the best samples of this line ever put on Sydney dinner tables have hailed from Geelong, where the secret of attaining an ample length of stick, as well as the head, has been mastered. Asparagus can be well and freely grown in the Botany, La Perouse, Manly, and other saline areas, and elsewhere in New South Wales. All the leading clubs, hotels, and restaurants in Sydney favour asparagus as a regular item of the bill of fare. The sale of preserved asparagus by grocers to private homes in Sydney and suburbs, and in country districts is on the increase. The world's stock has dwindled since the war began. A seedsman of experience can readily put the novice in the way of cultivating asparagus, which is easily raised to perfection in rich well-drained land. Those who have suitable ground for growing asparagus, with a view to canning or bottling, should bear in mind before planting that the ground should be trenched to a depth of 2 ft., at the same time working in a lot of manure, with a generous sprinkling of salt and soot. The seed should be sown in spring. The following winter the plants are transplanted to the prepared bed in rows 18 in. apart, and 9 in. apart in the rows. The plants should be encouraged to make as much grass as possible. They should not be cut for two years, and then sparingly. Asparagus beds properly made bear continuously for twelve to fifteen years. The seed in little lots for private garden use is about 9d. per ounce, 2s. 6d. per quarter-pound. Special terms are allowed to extensive growers in the sandy soils around Sydney and elsewhere, who market the raw asparagus, which is expensive because the quantity grown is not sufficient for the demand. The period to plant out asparagus is from June to September, preferably in July and August, or just as the plants have started to shoot. Usual prices for small lots of strong plants are:—Two years old, 5s. per 100; three years old, 7s. 6d. per 100. A considerable reduction is allowed for 1,000 plants or more. The ground should be got ready before ordering, so that the roots can be put in immediately on arrival."

Our advice to anyone intending to grow asparagus in Queensland is to obtain good strong plants from a nurseryman, plant in June or July, and about the end of October the young shoots will begin to appear. Sowing the seed entails three years waiting for a bed to come into bearing.

A bed of asparagus if the above directions are attended to will bear well for seven or eight years and even longer. Two rows, 30 ft. long will suffice for an ordinary family.

Pastoral.

STOMACH WORMS IN SHEEP.

BY W. G. BROWN, Instructor in Sheep and Wool.

In dealing with a small flock of weaners recently, I was surprised to find that another pest to sheep farmers was present, and I would like to ask pastoralists and sheep farmers generally to look out for it.

The history of the case is this: A letter came into the Department from a sheep farmer about three weeks ago, which informed me that, of 100 mixed weaners, about seven months old, over twenty had died. On proceeding to the farm, I could see at once that the sheep showed every sign of worm infestation. To make sure, I had one of the sheep killed which appeared to be moribund. I expected to find either the tape-worm, the ordinary stomach worm (*Strongylus contortus*), or both. To my surprise, neither of these was to be found, but on closer examination I found in the cœcum thousands of worms with the body about the size of a small blowfly maggot, and with a long hair-like attachment which was from half an inch to one and a-half inches long. I knew nothing of it, so I submitted a portion of the bowel to Mr. H. Tryon, of this Department, who informed me that he identified it as the cæcum-worm (*Trichocephalus affinis*), a worm well known in America, but only recorded once in this State.

I used the ordinary drench—arsenic and epsom salts—and on returning a week later to the farm I found that there had been several further deaths. I killed another sheep, and found that the worms were apparently not harmed. On further drenching, however, the flock picked up very well, and to date only one or two others have died, and these were so low when I saw them that I believed they would die.

The rest of the flock were examined by Mr. Adam McGown, M.R.V.C., of this Department, last week, and a post-mortem was held on one which was very low in condition, which was killed. On this occasion the numbers of the worm found were very few, but anæmia and emaciation were the causes of the animal being so poor when it was killed. The rest of the sheep were recovering.

Photographs of this new pest in Queensland will be published, with further remarks, in next month's "Journal of Agriculture."

BASIC SLAG FOR NATURAL PASTURE.

In writing to the "Farmers' Advocate," Bloemfontein, S.A., on farming and stock-feeding in England, Mr. A. de A. Donisthorpe, delegate amongst the "Fifty Farmers' Tour," for the Waterberg and Pietersberg districts of the Transvaal, said—

At Oxford we met Professor Somerville, who gave us some most interesting details of experiments at Cockle Park, the experimental station of Armstrong College, Newcastle, which we also visited later. The idea was to feed natural pasture with manure to increase its sheep-carrying capacity. The substance with which great success was obtained was basic slag. By manuring a 3-acre plot with half a ton of basic slag once only in ten years the ground, which at the beginning could carry only four sheep, at the end could carry ten, thus practically enlarging their farm threefold. Could not something be done in our country to try the effects of basic slag and other manures on our natural grazing to increase its carrying capacity and to encourage suitable grasses and herbage? The effect of the slag was to encourage the clover at the expense of useless weeds.

ANOTHER POSSIBLE SOURCE OF POTASH.

In the "Chemical News and Journal of Physical Science" of the 25th February, 1916 (says "The Indian Trade Journal"), is published an article entitled "Possible Sources of Potash in America," dealing, amongst other things, with the existence of a percentage of water-soluble potash in the flue-dust of cement works. The information therein given may possibly be of interest to cement works in this country. It is said that at least one, if not several, of the cement plants in America are actually recovering and marketing flue-dust containing a relatively high percentage of water-soluble potash. At the abnormally high prices which the product now commands, such flue-dust can, it is stated, be profitably collected and sold to certain consumers of potash salts, as, for instance, manufacturers of liquid soaps.

Mr. H. W. Mobsby, of the Queensland Agricultural Department, who represented Queensland at the late Panama Exposition, took an opportunity to visit several districts round San Francisco where industries were established which might be carried on in this State. Amongst others, he inspected the cement mills at Davenport, California, and there he found the houses, gardens, trees, &c., covered with a fine white dust, and a large area around the works was in a similar condition. This is probably the dust above alluded to.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF MAY, 1916.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Margaret	Ayrshire	14 Oct., 1915	612	5·2	37·59	
Cocoatina ...	Jersey	17 Mar., 1916	478	5·6	31·63	
Lady Melba	Holstein	28 Oct., 1915	664	4 0	31·17	
Sweet Meadows	Jersey	28 Sept. ,,	351	7·0	29·19	
Auntie's Lass	Ayrshire	4 April, 1916	620	4·0	29·11	
Netherton Belle	,, ...	23 April, 1915	476	5·1	28·66	
Pauline ...	Shorthorn... ...	17 Sept. ,,	485	4·4	24 96	
Miss Bell ...	Jersey	2 July ,,	370	5·7	24·95	
Lady Loch II.	Ayrshire	17 Mar., 1916	525	3 9	24 03	
La Hurette Hope	Jersey	17 Nov., 1915	385	5·3	23·98	
Belinda ...	Ayrshire	27 Feb., 1916	521	3 9	23 85	
Lady Maid	Shorthorn... ...	26 Jan. ,,	469	4 3	23·73	
Lady Dorset	Ayrshire	10 Aug., 1915	359	5·5	23·35	
Iron Plate ...	Jersey	20 Jan., 1916	393	5 0	23·18	
Mistress Bee	,, ...	21 Jan. ,,	391	5 0	23·06	
Twylish's Maid	,, ...	22 Oct., 1915	289	6·7	23·05	
Lady Spec	Ayrshire	6 Jan. 1916	469	4·0	22 03	
Rosine ...	,, ...	17 Aug., 1915	353	5·0	20·83	
Violette Peer's Girl	Jersey	8 Dec. ,,	318	5·4	20·30	

The above cows were fed on natural pasture only.

CHILI WINE.

In answer to a correspondent "Town and Country" gives the following recipe for making Chili Wine:—Take 2 quarts of water, 10 small bruised chilies, quarter oz. of citric acid, 2 tablespoonfuls of white sugar (burn black), 1 teaspoonful essence of lemon, and 3 lb. of sugar. Pour boiling water on the ingredients, colour with the burnt sugar, then when cool bottle and cork well. Another method is to take 1 lb. of brown sugar, 2 quarts of water, 8 small chilies, quarter oz. of citric acid, a teaspoonful of sugar (burnt black), and a teaspoonful of essence of lemon. Pour boiling water on the chilies, acid, and sugar. When cold, mix the burnt sugar to colour the mixture, add the essence, strain when cold, and bottle.

Poultry.

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

Three thousand nine hundred and ninety-one eggs were laid during the month. A large number of the birds are in moult. In addition to these mentioned in last month's report, the pens of the following owners are more or less affected:—King and Watson, Padman, Leney (White Leghorns), Gosley, Jarman, Hirst, Holland, Knoblauch, Knowles, Walters, Forrest, and Anderson (White Leghorns). From five to six birds are moulting in the pens owned by Moritz Bros., Leney (two pens), Becker, Pettit, Pocock, Lindus, Hammill, Forrest, and Harveston Poultry Farm. J. Zahl wins the monthly prize, with 132 eggs. The following are the individual records:—

Competitors.	Breed.	May.	Total.
*T. Fanning	White Leghorns ...	124	228
*J. Zahl	Do.	132	193
*A. T. Coomber	Do.	122	186
*Mrs. Jobling, N.S.W.	Black Orpingtons ...	106	170
*Dixie Egg Plant	White Leghorns ...	115	170
T. B. Hawkins	Do.	81	158
*J. Anderson, Victoria	Red Sussex	71	157
A. Howe, N.S.W.	White Leghorns ...	90	154
*Kelvin Poultry Farm	Do.	91	142
*Miss M. Hinze	Do.	122	141
G. H. Turner	Do.	88	141
S. B. Tutin	Do.	74	140
W. Lyell	Do.	86	135
Mrs. Munro	Do.	86	130
W. Meneely	Do.	100	130
*E. F. Dennis	Do.	90	128
Mrs. Bradburne, N.S.W.	Do.	50	125
*J. M. Manson	Do.	96	124
Dr. Jennings	Do.	94	123
*E. Walters	Do.	67	123
*E. A. Smith	Do.	73	121
T. E. Jarman, N.S.W.	Do.	58	120
P. Brodie	Do.	57	119
A. H. Padman, S.A.	Do.	52	117
Geo. Tomlinson	Do.	76	112
C. P. Buchanan	Do.	67	109
*J. F. Dalrymple, N.S.W.	Rhode Island Reds ...	83	107
J. M. Manson	Black Orpingtons ...	66	105
A. W. Bailey	White Leghorns ...	71	104
H. Jobling, N.S.W.	Black Orpingtons ..	49	103
Kelvin Poultry Farm	White Leghorns ...	73	103
H. W. Broad	Do.	54	99
T. Taylor	Do.	41	96
*J. H. Gill, Victoria	Do.	51	96
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	50	94
*C. Knoblauch	White Leghorns ...	52	93
J. Gosley	Do.	64	86
Geo. Prince	Do.	71	85
F. Clayton, N.S.W.	Do.	58	85
*E. West	Do.	59	84
G. W. Holland	Do.	33	81
Mrs. C. Davis	Do.	50	80

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	May.	Total.
King and Watson, N.S.W.	White Leghorns ...	37	77
A. F. Camkin, N.S.W.	Do.	61	77
*W. L. Forrest, N.S.W.	Do.	38	76
G. R. Wilson	Do.	73	76
Mars Poultry Farm	Do.	55	75
*W. H. Knowles, junr.	Do.	45	71
A. T. Coomber	Sicilian Buttercups ...	47	67
T. Fanning	Black Orpingtons ...	49	62
E. Pocock	White Leghorns ...	20	62
W. Hirst, N.S.W.	Do.	29	59
J. Anderson, Victoria	Do.	23	57
W. Purvis, S.A.	Do.	48	54
W. Becker...	Do.	23	51
F. Clayton, N.S.W.	Rhode Island Reds ...	19	49
W. H. Forsyth, N.S.W.	Black Orpingtons ...	21	49
R. Burns	S. L. Wyandottes ...	39	42
F. W. Leney	Rhode Island Reds ...	20	39
R. Burns	Black Orpingtons ...	29	39
Cowan Bros., N.S.W.	Do.	19	38
W. Lindus, N.S.W.	White Leghorns ...	0	34
*J. W. Macrae	Black Orpingtons ...	33	33
J. J. Richter	White Leghorns ...	22	28
H. Hammill	Do.	0	25
F. W. Leney	Do.	2	25
L. K. Pettit, N.S.W.	Do.	14	25
Cowan Bros., N.S.W.	Do.	23	23
Harveston Poultry Farm	Do.	0	18
Moritz Bros., S.A.	Do.	0	5
Mars Poultry Farm	Black Orpingtons ...	0	3
E. F. Dennis	Do.	3	3
E. F. Dennis	White Wyandottes ...	0	0
Totals	...	3,991	6,539

Pens marked * are engaged in single hen test.

