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Agriculture.

ELECTRIFICATION OF SEEDS.

Although the application of electricity to growing crops has, at the best, only proved a partial success, it appears that a very decided advantage can be gained by electrifying seeds before sowing. According to the "Scientific American," extensive experiments have been carried out by a certain Mr. Fry, the inventor of the process, in the south of England during the past few years. These have been conducted under ordinary farming conditions, and as many as 2,000 acres of electrified seed, principally wheat, oats, and barley, were sown on different properties last year.

Mr. Fry's investigations are not yet completed, but from the data that have been gathered remarkable results seem to be obtained from treated seeds in comparison with those sown in the ordinary way. In the first place, the yield is much heavier, electrified seed returning from 25 to 30 per cent. more grain. Then the sample itself is of better quality, the increase in weight ranging from 1 to 4 lb. per bushel. Another advantage is that treated seed stools out better, and the straw is longer and stronger. Further, electrified seed appears to be less susceptible to the attacks of fungus diseases and wireworm, but this point has yet to be proved conclusively.

The process of treatment invented by Mr. Fry is simple in principle, though it requires care and experience in application. A current of electricity cannot be passed through a heap of dry seed, so the grain is steeped in water that contains some kind of salt in solution that will act as a conductor. Different kinds of salt are necessary for different seeds and soils, and the strength also has to be varied according to local conditions. The solution is placed in a tank, the seed dipped in it, and a weak current passed through by means of electrodes attached to two opposite walls of the receptacle. The grain is then taken out and carefully dried. Mr. Fry uses a proper drying kiln for this purpose. Sowing must be carried out within a few weeks of treatment.

Briefly, that is the process, but it is stated that unless particular seeds are treated in certain ways (not specified, by the way) as regards the solution used and time spent in steeping, the result is likely to be unsatisfactory. In any case, it is more than probable that any formula that applies in England will not be much good under Australian conditions. Here is a matter for the Commonwealth Bureau of Science and Industry to investigate. Steps should be taken to obtain complete data from Mr. Fry, compensating him liberally if necessary. If it is found that the treatment does all that is claimed for it, farmers ought to be given an early opportunity to apply it here.—"Pastoral Review."

JUVENILE CORNGROWING COMPETITION, 1918-19.

Owing to the extreme dryness of the past season the competition has resulted in a disappointment to many of the competitors.

Out of one hundred and seventeen entries only twenty-two competed as a result of the indifferent season.

Generally speaking the maize showed uniformity in character and general ipmrovement in the type selected. In one or two instances, however, the cobs selected leave much to be desired.

Though the season has been far from favourable the high average yield of grain per acre has been maintained throughout, this being attributed to improved methods of cultivation and the high quality of seed used.

The highest yield was reached in the