RETURNS FROM SINGLE HEN TEST PENS FOR TWO MONTHS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
T. Fanning	45	45	43	38	32	25	228
J. Zahl	35	30	35	32	31	30	193
A. T. Coomber	35	38	28	32	19	34	186
Dixie Egg Plant	44	40	29	24	0	33	170
Mrs. Jobling	44	49	9	32	12	24	170
J. Anderson	38	19	31	0	39	30	157
Kelvin Poultry Farm	19	15	35	17	35	21	142
Miss Hinze	26	12	40	21	21	21	141
E. F. Dennis	22	31	4	35	18	18	128
J. M. Manson	0	47	22	11	30	14	124
A. E. Walters	13	43	9	19	28	11	123
E. A. Smith	31	1	10	39	24	16	121
J. F. Dalrymyle	27	6	29	0	20	23	107
J. H. Gill	3	40	5	37	1	10	96
J. H. Madrers	0	8	32	31	22	1	94
C. Knoblauch	23	7	6	19	16	22	93
E. West	28	17	0	1	0	38	84
W. L. Forrest	10	18	18	24	6	0	76
W. H. Knowles	33	7	12	3	6	10	71
J. W. Macrae	0	18	15	0	0	0	33

The Horse.

WHERE ARE THE HORSES?

By COLONEL RICARDO (England).

I do not know whether many people will take the trouble to read this short article, but if they do I must ask their pardon for possibly giving them only a repetition of a subject on which I have written for the past two years. The main point in both the two former articles centred round the future of the horse, and that is certainly a subject which ought to interest Englishmen. It has been for centuries our proud boast that we are a horse-loving nation, we have for years produced all that is best in all our breeds, we send our choicest sires to our colonies, and also to countries not owned by us. We have bred the finest blood stock the world has ever seen, we breed sires that are known all over the world, our polo ponies are eagerly snapped up by the Americans; but soon, according to the report, we shall cease to own a horse at all. The Government is far too busy just now to waste any thought on the coming shortage; but, undoubtedly unless some law is passed speedily, we shall be going hat in hand to foreigners after the war to try to get back our lost superiority. The law that should be passed at once without another moment's delay is one to prevent the exportation of another mare out of England. Once get this passed, the breeders must then turn to and do their best. There were a good number of mares sent back from the front last year; these should have been given (not hired) to the farmer, or breeder, if you like the word better, for his own, provided he put them to a suitable sire. All the vexatious restrictions put on the custodian by the Board of Agriculture which are in force now should be swept away. What matter to the nation if the breeder does occasionally hunt his mare even when in foal? In Ireland they have done this often enough, of course exercising care as to how long to go on. These cast mares from the Army sold at capital prices, but it would have been far more to the credit of the Government if they had made them a nucleus for a State breeding project. As I said before some years ago, we want ten thousand mares imported from somewhere—Argentine, Texas, or the various horse-breeding countries—and to set them apart at once for the purpose of setting up our depleted stock again. I do not mean to say that we are to do all this at once, for it must take time, but "never another mare to be sold out of England" should be the watchword of the day. It is true that the Government point to the different way all war is waged now; the whole of the transport is brought up to the very trenches by motor, and this has made an enormous difference in the work of the A.S.C. Granted that this is the case, granted that henceforward every shell and every biscuit supplied to our men shall be brought up by mechanical transport; can we horse our cavalry with motor cycles? can the Horse Artillery trust to motors to race their guns to the front? No, we must have horses, we must mount our men, so that when called

upon they can again ride through the German Uhlans as if they were paper; we *must* have the Horse Artillery, the pride of the English Army; we cannot lightly cast the horse aside. How is it that we have been able to produce any animals at all? Where would our mounted branches have been had it not been for the hunting studs? You can hardly take up a paper but you see a letter from someone imploring us at home to keep hunting going; but how can it be done unless there are a certain number of horses to go on with? The same with racing; the stoppage of this is going to ruin many thousands of men, let alone the breeders. The small men say that they cannot afford to breed now the prices rule so small; the small owner does not think it worth while to keep on his stud when there is no chance of his being able to get his horse in any race. The trainer has had three-quarters of his horses taken away, most of his stable lads, so how can he keep going or carry on? The crowds of people who live by racing, the touts, the very card sellers themselves, the thousand and one men who earn a precarious livelihood by something connected with the horse—all will have to go. Is there no far-seeing statesman who can look ahead a bit and foresee this and do his best to supply a remedy? Rumour states that a large quantity of the horses of the gallant yeomen who so worthily kept their end up in Gallipoli have been sold in Egypt for a song, to save the cost of bringing them home. The mares of this force might easily have been spared and brought home. No remount department appears strong enough to even suggest this to the powers that be; but surely it would be a sound undertaking? When the war is over, men will want to come back and hunt, the whole of the Army will want remounting. They have been wise enough these last few months in getting an enormous stock of mules into the country, and these most useful animals will save the horses a lot; but even the most sanguine statesmen cannot contemplate mounting the Army on mules, nor can the hunting man hope to hold his own on a quick thing on a mule. Horses will have to be got, and the sooner we puzzle out the way to get them the better. The authorities are not going the right way to keep what few horses they have in good health; here in the beginning of November we have them out in the open. The police tell me that an order has hurriedly come through, telling them to look out for billets for them for the winter. One would have thought after the experience of last winter, when the Yeomanry horses went down like flies, that some precautions would have been taken. Certainly at a number of garrison towns open sheds have been constructed; this is all as it should be, but there is not enough of them. Let us all, however, try our best to make up for the mistakes of others; let us "carry on" whenever possible; do not let our enemies ever have the chance of saying that they have frightened us into leaving off hunting and racing; do not give them a chance to say that we have knocked off breeding because we think it is not required; never let it be said that we were terrorised in our sports. But let us few who are left in England, who are too old for Lord Derby and his men, try to help towards what ought to be one of the first things to do, to take care that the English racehorse, the English hunter, the horses we love and whom we have hitherto been so proud of, do not die out altogether.—"Farm Bulletin," June.

The Orchard.

A HINT TO FRUITGROWERS.

ORCHARDISTS MAKING JAM.

The main object of an extensive fruitgrower is to run his orchard at a profit. Many orchardists have had the experience, on oocasion, of marketing fruit in Sydney and elsewhere at a loss. In other words, after paying freight, and other expenses incidental to getting the fruit to market—including the agent's commission—the fruitgrower has found himself out of pocket on the transaction; and this is without reckoning time or labour in gathering, grading, and packing the fruit for market. Such experiences have set the orchardists thinking. They do not blame the agents. These monetary losses have resulted from a glut, an unsaleable surplus of fruit of a perishable nature, that cannot be held over from day to day.

Among those orchardists who have pondered over the problem is Mr. H. H. Smith, of Jerseyville Orchard, Seven Hills. He has made a profit of £3 18s. on 90 lb. of fruit turned into jam on the orchard premises, a striking contrast to a direct loss accruing from the marketing of raw fruit, or to a paltry 1s. or so per case, as the credit balance after paying for cases, commission, &c. Several months ago Mr. Smith established a jam factory on his orchard, beginning with a capacity of a cwt. of jam at a time, the appliances including a one-horse boiler and a 12-gallon copper. He also has a preserver, in which 2 lb. cans (with the fruit whole, in syrup) are dipped three dozen in each operation. The lids are crimped, so that no soldering is required. The machinery is sheltered in a commodious shed. Screwlids are in many instances found preferable to prepared parchment as a covering for glass jam jars. The varieties of fruit so far requisitioned for the new industry include peaches, apples, apricots, pears, and plums. Mr. Smith has further succeeded in the make of plum sauce, readily saleable. He is about to extend his plant, and proposes to buy fruit extensively from orchardists in his neighbourhood.—"Town and Country."

A MAIZE-CUM-POTATO CROP.

The "Farmers' Advocate," Bloemfontein, S.A., records that an American farmer is doing a good deal of maize-potato planting. The two combine splendidly. One secures almost as much maize to the acre as though it were planted to it alone, and the potatoes are an extra crop. In following this method the rows of potatoes and maize should alternate 40 in. apart, and the maize should be 8 in. apart in the row. This method secures plenty of air and direct sunshine upon the maize crop.

Viticulture.

GRAPE CULTURE EXPERIMENT—BUDERIM MOUNTAIN STATE SCHOOL.

Local growers hitherto have planted Isabella grapes for their own use. These have not proved very satisfactory for several reasons—(1) Uneven ripening of fruit on individual bunches; (2) ripening takes place late—during our wet season—and the excessive moisture causes bursting of fruit.

Objects of Experiment.—It was thought that these disadvantages could be overcome by planting other varieties which would—(1) ripen earlier; (2) produce looser bunches, allowing room for expansion of fruit.

After consultation with fruit experts, two grafted plants of each of six varieties (likely to meet requirements) were planted on the school experimental plot in October, 1915. The ground was trenched to a depth of 2 ft. 6 in., and loose stones put in the bottom of the trench for drainage. Well-decayed farmyard manure was added to the top soil.

A comparison of the first season's growth of the different varieties as shown below is interesting, although, of course, we must wait for the production of fruit to obtain full results from this experiment:—

Variety.	Length of Canes.	Total.
Snow's Muscat ..	No. 1. 2½ inches	2½ inches
	No. 2. 1 foot	1 foot
Goetha	No. 1. 4 canes—9 feet, 3⅓ feet, 4 feet, 4 feet ..	20⅓ feet
	No. 2. 5 canes—5 feet, 4 feet, 4 feet, 4 feet, 4 feet	21 feet
Chasselas ..	No. 1. 2 canes—2 feet, 1 foot 6 inches	3½ feet
	No. 2. Scion died	Nil
*Wilder	No. 1. 4 canes—18 feet, 1½ foot, 2 feet, 2 feet ..	23½ feet
	No. 2. 2 canes—10 feet, 4 feet	14 feet
Iona	No. 1. 2 canes—5 feet, 4 feet	9 feet
	No. 2. 3 canes—2½ feet, 5 feet, 7 feet	14½ feet
Syrian	No. 1. 2 canes—1¾ foot, 4 feet	5¾ feet
	No. 2. 1 cane—5 feet	5 feet

* No. 2 Wilder was planted at end of trench.

[We have frequently been indebted to Mr. R. G. Bartlett, headmaster of the State school, Buderim Mountain, for very interesting accounts of experiments made in fruitgrowing at the school grounds. These experiments are not made haphazard, but with judgment, aided by the officers of the Department of Agriculture and Stock, and are carried out on scientific lines. The above notes on "Grape Culture Experiments" are valuable aid to local viticulturists, and it is to be hoped that when the fruit ripens Mr. Bartlett will give us a full account of the results.—Ed. "Q.A.J."]

Tropical Industries.

THE LATEST COTTON-PICKING MACHINE.

In the June number of this Journal for 1911 we gave some account, with illustrations, of the Angus Campbell cotton-picking machine, which has taken twenty-five years to bring to the state of perfection at which—according to the undoubted testimony of such men as Herbert E. Walmsley, then president of the New England Spinners' Association; Arthur Hammerslag, of the Carnegie Technical Schools of Pittsburgh; Percy Freeman, the Dallas agent of Alexander Eccles and Co., the English cotton-buying house—it has triumphantly arrived. After seeing it at work in the field, Mr. Walmsley, who attended the final trial as a sceptic, came away thoroughly convinced that, at last, a perfect machine had been evolved. He said: "After having seen the machine in operation, after having seen the actual results accomplished by this particular cotton-picker, and after carefully and thoughtfully studying the matter. . . . . I am convinced the machine must and will rank in the future with such inventions as the gin, the sewing-machine, or the drawing and spinning frame. The rapidity, the ease, and the self-evident perfection with which the machine does the work were to me a revelation, and must, in my judgment, prove to be a revolution in cotton-picking."

Mr. Freeman, above mentioned, who is not a demonstrative person, pronounced it a success. He had counted stalk after stalk with 14 or 15 opened bolls, and every one was picked. He then wrote to his firm in Liverpool, and they, in turn, cabled that they would like to become interested in the machine.

In the words of a writer in "The World's Work," December, 1910:—"The death knell of the annual cotton-picking upheaval in the South has been sounded. . . . . The average field hand can pick between 200 and 250 lb. of seed cotton a day, although fast pickers often get as much as 400 or 500 lb. The machine can cover 8 or 10 acres a day. In a good field it would pick 8,000 or 10,000 lb., and in a poorer field 4,000 to 5,000 lb. With it, a man could go over a 40-acre farm twice in ten days, and picking time would be the least busy time of the year."

The machine itself is a small, gasoline, traction engine, with two picking attachments swung under it and a pair of canvas bags hung

out behind. It travels through the field as fast as a man walks, taking the cotton plant between the wheels, where it is picked over by almost countless steel fingers which catch the lint, but leave the plant uninjured, so that the later bolls may mature. Here it is that the machine triumphs.

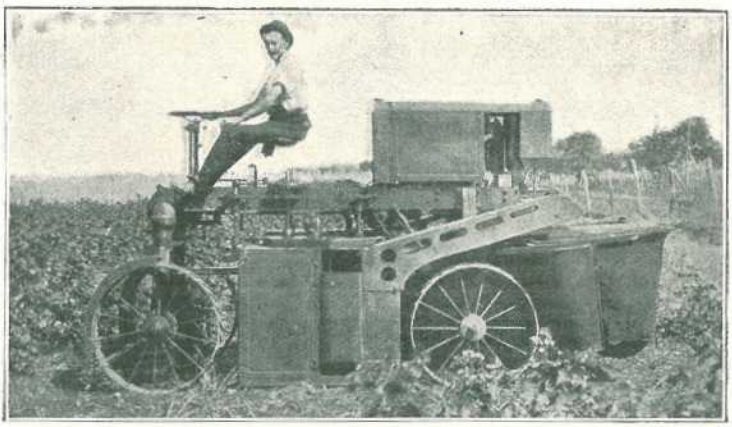


PLATE NO. 1.—THE MODERN COTTON-PICKER IN OPERATION.

Not an unburst boll is damaged. To leave the unripe bolls has, until now, been the great difficulty in making a mechanical cotton-picker. Cotton cannot be gathered all at once, like wheat. Cotton bolls on the same plant mature and open progressively, making the problem of mechanically picking cotton extremely difficult.

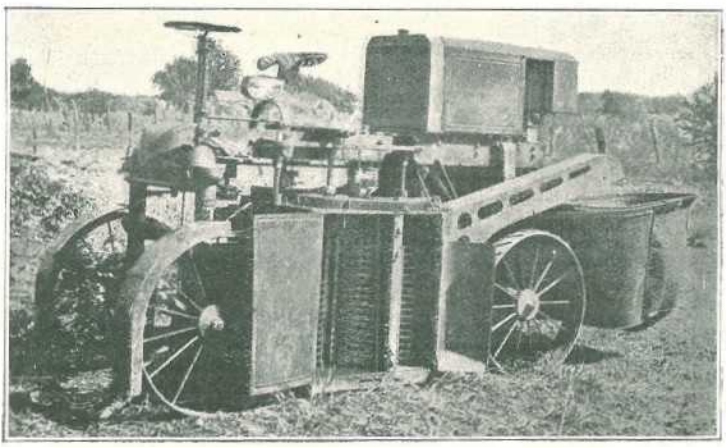


PLATE NO. 2.—COTTON-PICKER WITH CASING OPENED TO SHOW THE MECHANISM.

A cotton-picking machine to be commercially successful must be able to pick the open bolls without injury to the unopened bolls and blooms or to the foliage and the plant itself. It must do this faster and at a lower cost than can be done by hand, and it must be able automatically and mechanically to discriminate between the ripe and unripe bolls.

Further, as the cotton is not all ripe and open at the same time, it must be able to go over the same field and plants two or three times during the season without injury to plants or bolls. At one of the demon-

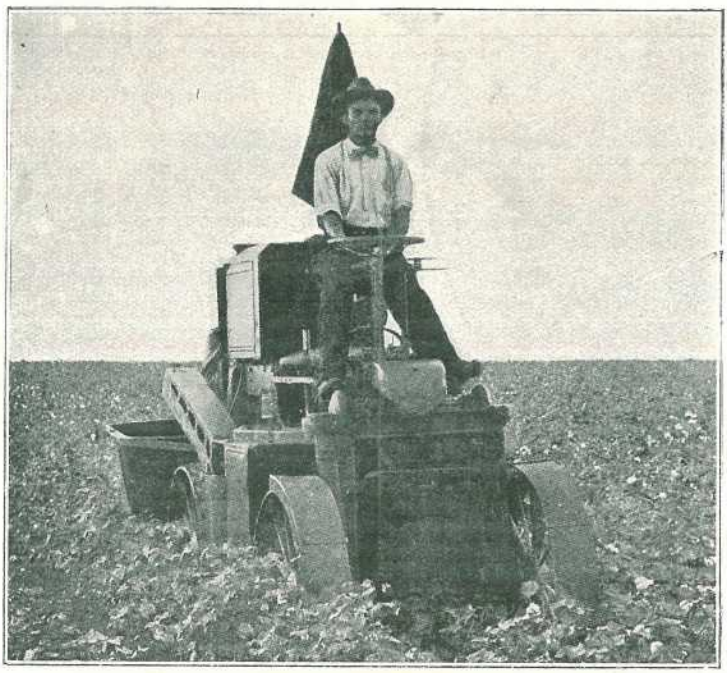


PLATE No. 3.—COTTON-PICKER MOVING BETWEEN THE ROWS.

stations in Texas, a farmer followed it for a while, and then stopped still in the row and indulged in every ejaculation of surprise of which he was capable, profane and otherwise, winding up with: —

"Why, that thing looks like it was made to make sausage out of a live hog, and it's been over half a row of cotton and ain't hurt a plant."

THE PICKER A MONEY SAVER.

Still quoting the "World's Work," we are told that the machine will save the cotton farmer's money and temper. It will pick his cotton more cheaply than the hand pickers do, and it will not have to be begged to do so. Let us take, for example, a 100-acre farm producing half a bale to the acre. The machine can cover at least 8 acres a day. Its expenses would be approximately—

Wages in America.

Driver	£0 6 3
Gasoline and oil	0 10 5
Boy	0 4 2
Repairs	0 4 2
Per day	£1 5 0

At that rate it would cost £15 to go over the farm once with the machine, and £30 to pick the 100 acres twice, which it could do in 25 days. To pick the 50 bales from this 100 acres by hand would cost between £100 and £160; and it would take more than twelve hands to complete the task.

From the saving of from £70 to £130 must be deducted the interest on and depreciation of the machine.

The mechanical cotton-picker is arranged so that the machinery can be taken off, and a plough, planter, harrow, or any other farm implement hitched to the 29-h.p. tractor. The price of the machine is £1,000.

HOW THE MACHINE WOULD AFFECT QUEENSLAND.

Now that there is some prospect of a forward movement in cotton-growing in Queensland, we may point out in what manner this successful machine would benefit the industry in this State. First of all, the cost of the machine has to be considered. At present the price is £1,000. There are, so far, no growers in Queensland who could afford to purchase such a machine; but, reasoning by analogy, there are no farmer growers of sugar-cane who could afford to pay £10,000 to £40,000 for a sugar-mill; yet we find in all our sugar-growing districts men growing from 10 to 50 acres of cane who make the industry pay them handsomely by means of the central or privately owned sugar-imlls. The present cotton-growers own no cotton gins, neither did they in the palmy days of cotton-growing in Queensland; yet the small grower found it paid him to grow from 5 to 50 acres of cotton, because he could either sell it to the ginowners or have it ginned at a reasonable rate. What applies to the sugar-mill and the cotton-ginnery will apply with equal force to the cotton-picker.

It may also be cited, as an instance of the employment of expensive machinery, that, although individual wheatgrowers may not be able to purchase their own threshing machines, not cultivating vast areas of wheat, yet they derive a certain amount of profit by growing small areas and having it threshed by owners of threshing machinery. The growers in a cotton district could either combine to purchase a picker, or a capitalist could, on the assurance of a certain area being laid down in cotton, be induced to purchase a machine and pick all the cotton in the district.

The main question to be answered is—Would it pay the grower to have his cotton picked by the machine, and would it pay the machine-owner to pick it at such a price as would enable the grower to realise a good profit from his crop?

As we took a 100-acre farm and a half bale (200 lb. lint, equal to 600 lb. seed-cotton) crop as an example of the cost of picking the crop

by machinery, we will consider the same area as being picked by hand. In twice picking by the former method, the cost is set down at £30 to pick 600 lb. seed cotton per acre on 100 acres; that is to say, that 60,000 lb. of cotton are picked for £30. By hand, the cost of picking in the United States is 1 dollar 10 cents per 100 lb., or about ½d. per lb. This is the price paid in Queensland. Hence 60,000 lb. would cost £125 to pick by hand, as against £30 by machine, not to speak of the vast saving of time and labour. The cotton-grower within reach of a machine would have nothing to do with this crop at picking time, and would, therefore, be at liberty to attend to other work, which, under the hand-picking system, would have to be neglected or additional labour would have to be employed. The capabilities of cotton-growing in Queensland are enormous, and the advent of this machine should prove an incentive to farmers all over the cotton districts to plant as many acres of cotton as possible, with a view to making the State what it can easily become—the greatest cotton-growing country in the world without employing a single coloured labourer.

SUGAR PROSPECTS IN THE NORTH.

LOWER BURDEKIN DISTRICT.

The General Superintendent of Sugar Experiment Stations has received from the Field Assistant to the Bureau (Mr. A. P. Gibson) the following report:—

Since my last inspection, beneficial rains have been precipitated upon this district, registering for the past three months in parts up to 26 inches, consequently quite a transformation was noted. The apparent barren surface soil once again has become carpeted by dense vegetation. The water-courses and lagoons, although far from being full, contain adequate supplies. Owing to the prolonged adverse conditions during the season 1915, it was not found possible to prepare the land for planting until softened firstly by the application of water, which operation naturally was found most costly; fortunately the rainfall of recent date fell in sufficient quantities, thereby obviating the necessary methods practised last year of watering previous to cultivating. Much activity prevailed upon the many holdings, and the turning over of extensive areas by double disc and oil tractor ploughs was proceeding apace. In a few instances settlers did not avail themselves of the favourable opportunities to break the soil of their cleared areas, thus delaying planting. Such virgin lands should be broken and frequently stirred for their betterment for a period of not less than three months previous to planting.

Climatic conditions at present for planting are most favourable. Sufficient moisture exists for the satisfactory germination of seed, and it is anticipated, should further beneficial rains fall, the crop for 1917 could be an exceptionally good one.

Where planting was being continued the soil was noted to be in fair condition. The cane drills were being run out at 5 feet centres, and the principal varieties being planted were 24B and H.Q.426.

The cane in use appeared satisfactory. Unfortunately much unavoidable waste resulted, due to the stem possessing so much immature top. The seed was being deposited by crop planter into the drills at distances varying from 5 to 8 inches, and utilising probably some 27 cwt. of plants per acre.

Relating to the husbandry of plant cane besides the use of disc and scarifier cultivators, it is customary to subsoil a part or the whole of the land existing between cane rows. This operation, especially where the cane has already stooled, requires much consideration, and when performed during periods of dryness seriously retards all growth, owing to the supply of food suddenly being cut off by the severing of the nutrifying roots.

Until quite recently intense irrigation has been practised. The 1916 crop, comparatively speaking, was raised by it, consequently meagre profits are anticipated. However, without it, caneraising in these parts seems but a gamble. Some paddocks of cane have received as many as seven waterings, but the average may be put down at four, costing approximately per application per acre from 30s. to £2. The area watered per day is dependent principally upon the levelness of ground and composition of sub-strata. Previous to the falling of rain this year the subterranean supply in places subsided as much as 7 feet, but has risen to its customary level now.

The spray system of irrigation has been given a trial upon the well-known property possessed by Mr. Clark. The water is sucked up from an adjacent lagoon by a centrifugal pump, belt driven from an oil tractor engine, and forced through a 6-inch main composed of 20 gauge galvanised iron, and containing, every 35 feet, two 4-inch valves on opposite sides, so that portable pipes possessing sprayers at 17 feet 6 inches spaces may be attached. Two branches are necessary, for when one is in operation, the other may be transported into the desired position. This system is yet in the experiment stages, so no authentic information is available. However, I consider the system beneficial for the irrigation of canes in the smaller stages.

Fertilisers are not extensively applied here; the only one used is meat-works, at the rate of 6 cwt. per acre, and lime by way of experi-

ments, with marked results. Where intense irrigation is practised it is considered most essential that manures should be applied, especially so where the waters are derived from subterranean sources. These waters percolating through rocks, soils, &c., have the tendency to dissolve ingredients which are partly retained in solution, consequently impoverishing the soil, therefore I maintain it is important that this depletion by leaching, where possible, should be restored by frequent manuring. Green manuring in conjunction with liming and fertilising upon the forest soils of the Lower Burdekin are essential for yielding nitrogen, and materially improving the capacity of the soil for retaining moisture. Corn partly by way of rotation has been grown extensively. Unfortunately, climatic conditions proved detrimental, causing the crop to become severely blighted, resulting in exceptionally poor returns.

The variety of cane known as B.208 has now become so seriously affected by the prevalent top disease that the discarding of it is recommended.

M.1900 and N.G.15 also indicated slight signs of top disease; therefore I would urge the growers to exercise the greatest care in seed selection, otherwise serious losses at some future date must follow. Hoppers in all stages were in evidence, but doing little damage to the growing crops. Strange to relate, the toads, which abound in this locality in uncountable numbers, evidently find the hoppers appetising, and have considerably reduced the population of this pest.

The prospects for the coming season are not flourishing, but present a brighter appearance than did season 1915. Approximately some 145,000 tons for the district are estimated, and Inkerman factory will crush this season, commencing in July, and treating probably some 45,000 tons.

PROSERPINE NOTES.

The above-mentioned sugar district was visited, and my work was much hindered by wetness.

Portions known as Cannon Valley and Saltwater were reported to have received as much as 12 inches of rain, while the precipitation upon the lands surrounding the factory was much less. The crop previous to the rainfall of recent date was reported to be fast perishing, but since has much improved, and at time of visit I considered the crop well advanced and looking remarkably well, especially that raised at Saltwater and adjacent river lands, consequently large tonnages are anticipated, provided that they are harvested before deterioration sets in.

Little work upon the farms was being continued owing to prevailing wetness. The existing cultivation apparently was superior by far to that seen on previous visits, due probably to past dry conditions, permitting cleaning of crops and better tilling.

Small areas of cane have been planted this year, but much remained to be planted, and what had been planted seemed to have germinated satisfactorily.

The varieties of cane here raised are numerous, many of which unfortunately possess a low sucrose content, therefore should be discarded.

The canes seemingly suitable for the district are as follows:—N.G.15, on portions of the river flats, The Gorus, 24B, 24A, 24, and H.Q.426 upon the adjacent river flats.

D1135 and Malagache grow favourably upon most lands, and often produce satisfactory crops on soils where other varieties fail completely. When raised upon fertile soils the Malagache, which really is a ten-months' cane, yields prolific crops of a recumbent nature, and if not harvested and milled at maturity (which generally is about the end of September), quickly deteriorates, thereby resulting in serious losses to grower and miller. If less Malagache were raised and more of the approved varieties grown, increased profits by farmer and miller would be derived.

The variety known as Green Seedling has contracted the top disease, apparently similar to that possessed by the B.208. Yellow stripe was noted upon the leaf blades of H.Q.426 and B.147. This disease, according to investigations made in other parts, was not found infectious, and only spread by the planting of stems containing the disease.

H.Q.5.—The mid-rib of many leaves possessed a ruby red colouration from sheath to the utmost extremities. The same thing was noted on N.G.15 at Herbert river, season 1915.

Leaf hoppers were plentiful, but not causing extensive damage. Grubs in places were troublesome. However, no startling damage has yet been reported.

The prospect for the coming season is not a record, but is most promising. Approximately some 52,000 tons are expected to pass through the rollers, but this tonnage may probably be increased now that beneficial rains have fallen.

COTTON SEED FOR THE 1916 SEASON.

The enormous demand in the United States of America for cotton seed for oil-making purposes has resulted in a shortage of seed for local planting in the cotton-growing States and for export. The Queensland Department of Agriculture and Stock, however, made early arrangements for the purchase of a considerable quantity for distri-

bution to Queensland farmers in time for the coming planting season. The shipments should arrive in time for September planting. Five varieties, so far known in this State, appear from description to be the very best quality of heavy producers, some coming early to maturity, four being long-stapled, and one short-stapled—all Uplands, which kind is most suitable for planting in the Southern, Central, and Western districts.

LONE STAR.

appears to be a very productive variety of long staple. The bolls are very large, being from 1½ to 1¾ inches in diameter and 1¾ to 2 inches in length. They have short, blunt points, and from thirty-five to forty-five go to the pound. The lint is from 1 to 1⅛ inches long, very strong, even fibres, and the percentage is from 38 to 40 of lint per cwt. of seed cotton, which means about 1 bale (400) ginned cotton from a 1,000-lb. crop, or £15 to £20 per acre, besides the seed. A common crop of Lone Star in the States is two bales per acre.

TRICE.

This is a short-stapled cotton, maturing very early. The plant grows from 2 to 5 feet in height. Like Peterkin, to which it bears a great resemblance, it is very prolific. The lint runs from ⅞ to 1 inch in length, and the percentage of lint to seed is from 28 to 35.

COLUMBIA.

Another long-stapled variety of Uplands, of the Russell Big Boll type. The bolls are very large, and the lint is from 1¼ to $1\frac{7}{16}$ inches long, very fine and silky, and uniform; 29 to 33 per cent. of the crop is lint. It is of low-growing habit. The lint often has a green tinge, arising from the colour of the fuzz on the seed. This is a very undesirable quality. The true seeds should be white. Any plant producing bolls with a green tinge should be destroyed, as the lint is worthless. But where white seeds only are sown, this variety is well worth planting, being superior both in quality and price to Russell's.

DURANGO.

A new type of long-stapled Uplands, a very early-maturing variety, and suited to a long range of varying climatic conditions. It is earlier than Columbia, and is well adapted to the new system of cotton culture (which we described in this Journal in February, 1916). By this system the vegetative branches are suppressed, and the fruiting branches are increased, hence an earlier and increased crop. The bolls run 60 to the lb. The lint is 1¼ inches long, and the seeds are fuzzy.

HOLDON.

This is a big-bolled type. The lint is longer and the bolls larger than in any other type. The plants grow to a height of from 2 to 4 feet. Bolls short and blunt. Lint fine and silky, from 1⅛ to $1\frac{3}{16}$ inches long, and the yield is from 33⅓ to 35 per cent. of lint. The seed has a dense white fuzz, with a larger percentage of the 5-locked bolls of any other variety.

Such is a short description of the varieties of cotton which the Department has been advised to import, and unless a shortage of shipping, or any casualty due to the war, should occur, there will be ample time in September to sow. Possibly seed of Columbia and Holdon may not be obtainable. We may incidentally mention that last year we sowed cotton in December, and at this time of writing the plants are bearing fine bolls (7th June), and they have not suffered in the least by the frosts of 19th and 20th June.

PERPETUATING GOOD VARIETIES.

Cotton-growers who wish to ensure a continuance of the true types, should bear in mind that unless selection is continued, the value of a variety is sure to decline. Even in the best and the most carefully selected stocks, inferior plants will appear, and if these are allowed to multiply and cross with the others, the stock will surely deteriorate. The pollen from the flowers of these inferior plants is carried about by bees and other insects, and the seeds developed from such pollen transmit the characters of the inferior plants, and even if they do not come into expression in the first generation, they are likely to appear in the second.

To grow cotton from unselected seed involves the same kind of losses as in an orchard planted with unselected, ungrafted apple, citrus, or other orchard fruits.

PRESERVATION OF VARIETIES BY SELECTION.

The method of selection to be followed in preserving a variety from deterioration is entirely different from that employed in the development of new varieties. The breeder of new varieties looks for exceptional individuals, and prefers those which are unlike any variety previously known. This is, however, a specialty, and the cotton-grower's business is, not to secure seed from peculiar plants, but to reject all that deviate from the characters of the variety he has grown. Now, to command success in preserving a variety, the first qualification for selection is a familiarity with the habits of growth and other characters of the variety, to enable the farmer to confine his selection to the plants which adhere to the form or type of the variety, and to reject all that vary from that type. How is this done? The first thing to note is the behaviour of a new variety. Do not wait till the crop matures, but watch the plants in the early part of the season. Even before the time of flowering, it is possible to distinguish "freak" plants by differences in their habits of growth, or the character of their stems and leaves. Wherever you find any divergence from the true plant characters, the plants showing them must be pulled out at once in order to prevent the crossing of the good plants with inferior pollen. After the bolls begin to reach a mature size, it is well to go through the field again and pull out all plants that show by the small size or other peculiarity of the bolls, that there had been a variation from the standards of the variety. These field selections will save a world of trouble at crop time, when attention can be limited to the yield and to the character of the lint and seed.

ADMIXTURE OF SEEDS.

One of the most serious difficulties in maintaining the uniformity of a superior variety of cotton is the mixture of seed in gins. A few farmers (in America) have their own gins or small hand gins for their seed cotton, and in some localities, ginning establishments are beginning to provide small gins that are kept clear for ginning seed cotton. Some farmers take care to avoid the mixture of seed by holding their seed cotton until the end of the season, when the time can be taken to clean out the gin. It is also possible to plant progeny rows or seed plats with unginned seed by wetting the lint before planting or by pressing the seed into moist ground.

The above advice should be taken by those who intend to plant cotton about next September in Queensland, as it emanates from an American expert, Mr. O. F. Cook, Bionomist in Charge of the Bureau of Plant Industry, Washington, U.S.A.

We may mention, in conclusion, that when cotton-growing was largely engaged in in Queensland, during the American Civil war, all kinds of cotton were sowed indiscriminately in the same field. As owners of a ginnery, we bought large quantities of cotton, all mixed—Sea Island, Uplands of unknown varieties, and hybrids. All these went into the same bale and brought high prices in England. But cotton was cotton in those days. To-day what is required is a uniform sample, perfect in all respects, and this end can be attained by careful attention to the plants as they grow and to the flowers and bolls at maturing time. The Department of Agriculture is obtaining the best of varieties for distribution to farmers in this State, and it lies with them to preserve the different types for future planting as above recommended.

GROOVED SUGAR-MILL ROLLERS.

Mr. J. Gordon Lowe, representative in Natal of the well-known sugar machinery firm of Mirrlees, Watson, and Co., Ltd., of Glasgow, recently returned to Durban from Mauritius, and amongst other items, in an interview with a representative of the "Agricultural News," supplied the following information on the grooving of feed rollers:—

He mentioned that his firm hold the patent rights for Messchaert patent juice grooves for sugar-mill rollers, which have been reported on most favourably in all countries where they have been tried. He mentioned that there are forty rollers working on the Messchaert system in various mills in Mauritius, all installed during the past year, and they are giving wonderful results. On its merits the system makes a strong appeal for adoption, and as it becomes better understood it will doubtless be more universally installed.

The "Agricultural News" also publishes an article from the "International Sugar Journal" dealing with recent progress in sugar manufacture in Hawaii, which states:—

"Apparently the grooving of feed rollers in cane-sugar factories will be adopted throughout the whole sugar world, as it has given very

highly satisfactory results wherever it has been tried. In the latest 'International Sugar Journal' the following appears in an article dealing with recent progress in sugar manufacture in Hawaii:—

"As it has been proved that there was an advantage in grooving feed rollers so that the pressed-out juice could run away in small streams from the entire length of the roller, it was thought that there might be some benefit from grooving the discharge rollers also. This has proved to be the case during the past season when the right kind of grooves were used and they were kept well cleaned out. In three factories an immediate drop of 3 per cent. in the moisture in the bagasse was noticed when using grooved discharge rollers, which, other things equal, should raise the extraction by 0·2 to 0·3 per cent.

"But it was proved to be of great importance to keep the grooves cleaned out. It was noticed in several factories that the moisture in the bagasse increased progressively each day of the week, and this was ascribed to wearing of the scrapers, which are changed every Sunday. In fact, between Monday and Saturday this increase was, in one series of trials, found to be over 2 per cent. The remedy for this would appear to consist in using a double set of scrapers on the discharge rollers. Another factory obtained the following data of moisture in bagasse per cent.:—

	Per cent.
Moisture in bagasse without grooves	44·5
Moisture in bagasse with partially cleaned Messchaert grooves	41·0
Moisture in bagasse with two sets of scrapers	38·0

QUEENSLAND SUGAR-MILLS.

CRUSHING DATES.

The following is the list of crushing dates, as published in the June issue of the "Queensland Sugar Journal," as far as that journal has been advised:—

Australian Sugar Company, Ltd. (Mourilyan), about 14th June.

Baffle Creek Sugar Mill, end of August.

Buss Bros., first week in August.

Farleigh Estate Sugar Company (60,000 odd tons), early in July.

Bingera (Gibson and Howes), middle of July or beginning of August.

Goondi Mill, 14th June.

Inkerman Sugar Mill, middle of July.

Macknade Mill, 14th June.

Marian Central Mill Company, Ltd., third week in July.

Maryborough Sugar Factory, shortly after middle of August.

Millaquin Sugar Company (Doolbi Mill)), end of August or early in September.

Millaquin Sugar Company (Millaquin and Qunaba), late in August or early in September.

Moreton Central Sugar Mill, last week in July.

Mossman Central Mill, 8th June.

Mulgrave Central Mill, 14th June.

Pioneer Sugar Mill, middle of July.

Plane Creek Central Mill (between 40,000 and 50,000 tons of cane), first week in July.

Pleystowe Central Mill, middle of July.

Proserpine Central Mill, first or second week in July.

Victoria Mill, 14th June.

TREATING CANE DAMAGED BY FROST.

In a paper on the handling of cane damaged by frost, Mr. W. E. Cross, of the Tucuman Agricultural Experimenting Station, points out that the difficulties in boiling are mainly due to the viscosity of the juices and syrups, caused by the presence of the gums produced by fermentation. This cannot be removed, and it is the more necessary to exercise care in choosing cane for grinding, and to keep down fermentation as far as possible from the moment the cane enters the sugar-house. A large percentage of molasses necessarily will be obtained; and by leaving the molasses a long period in crystallisers, or after boiling to a suitable density, or for many weeks stored in tanks, a considerable yield of sugar often can be obtained therefrom. In order to reduce the damage caused by a freeze, the practice in Louisiana is to cut the cane, and, without removing the leaves, to lay it in the furrow in such a way that the leaves of the second canes cover the stocks of the first, and so on. This is known as windrowing.—"Agricultural News," Durban, S.A.

THE SISAL HEMP TRADE OF MEXICO.

Notwithstanding the efforts which have been made by the Department of Agriculture and Stock for a number of years to encourage the growing of sisal in this State, the result has been practically nothing. A few private planters entered into the business, and one sugar planter at Childers was remarkably successful in his sisal plantation of some 60 acres. He installed up-to-date machinery, and manufactured the fibre to the tune of over 1½ ton per acre, which left a big profit. It may be asked why he gave it up and reverted to sugar planting. The reason is simple. The land was so rich that in about three and a-half years the plants arrived at maturity, and replanting became necessary, which meant machinery idle for three years more. Sisal planted on poorer soil has, to the writer's knowledge, not arrived at the "poling"—*i.e.*, maturing stage—for twelve years; but as most of the original growers planted on rich soil, they soon abandoned the industry. In Mexico the sisal industry is very important, the annual production of fibre in Yucatan and Campêche amounting to over 1,000,000 bales of 375 lb. each, equal to 16,741 tons. With sisal at the present price of £50 per ton, the value of the crop annually amounts to about £1,000,000.

From a report made lately to the Board of Trade by H. M. Chargé d'Affaires at Mexico city, as reported in the "Indian Trade Journal," it is gathered that until the establishment of the Government Commission for the Regulation of the Henequen ("Sisal") Industry there had never been an absolute monopoly of the hemp business in the States of Yucatan and Campêche, the annual production in which is in excess of 1,000,000 bales, averaging 375 lb. each. Nearly all the farmers producing "sisal" hemp in the two States were recently obliged to contract for five years to sell their hemp exclusively to the Commission (see page 389 of the "Indian Trade Journal" of 10th March). The Commission fixes prices to both producers and buyers, and retains a large share of the profits; it controls the railway service and provides no cars for hemp save to its own customers; and it has opened a bureau in New York for the purpose of convincing American consumers, who take about 80 per cent. of the production of hemp for the manufacture of binder twine, that no monopoly exists. At the present time the price of hemp is unusually high owing to high freight rates for shipping. Apart from this, however, the cost of hemp has been increased by the imposition of a State duty of 10 cents. per kilogramme (2·2046 lb.) and a Federal duty of 1½ cents gold per kilogramme payable in American gold at par. In addition to these duties railway freights have increased by 300 per cent. and warehouse charges at Progreso also by 300 per cent. A corporation formed in New Orleans, styled the Pan-American Commission, receives the hemp sent to the United States and hands it over to the bankers who financed the loan of 10,000,000 dollars to the Government Commission. For this service the Pan-American Commission is to receive 5 per cent. commission on all sales of hemp made by the Government Commission. If 1,000,000 bales of hemp are sold in the United States at an average of 6 cents per lb. the commission payable to the Pan-American Commission will be over 1,000,000 dollars, or 100 per cent. per annum, on its reported capital! 100 cents = 1 dollar (U.S.) = 4s. 1⅓d. at par.

The "Indian Trade Journal" for 10th March above referred to, says:—"His Majesty's Legation at Mexico city reports to the Board of Trade, under date 8th December last, that contracts have been entered into between the Government Commission for the Regulation of the Henequen Industry and the hemp producers of the States of Yucatan and Campêche on a "profit-sharing" basis. The contract in each case was for five years, and during that period all the henequen grown by the producer is to be delivered to the Commission, in return for which the producer will receive a sum of money on account. At the end of five years the Commission will pay a portion of its net profits to the producer in proportion to the amount of henequen received from him. Should there be a loss the Commission will bear it. The contract covers plantations which may be subsequently acquired by the producer, and should the planter transfer his estate the transferee incurs all his rights and liabilities under the contract. It appears, therefore, that the institution of the Commission has, to all intents and purposes, transformed the hempgrowing industry into a Government monopoly."

Entomology.

BEAN FLY AND OTHER PESTS.

By H. TRYON, Government Entomologist, &c.

We frequently receive letters asking us to publish a remedy for the ravages of the French Bean Fly. In reply to one of them, Mr. H. Tryon, Vegetable Pathologist and Entomologist to the Department of Agriculture and Stock, supplies the following information:—

"The fly that attacks the french beans, named *Angromyza phaseoli*, is an insect that is very troublesome to deal with. It is attracted to its host plant in the first instance by the sense of smell, and therefore anything that masks its (the bean) attractive odour should, one might be justified in concluding, serve to protect this plant from being assailed. Similarly, also any substance endowed with a perfume repellent for the insect.

Unfortunately, hitherto, experiments have not led to the discovery of a substance or substances that can invariably be depended upon for exerting the influences mentioned. The substances Mr. W. Weston has employed have a limited use for the purpose in view, but better still appears to be some ammoniacal liquid, such, *e.g.*, as is obtainable wherever horses are stabled, &c.

However, the principal contributor to the depredations exerted by the fly in destroying the bean is man's own negligence. This results from his practice of leaving bean plants—fatally injured—cumbering the soil, and so adding continuously to the numbers of the destructive insect, instead of promptly burning them and so destroying the pest. When it is entrapped, as it were, in the tissue in which its eggs have been deposited, or rather placed, their death, or the maggots that result from their hatching, is easily accomplishable. The want of action in this direction, especially combined action, is the explanation of the fact that, as the summer progresses, the depredations of the insect, as brood after brood succeed each other, become more and more pronounced.

The Bean Fly, it may be pointed out, is victimised by more than one parasitic hymenopteron, so that in spite of this default its numbers are not naturally augmented to the extent they would be were not such the case; and it results, moreover, from its having natural enemies of this class, that its reduction in numbers when once accomplished will give results more persistent than might be experienced did nothing of the kind occur to aid man's efforts.

As autumn follows summer and winter it, low temperatures, that are more and more prevalent, appear, in turn again, to either kill the insect or to restrain its numerical increase. Thus it happens that beans sown from now onwards for a month or two, escape or almost escape

its pernicious attentions; and the knowledge of this fact has induced some horticulturists to limit their growth of this crop to the season indicated accordingly. But beans will grow, and beans are in demand all the year round, and therefore the ingenuity of man should prove superior to the attacks of this their enemy, and one cannot be satisfied until it is so.

The insects described as "White Winged Flying Aphis" and "White Aphis" are unknown to me. Were specimens forthcoming, suggestions for subduing them might be advanced."

GRUB STAGE OF THE CANE-BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

This month (June), like the preceding, has been devoted to research work relating to the grub stage of our grey-back cane-beetle.

The principal experiments undertaken have brought to a satisfactory conclusion a long series of investigations concerning a much-talked-of method of remedial control—viz., that of poisoning the grub whilst in the soil.

Preliminary experiments in this connection (not yet reported) were initiated in 1915, but need not be mentioned here, it having been decided by the General Superintendent of the Bureau of Experiment Stations to issue almost at once a bulletin dealing with recent important discoveries, and embodying also a brief survey of early investigations.

During this month 7 inches of rain was recorded at the Mulgrave Central Mill, as against 3.44 inches, the rainfall for Cairns district in April, 1915.

Practically the whole amount fell between the 27th ultimo and 4th May, the mean temperature during this period of eight days being approximately 77.25 degrees F. dry heat, accompanied by an average humidity of 73 degrees F.

The above record acquires scientific interest from the fact that these climatic conditions are evidently favourable to the development of the so-called "Green Miscardine" fungus (*Metarrhezium anisopliae*, Metsc), an outbreak of which in volcanic soil near Neringa was brought under my notice on the 3rd of May.

Upon inquiry I found that the mortality occasioned, although sufficiently marked to have aroused the curiosity of those engaged in collecting grubs, was not excessive, and that the fungus was attacking fully-grown larvæ of the common cane-beetle, *Lepidiota albohirta*, Waterh.

Most canegrowers are familiar with the appearance of grubs killed by this vegetable parasite, as the body, instead of decomposing, retains its shape, and, gradually hardening, turns at first whitish and finally dull green.

The internal organs and fluids of the victim are quickly absorbed, and replaced by vegetable tissue constituting the mycelium or rooting portion of the fungus, until the entire grub becomes as firm as a piece of hard cheese, and can be easily broken into pieces.

As already pointed out in previous reports, it might be found advantageous to artificially disseminate the parasite over grub-stricken areas. Investigations in this direction have hitherto been confined almost exclusively to cage experiments dealing with soil infection, but, owing to work of a more pressing nature supervening, were discontinued some months ago.

For the present I should advise cane-growers to see that all grubs attacked by this fungus are left in the ground, or, better still, broken into powder, which should then be scattered about and, when practicable, buried in the furrows.

The green crust-like covering or fructification of the fungus noticeable on a dead larva, is in reality composed of millions of spores massed together, and only visible under a powerful microscope each of which, however, under congenial circumstances is probably able to infect and destroy a cane grub.

SUGAR-CANE PESTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received from the Entomologist to the Bureau (Mr. E. Jarvis) the following report:—

"Grubs of the common cane-beetle will soon be going down out of reach of the plough preparatory to pupating, all specimens collected at the laboratory during the present month having been third-stage larvæ, and for the most part fully developed.

"Considerable damage has been occasioned by this insect in the Highleigh and Babinda areas, and at Greenhills it is credited with destroying about 300 acres of cane.

"It appears—from information supplied by the secretary—that grubs received at Mulgrave Central Mill during 1916 season were mostly from Greenhills, Mount Sophia, and Meringa, and that probably the total amount weighed at this mill will be much the same as that recorded last year.

"Mr. L. O. Bailey, secretary of Babinda Canegrowers' Association, advises that receivers in his area have weighed in about 24 cwt. of grubs, the majority of which were collected in the vicinity of McDonnell's Creek.

"In a previous report mention was made of the occurrence at Deeral of the cockchafer *Lepidiota caudata*, a reddish-brown species noticeably larger than our excessively abundant cane-beetle, *L. frenchi*, but slightly smaller than the familiar grey-back. This insect (*caudata*), which breeds extensively in the neighbourhood of scrub lands, was observed about the end of September, 1915, flying among plant cane in sufficient numbers to alarm some of the Babinda growers, one of whom brought a tinful of the beetles to the laboratory for identification.

"It was said to have been responsible for most of the damage to cane in those parts during previous years, so I was disposed to think that it might eventually become firmly established there as a troublesome pest.

"Up to the present, however, recent but very brief investigations at Deeral have afforded no evidence of serious injury to sugar-cane from the attacks of *caudata*.

"Apparently the so-called "Carpet-grass" (*Paspalum platycaule*) is one of its favourite native foods, since out of forty-three grubs collected at random from among the roots of this plant on the 25th instant, no less than 88 per cent. were *caudata*, the remainder being larvæ of our grey-back cane-beetle.

"The grub of the former insect grows to about the same size as that of *albohirta*, but, owing to its having a two years' life-cycle, is, of course, longer in the soil.

"It is proposed to resume investigations regarding the topography of Gordonvale, commenced last season.

"As already pointed out in a former monthly report ('Australian Sugar Journal,' vol. VII., Jan., 1916), this inquiry is likely to prove interesting from an economic as well as scientific standpoint.

"With further reference to the new noctuid moth-pest (*Mocis frugalis*, Fab.) found to be defoliating cane stools at Meringa and Gordonvale last March, I may mention that caterpillars of this insect belonging to a recent brood have again occurred, but this time very sparingly, on young plant-cane in the former locality.

"In the present instance, however, the ground is free from weeds of any kind, and the parent moth has evidently selected the sugar-cane in preference to native grasses, &c., as being a suitable food-plant for its offspring.

"Fortunately this species is not likely to prove hurtful to cane-growers, as it is, no doubt, well controlled by natural enemies; but the above occurrence, although trivial, is not without significance, since it furnishes another illustration of the readiness with which certain insects will acquire a liking for cultivated plants that happen to be closely related to those on which they habitually subsist."

TABLE FOWLS.

The practice of breaking the breast-bone of a table chicken to make it look more attractive on the slab needs only to be mentioned to be condemned. It is a deception calculated to make a bird look to have more breast meat than it really has. All methods tend to break up the breast meat so that it falls to pieces when being carved. The usual ways are to insert a trussing knife from the stern, drive it with some force into the point of breast, twist it, and then press on the breast so as to cause it to fall, and press up the breast meat. Another is to insert a pair of strong scissors and cut a strip off the edge of the breast-bone, and then tap it flat with the haft of the knife. Both displace the meat.—Exchange.

General Notes.

DENATURED SPIRIT OF ALCOHOL.

The Russian Ministry of Finance, according to a message from Reuter, reports the "Indian Trade Journal," is organising an international competition, with prizes ranging up to £3,000, for methods of rendering methylated spirits and similar harmful liquids absolutely undrinkable. A second competition is being arranged, with prizes up to £7,500, for new or improved methods of utilising alcohol for combustible or other purposes. The total rewards will amount to nearly £68,000.

Tropical planters and others in all parts of the world should take an interest in this contest, and try to induce their respective Governments to do the same, as the enormous amount of raw material that is made available every year from the waste products of the Manila fibre, banana, coconut, sugar, cacao, and other industries would allow an output of alcohol suitable for fuel and other purposes sufficient to enable the British Empire and her Allies to be independent of unfriendly nations for their supply of spirit for such purposes. Like Pears' soap baby, we shall not be happy until we have induced the authorities and the planters to combine and put these valuable by-products to so good a use.—H. Hamel Smith in "Tropical Life."

Denatured alcohol is simply alcohol which has been so treated as to spoil it for use as a beverage or medicine, and prevent its use in any manner except for industrial purposes. Denaturing can be accomplished in many ways. In England a mixture suitable for industrial purposes, but unfit for any other use, is made by mixing 90 per cent. of ethyl alcohol (alcohol made from grain, potatoes, beets, &c.) with 10 per cent. of methyl or "wood alcohol." In Germany some of the other denaturants are camphor, chloroform, iodoform, ethyl bromide, benzine, castor oil, &c.

In a very interesting work on the subject by F. B. Wright, U.S.A., full details are given as to the various methods of producing the desired results, and mention is made of the uses to which denatured alcohol may be put. For instance, he says it is a safe fuel. Although it has only about half the heating power of kerosene or gasoline, gallon for gallon, yet it has many valuable properties which may enable it to compete successfully in spite of its lower fuel value. In the first place, it is very much safer. Alcohol has a tendency to simply heat the surrounding vapours and produce currents of hot gases which are not usually brought to high enough temperature to inflame articles at a distance. It can be easily diluted with water, and when so diluted, no more than one-half, it ceases to be inflammable. Hence it may readily be extin-

guished, while burning gasoline, by floating on the water, simply spreads its flame when water is applied to it.

When alcohol is used for lighting purposes, the general estimate of its value gives it about double the power of kerosene, a gallon of alcohol lasting as long as 2 gallons of the oil. When used for street lighting, alcohol vapour burns like gas with an incandescent flame in a hooded flame covered by a Welsbach mantle. This light rivals the arc light in brilliancy, and requires to be shaded to adapt it to the endurance of the human eye. Alcohol can also be employed in the same manner as gas in cooking stoves.

Mr. J. C. Brünnich, Agricultural Chemist, writing on Neglected Industries, mentioned amongst other items the shortage of methylated spirit in Brisbane, and presumably throughout Australia, which, he said, was due to the shortage of molasses last year.

He was unable to understand why we did not make good the shortage by manufacture from other materials such as maize, of which the Atherton district at present had a record crop. A bushel of maize (56 lb.) would yield about 5 U.S. gallons of proof spirit, or 2½ gallons of absolute alcohol. One gallon of molasses would yield about four-tenths of a gallon of alcohol. One bushel of sweet potatoes (54 lb.) would give about half a gallon of absolute alcohol, and ordinary potatoes might be expected to give a similar quantity.

Mr. Brünnich said that another excellent article very largely used in America was cassava (arrowroot), which was known to yield very heavy crops in some parts of Queensland, and this would give about the same amount of alcohol as sweet potatoes.

The Agricultural Chemist pointed out that alcohol could be used for driving gas engines for ordinary running, but it had not been found suitable for running motor-cars, as it had not the flexibility of petrol, such as is required for frequent starting, and running at slow speed. The difficulty was reported to have been overcome in Germany by the addition of a certain amount of bezol (benzene), which was a by-product of coal distillation, and which could be produced in this country. Alcohol, however, could be used in certain classes of lamps, and it was one of the cheapest of fuels and sources of light.

A secondary product of alcohol was acetic acid, which was also in very short supply. Mr. Brünnich suggested spoiled pineapples and apples as sources of supply. In connection with the latter crop, visitors to Southern States had said that the waste of apples owing to difficulties of transport was extraordinary.

Mr. Brünnich expressed the opinion that little or no kerosene should be imported into Australia; it could be largely, if not entirely, replaced by the production of our own alcohol. He pointed out that there were numerous other products which could be produced in Australia at a profit at present prices—even if not profitable to produce under normal conditions.

A SUBSTITUTE FOR PARIS GREEN.

The "Cotton Oil News," Texas, U.S.A., says:—Paris green costs more than twice as much this year as last. It is selling at 50 cents per lb. even in large quantities. It is doubtful whether it can be purchased for less than 45 cents per lb. Fortunately, says A. G. Ruggles, University Farm, St. Paul, arsenate of lead, a better stomach-insecticide than Paris green, has not advanced in price. The powdered form may be obtained for about 25 cents per lb., and 1½ lb. of the powder is used in making 50 gallons of spray mixture.

"In experiments at University Farm," adds Mr. Ruggles, "we have found arsenate of lead better than Paris green as a remedy for potato bugs and all orchard insects. It is not necessary, therefore, to allow injurious biting insects to live simply because Paris green is costly."

FRUIT AND COTTAGE GARDEN COMPETITION.

The National Association has announced that the cottage garden competition will be conducted this year on similar lines to that adopted in 1915, and invites inquiries from intending competitors. Possibly the most important of the new features introduced this year will be a district fruitgrowing competition. For this purpose the National Association has divided the fruitgrowing portions of Queensland into fourteen districts, and £100 has been allotted as prize money for the districts competing next August. The government of the competition is much on the lines of the well-known district exhibits, the amount of the award depending upon the points scored. The scale of points and all other particulars will be made available to intending competitors upon application to the secretary, Mr. J. Bain, Courier Building. Mr. A. H. Benson, Director of Fruit Culture, is hon. steward of this section, and is keenly interested in its success. He is of opinion that the individuality of the various districts, and their worth from a fruitgrowing point of view, can be illustrated by means of a competition such as this.

SNAKES AND PORK.

We get some strange ideas often from the U.S.A. We have heard of rattle-snake farms, wolf farms, and alligator farms. Here is another reputed great discovery by an American farmer, who is stated to have found that feeding pigs on snakes imparts a delicious flavour to the pork. The farm concerned, it appears, was infested with snakes, which defied all efforts at extermination. Several specimens of a breed of small black pigs were bought and turned loose on the farm. Some time later the farmer received a surprise in the form of a letter from a New York restaurant, which, after several weeks, had succeeded in tracing to the farmer a shipment of pork which had caused much favourable comment by patrons. It appeared that the pork had gained a peculiarly rich, gamey flavour, and the restaurant proprietor contracted with the farmer for all the pork he could raise.

TANNING A HIDE.

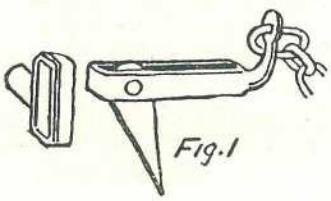
DEPILATION.

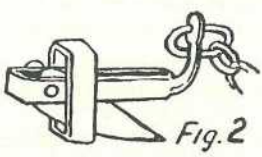
The first operation to which hides are subjected is depilation, which removes not only the hair but also the scarf-skin. This is effected variously. The most common plan in England is to throw the hide or skin into a strong watery ley of slaked lime, with lime in excess. By this, in a few days, the hair is easily detached. In America, the sweating is performed cold; the hides are hung up wet in a damp cellar, and are kept moist for ten days or a fortnight. Then, incipient putrefaction takes place, when the hair and scarf-skin are easily removed. One hundred pounds of hide will take 300 lb. of bark, oak or wattle, yielding 40 to 50 lb. of leather.

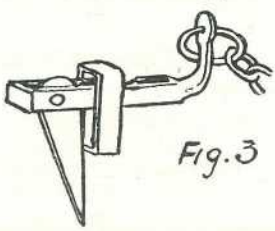
Wattle bark, as well as other tanning bodies, are reduced to a small and uniform size by grinding machinery. The new bark, over which is pumped cold water, is put into one pit and the liquor passes from one stage to another till the whole of the tannin is extracted. This takes from three to eight months.

AN EFFECTIVE GATE-FASTENER.

Of the numerous gate-fasteners which have been invented by ingenious men, many of which have been described and illustrated in the "Queensland Agricultural Journal" during the past nineteen years, the accompanying sketches seem to us to be amongst the best, if not the best, of any we have yet seen. They appeared in the latest issue







of the "Farmers' Advocate," Bloemfontein, S.A. The sketches explain the working of the fastener. A triangular piece of iron working on a pin passes through the staple, and as soon as it does so drops down automatically at right angles, making it almost impossible for the gate to be opened by accident.

THE WORKERS' COMPENSATION ACT OF 1916.

The Insurance Commissioner announces in our advertisement column that Forms of Application for Insurance under the above Act may now be obtained at the State Accident Insurance Office, Parbury House, Eagle street, Brisbane, and from all clerks of petty sessions, and at all railway stations and branches and agencies of the Government Savings Bank.

The lodging of an application will act as a cover to the employer from the date of commencement of the Act, until the policy can be issued.

It is anticipated that the Act will be brought into force on 1st July, and the Commissioner hopes that employers will send in their applications as soon as possible.

REGULATION OF SUGAR-CANE PRICES ACT.

LOCAL BOARD AWARDS.

GOONDI.—The Goondi Local Board has issued an award under the Sugar Cane Prices Act, providing that the price of cane supplied by the canegrowers to the Goondi mill for the season 1916 shall be paid by group analysis according to the following schedule (with proportionate payments between the various p.o.c.s. units). Groups consisting of one or more growers:—7 p.o.c.s., 11s.; 8 p.o.c.s., 14s.; 9 p.o.c.s., 17s.; 10 p.o.c.s., 20s.; 11 p.o.c.s., 23s.; 12 p.o.c.s., 26s.; 13 p.o.c.s., 28s.; 14 p.o.c.s., 30s.; 15 p.o.c.s., 32s.; 16 p.o.c.s., 34s.; 17 p.o.c.s., 36s.; 18 p.o.c.s., 38s. Provision has been made for payment for burnt cane at from 1s. to 2s. per ton deduction. Deductions are also to be made for diseased, badly-topped, and trashy canes, and for cane of varieties not approved. This award is to operate for twelve months from 1st June, 1916. The varieties approved by the Local Board are—Badila, N.G. 24A, 24B, H.Q. 426, and Clark's Seedling.

PALMS MILL.—The award made by the Palms Local Board under the Regulation of Sugar Cane Prices Act provides for the payment for cane at the rate of 28s. 6d. per ton. Deductions are to be made for burnt, frosted, or diseased sugar-cane or badly-topped or trashy sugar-cane, or varieties of sugar-cane, the growing of which has been disapproved by the Local Board with the sanction of the Central Board, in accordance with the rate and manner decided upon by the Central Cane Prices Board. The award is to have effect for 12 months from 20th April last.—From the "Australian Sugar Journal."

Answers to Correspondents.

EUPHORBIA PILULIFERA.

A firm in South India (writes the editor of the "Indian Trade Journal") desires to be placed in touch with suppliers of *Euphorbia pilulifera*. Particulars may be obtained from the Director-General of Commercial Intelligence, New Imperial Secretariat, 1 Council House street, Calcutta.

CROSSBRED SHEEP.

F. GRADULE—

The pamphlets you ask for are forwarded, under separate cover.

Your questions, answered by Mr. W. G. Brown, Instructor in Sheep and Wool, in the order you put them are:—

1. Do you consider Corriedales good dual purpose sheep?—I have a limited experience of this breed, but what I know of them indicates that they are excellent sheep for comparatively dry areas. I have samples of wool grown by Mr. T. Greenwood at Longreach which reached very high prices recently. The sheep were bred at Tocal, Longreach. The sheep I know did well.

2. Do you consider Corriedale and merino a good cross for fat-lamb raising?—That is a question which remains to be proved in Queensland. There is no doubt that mutton and wool of this breed are excellent.

3. Do you consider crossbreds suitable for Goondiwindi?—Yes.

4. Would you prefer a Border Leicester and merino cross or Corriedale?—Border Leicester.

5. Will crossbreds stand a dry time as well as merinos?—Some crosses, more particularly the Border Leicester, are good doers in a dry time. The heavier sheep, such as the Lincoln, being gross feeders, are not so likely to do as well. Merinos, of course, are a dry-country sheep, and are likely to do better, if plain bodied, than any other breed.

Upon the whole the Goondiwindi district is merino country, therefore the nearer the cross is to merino the better, if crossbreds be taken on your country.

The Markets.

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

Article.		JUNE.
		Prices.
Bacon	lb.	1s. 1½d. to 1s. 3½d.
Barley	bush.	...
Bran	ton	£7
Broom Millet	,,	£37
Butter	cwt.	140s.
Chaff, Mixed	ton	£5 10s.
Chaff, Oaten	,,	£4 to £5 10s.
Chaff, Lucerne	,,	£5 10s. to £8
Chaff, Wheaten	,,	£5 to £5 10s.
Cheese	lb.	9d
Flour	ton	£12 5s.
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten (Victorian)	ton	...
Hay, Lucerne	,,	£6 to £7
Honey	lb.	6d.
Maize	bush.	4s. 8d. to 4s. 10d.
Oats	,,	3s. 10d.
Onions, Spanish	ton	£5 15s.
Peanuts	lb.	2d. to 3d.
Pollard	ton	£6 10s.
Potatoes	,,	£7 to £10 10s.
Potatoes (Sweet)	,,	£6 to £6 5s.
Pumpkins	,,	£2 5s.
Eggs	doz.	1s. 10d. to 2s.
Fowls	pair	5s. 6d to 7s.
Ducks, English	,,	5s. to 5s. 6d.
Ducks, Muscovy	,,	6s. to 7s. 9d.
Geese	,,	8s. 6d. to 9s.
Turkeys (Hens)	,,	9s. to 11s. 6d.
Turkeys (Gobblers)	,,	15s. to 25s.
Wheat	bush.	5s. to 5s. 6d.

VEGETABLES—TURBOT STREET MARKETS.

Cabbages, per dozen	1s. 6d. to 5s. 6d.
Beans, per sugar bag	1s. 6d. to 5s. 6d.
Beetroot, per dozen bunches	9d. to 1s.
Carrots, per dozen bunches	9d. to 1s. 2d.
Chocos, per quarter-case	1s. 9d. to 2s. 3d.
Cucumbers, per dozen	9d. to 1s. 3d.
Custard Marrows, per dozen	1s. to 2s.
Vegetable Marrows, per dozen	Unsaleable
Peas, per sugar bag	4s. 6d. to 7s. 6d.
Celery, per bunch	1s. to 1s. 4d.
Sweet Potatoes, per cwt.	2s. 6d. to 3s. 6d.
Table Pumpkins, per dozen	2s. 6d. to 4s. 6d.
Tomatoes, per quarter-case	5s. 6d. to 7s. 6d.
Turnips, per dozen bunches	4d. to 6d.
Rhubarb, per dozen bundles	...

SOUTHERN FRUIT MARKETS.

Article.	MAY. Prices.
Bananas (Queensland), per case	8s. to 12s.
Bananas (Fiji), per case	13s. 6d. to 14s. 6d.
Bananas (G.M.), per bunch	17s. 6d.
Custard Apples, per tray	4s. to 6s.
Mandarins, per case	8s. to 13s.
Mangoes, per case	...
Oranges (Navel), per case	10s. to 13s.
Oranges (other), per case	5s. to 10s.
Passion Fruit, per half-bushel case	3s. to 6s.
Lemons (Local), per bushel case	7s. to 11s.
Papaw Apples, per double-case	9s. to 11s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	5s. to 8s.
Pineapples (Ripleys), per double-case	4s. to 6s.
Pineapples (Common) per double-case	5s. to 7s.
Tomatoes, per quarter-case	3s. to 5s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JUNE. Prices.
Apples, American, per case	3s. to 7s.
Apples, Cooking, per quarter-case	2s. to 4s.
Bananas (Cavendish), per dozen	2½d. to 6½d.
Bananas (Sugar), per dozen	2d. to 4d.
Citrons, per cwt.	10s.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	4s.
Lemons (Lisbon), per half-case	4s. to 7s.
Lemons (Italian), per case	...
Limes, per quarter-case	...
Mandarins (Local), per half-case	10s. to 14s.
Mangoes, per case	...
Nectarines, per quarter-case	...
Oranges, (Navel), per case	10s. 6d. to 12s.
Oranges (other), per case	5s. to 7s.
Oranges (Seville), per cwt.	10s.
Papaw Apples, per quarter-case	1s. 6d. to 2s. 6d.
Passion Fruit, per quarter-case	5s. to 7s. 6d.
Peaches, per case	...
Pears, per half-bushel case	9s. to 10s.
Peanuts, per pound	2½d. to 4d.
Persimmons, per quarter-case	...
Plums, per case	...
Pineapples (Ripleys), per dozen	2s. to 4s.
Pineapples (Rough), per dozen	2s. to 4s.
Pineapples (Smooth), per dozen	2s. to 4s. 6d.
Quinces, per case	...
Rockmelons, per dozen	...
Rosellas, per sugar bag	1s. to 2s.
Strawberries, per dozen pint boxes	...
Tomatoes, per quarter-case	2s. 9d. to 7s.
Piemelons, per dozen	...
Watermelons, per dozen	...

TOP PRICES, ENOGGERA YARDS, MAY, 1916.

Animal.	MAY. Prices.
Bullocks	£15 15s. to £20 10s.
Bullocks (Single)	...
Cows	£8 5s. to £14 5s.
Merino Wethers	36s. 3d.
Crossbred Wethers	31s. 6d.
Merino Ewes	24s. 3d.
Crossbred Ewes	34s. 9d.
Lambs	35s.
Pigs (Porkers)	80s.
Pigs (Slips)	...

LONDON QUOTATIONS.

London, 10th June.

Jute, August shipment from Calcutta, £33 per ton.

The hemp market is dull. New Zealand, good to fair, August-October shipment, £48 10s. per ton.

Rubber, fine hard Para, 2s. 8½d. per lb.; plantation first latex crepe, 2s. 6⅝d.; smoked sheet, 2s. 5¾d.

Copra, South Sea, May-June shipment, £31 10s. per ton (quotation nominal).

The market for frozen rabbits is firm, and prices are unchanged.

Raw linseed oil, spot pipes, £34 10s. per ton.

The Liverpool quotation for middling American cotton, June-July shipment, is 8·095d. per lb.

Mexican Sisal.—For European consumption orders at full prices for considerable quantities have been cabled out, but have not been executed. All stocks have been disposed of, and the only and principal shippers assert that they have over-sold.

British East African Sisal.—This continues in good demand, and values remain at £55 to £60 per ton according to quality.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	May.	No. of Years' Records.	May, 1916.	May, 1915.
North Coast.	In.		In.	In.
Atherton	2·05	15	1·92	0·60
Cairns	4·58	34	3·60	3·27
Cardwell	3·65	44	1·72	0·47
Cooktown	2·95	40	4·66	0·81
Herberton	1·57	29	1·46	0·87
Ingham	3·53	24	1·97	0·67
Innisfail	12·16	35	6·60	6·74
Mossman	2·10	5	3·39	0·59
Townsville	1·39	45	0·60	0·36
Central Coast.				
Ayr	1·16	29	0·89	0·34
Bowen	1·39	45	1·31	0·13
Charters Towers ...	0·80	34	0·73	Nil
Mackay	3·96	45	3·19	1·19
Proserpine	5·58	13	5·28	1·25
St. Lawrence ...	1·92	45	0·62	0·86
South Coast.				
Biggenden	2·09	14	2·42	0·73
Bundaberg	2·85	33	1·45	1·82
Brisbane	2·94	65	1·01	2·48
Childers	2·42	21	3·64	0·45
Crohamhurst ...	5·30	22	2·20	3·78
Esk	2·25	29	0·91	0·82
Gayndah	1·67	45	0·50	1·60
Gympie	3·16	46	1·75	2·5·
Glasshouse M'tains	2·82	6	1·60	7·28
Kilkivan	2·09	37	0·91	1·07
Maryborough ...	3·07	45	5·76	2·18

Divisions and Stations	Average Rainfall.		Total Rainfall.	
	May.	No. of Years' Records.	May, 1916.	May, 1915.
South Coast—continued:	In.		In.	In.
Nambour	5·03	20	3·84	3·95
Nanango	1·72	34	0·96	0·74
Rockhampton ...	1·61	29	0·14	0·84
Woodford	3·03	29	1·52	2·57
Darling Downs.				
Dalby	1·39	46	0·80	0·52
Emu Vale	1·12	17	0·79	1·63
Jimbour	1·41	24	0·49	0·53
Miles	1·77	31	0·13	1·00
Stanthorpe ...	2·05	43	0·94	2·64
Toowoomba ...	2·43	44	0·45	2·24
Warwick	1·77	29	0·45	4·00
Maranoa.				
Roma	1·64	42	Nil	1·43
State Farms, &c.				
Bungeworgorai ...	0·86	3	Nil	1·14
Gatton College ...	1·96	14	0·30	1·96
Gindie	1·11	13	Nil	1·42
Hermitage ...	0·91	7	0·76	1·98
Kairi	1·27	3	1·34	0·60
Kamerunga Nurs'y	4·48	27	3·31	2·33
Sugar Experiment Station, Mackay	3·81	16	2·91	2·12
Warren	0·44	3	0·06	1·26

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May 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 SECOND FOUR MONTHS OF 1916.

Date.	MAY.		JUNE.		JULY.		AUGUST.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·14	5·16	6·31	5·0	6·40	5·3	6·30	5·18
2	6·14	5·15	6·31	5·0	6·40	5·4	6·30	5·18
3	6 15	5·14	6 32	5 0	6·40	5·4	6·29	5·19
4	6·15	5·13	6·32	5 0	6·40	5·4	6·29	5·20
5	6·16	5·13	6 33	5·0	6·40	5·4	6 28	5·20
6	6·17	5·12	6·33	5·0	6·40	5·5	6·28	5·20
7	6·17	5·12	6·34	5·0	6·40	5·5	6·27	5·21
8	6 18	5·11	6·34	4·59	6·40	5 6	6 26	5·21
9	6·18	5·10	6·35	4·59	6·39	5 6	6·25	5·22
10	6·19	5·10	6·35	4 59	6 39	5·7	6 24	5·23
11	6·19	5·9	6·35	4·59	6 39	5·7	6·23	5·23
12	6·20	5·9	6·35	4·59	6·39	5·7	6 22	5·24
13	6·20	5·8	6·36	4·59	6 39	5·8	6·21	5·25
14	6·21	5·8	6 36	4·59	6·39	5·8	6 20	5·25
15	6·21	5·7	6·36	4·59	6 39	5·9	6·19	5·26
16	6·22	5·7	6·37	4 59	6·38	5·9	6·18	5·26
17	6·22	5·6	6·37	4·59	6 38	5·10	6·17	5·26
18	6·23	5·6	6·38	5·0	6·37	5·10	6·17	5·27
19	6·24	5·5	6·38	5·0	6·37	5·11	6·16	5·27
20	6·24	5·5	6 38	5·0	6 36	5·12	6·15	5·28
21	6 25	5·4	6·38	5 0	6·36	5·12	6 14	5·28
22	6 26	5·4	6 39	5·1	6 36	5·12	6·13	5 28
23	6·26	5·3	6·39	5·1	6 35	5·13	6·12	5·29
24	6·27	5·3	6·39	5·1	6·35	5·13	6·11	5·29
25	6·27	5·2	6·39	5·1	6·34	5·14	6·10	5·30
26	6·28	5·2	6 39	5 1	6·33	5·15	6·9	5·30
27	6 28	5·1	6·40	5·2	6·33	5·15	6·8	5·30
28	6·29	5·1	6·40	5·2	6·32	5·16	6·7	5·31
29	6·29	5·1	6·40	5·2	6·32	5·16	6·6	5·31
30	6 30	5·0	6·40	5·3	6·31	5·17	6·5	5.32
31	6·30	5 0	...	...	6 31	5·17	6·4	5·32

The Phases of the Moon commence at the times stated on or near the 150th Meridian, East Longitude.

			H.	M.	
2	May	● New Moon	3	29	p.m.
10	,,	(First Quarter	6	47	,,
18	,,	○ Full Moon	12	11	a.m.
24	,,	) Last Quarter	3	16	p.m.

The moon will be farthest from the earth on the 7th, and nearest on the 19th.

1	June	● New Moon	5	37	a.m.
9	,,	(First Quarter	9	59	,,
16	,,	○ Full Moon	7	42	,,
22	,,	) Last Quarter	11	16	p.m.
30	,,	New Moon	8	43	,,

The moon will be farthest from the earth on the 4th, and nearest on the 16th at midnight.

8	July	(First Quarter	9	55	a.m.
15	,,	○ Full Moon	2	40	,,
22	,,	) Last Quarter	9	33	,,
30	,,	● New Moon	12	15	p.m.

The moon will be nearest to the earth on the 15th, and farthest from it on the 28th.

7	Aug.	(First Quarter	5	6	a.m.
13	,,	○ Full Moon	10	0	p.m.
21	,,	) Last Quarter	10	52	,,
29	,,	● New Moon	3	25	a.m.

The moon will be nearest to the earth on the 12th, and farthest from it on the 25th.

A partial eclipse of the moon will occur on 15 h July at 2·30 p.m., when the moon will be below the horizon in Australia.

An eclipse of the sun will take place on 30th July. It will be partial only in Queensland but annular, or leaving the edge of the sun visible as a magnificent golden ring at Adelaide, and in a line across the south-west of Australia.

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 May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moon-light 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 August.

This and the following two months are about the busiest periods of the year so far as work in the field is concerned; and the more activity now displayed in getting in the summer crops, the richer will be the reward at harvest time. Potatoes should be planted, taking care to select only good sound seed that has sprouted. This will ensure an even crop. Yams, arrowroot, ginger, sisal hemp, cotton, and sugar-cane may now be planted. Sow maize for an early crop. If the seed of prolific varieties is regularly saved, in the end it will not be surprising to find from four to six cobs on each stalk. This has been the experience in America, where the selecting of seeds has been reduced to a fine art.

In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that, by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. A change of seed from another district is also beneficial. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may be sown, but they will have to contend with weeds which will begin to vigorously assert themselves as the weather gets warmer; therefore keep the hoe and cultivator constantly going in fine weather. Tobacco may be sown during this month. If vines are available, sweet potatoes may be planted towards the end of the month. In this case also it is advisable to avoid too frequent planting of cuttings from the old vines, and to obtain cuttings from other districts. If grasses have not yet been sown, there is still time to do so, if the work be taken in hand at once. Sugar-cane crushing will now be in full swing, and all frosted cane in the Southern district should be put through the rollers first. Plough out old canes, and get the land in order for replanting. Worn out sugar lands in the Central and Northern districts if not intended to be manured and replanted will bear excellent crops of sisal hemp. Rice and coffee should already have been harvested in the North. The picking of Liberian coffee, however, only begins this month. Collect divi-divi pods. Orange-trees will be in blossom, and coffee-trees in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

Kitchen Garden.—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown which will keep the market gardeners busy for some time: Carrots, parsnip, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohl-rabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month

before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

Flower Garden.—All the roses should have been pruned some time ago, but do not forget to look over them occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall 2·63 in., and for September 2·07 in., increasing gradually to a rainfall of 7·69 in. in February.

Orchard Notes for August.

THE SOUTHERN COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of Citrus Fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the Spring growth. All heavy pruning should be completed previous to the rise in the sap; and where Winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with the lime and sulphur wash.

Where there are inferior sorts of seedling citrus trees growing, it is advisable to head same hard back, leaving only the main trunk and four or five well balanced main branches cut off at about 2 ft. from the trunk. When cut back give a good dressing with the lime and sulphur wash. Trees so treated may either be grafted with good varieties towards the end of the month or early in September; or, if wished, they may be allowed to throw out a number of shoots, which should be thinned out to form a well balanced head, and when large enough should be budded with the desired variety.

Grafting of young stock in nursery, not only citrus but most kinds of deciduous fruits, can be done this month. It comes in useful in the case of stocks that have missed in budding, but for good clean grown stocks I prefer budding.

In the case of working our Seville orange stocks to sweet oranges, grafting is, however, preferable to budding, as the latter method of propagation is frequently a failure. The Seville stock should be cut off at or a little below the surface of the ground. If of small size, a single tongue graft will be sufficient, but if of large size, then the best method is the side graft—two or more grafts being placed in each stock, so as to be certain of one taking. In either case the grafts are tied firmly in place, and the soil should be brought round the graft as high as the top bud. If this is done, there will be few missed, and undesirable Seville stocks can be converted into sweet oranges.

In selecting wood for grafting, take that of the last season's growth that has good full buds and that is well-matured—avoid extra strong, or any poor growths.

Seville oranges make good stocks for lemons. In case it is desirable to work them on to lemons, it is not necessary to graft below ground, as in the case of the sweet orange, but the stock can be treated in the same manner as that recommended in the case of inferior oranges—viz., to head hard back, and bud on the young shoots.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the trees' use during Spring. This is a very important matter, as Spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop, to a greater or lesser extent.

Where necessary, quickly-acting manures can be applied now. In the case of orchards, they should be distributed broadcast over the land, and be harrowed or cultivated in; but, in the case of pines, they should be placed on each side of the row, and be worked well into the soil.

The marketing of pines, especially smooths, will occupy growers' attention, and where it is proposed to extend the plantations the ground should be got ready, so as to have it in the best possible condition for planting, as I am satisfied that the thorough preparation of the land prior to planting pines is money very well spent.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is often done. You only want one strong shoot from your cutting, and from this one shoot you can make any shaped vine you want. Just as the buds of the vines begin to swell, but before they burst, all varieties

that are subject to black spot should be dressed with the sulphuric acid solution—viz., three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid.

THE TROPICAL COAST DISTRICTS.

Bananas should be increasing in quality and quantity during the month, and though, as a rule, the fruit fly is not very bad at this time of the year, still it is advisable to take every care to keep it in check. No over-ripe fruit should be allowed to lie about in the gardens, and every care should be taken to keep the pest in check when there are only a few to deal with, as, if this is done, it will reduce the numbers of the pest materially later on in the season. The Spring crop of oranges and mandarins will be now ready for marketing in the Cardwell, Tully, Cairns, and Port Douglas districts. For shipping South see that the fruit is thoroughly sweated, as unless the moisture is got rid of out of the skins the fruit will not carry. Should the skins be very full of moisture, then it will be advisable to lay the fruit on boards or slabs in the sun to dry; or, if this is not possible, then the skin of the fruit should be artificially dried by placing same in a hot chamber, as the moisture that is in the skin of our Northern-grown citrus fruits must be got rid of before they will carry properly.

Papaws and granadillas should be shipped South, and the markets tested. If carefully packed in cases holding only one layer of fruit, and sent by cold storage, these fruits should reach their destination in good order. Cucumber and tomato shipments will be in full swing from Bowen. Take care to send nothing but the best fruit, and don't pack the tomatoes in too big cases, as tomatoes always sell on their appearance and quality.

THE SOUTHERN AND CENTRAL TABLELANDS.

All fruit-tree pruning should be finished during the month, and all trees should receive their winter spraying of the lime and sulphur wash.

All new planting should be completed, orchards should be ploughed and worked down fine, and everything got ready for Spring.

In the warmer parts, grape-pruning should be completed, and the vines should receive the Winter dressing for black spot. In the Stanthorpe district grape-pruning should be delayed as late as possible; so as to keep the vines back, as it is not early but late grapes that are wanted, and the later you can keep your vines back the better chance they have of escaping Spring frosts.

Towards the end of the month inferior varieties of apples, pears, plums, &c., should be worked out with more desirable kinds; side, tongue, or cleft grafting being used. In the case of peaches, almonds, or nectarines, I prefer to head back and work out by budding on the young growth.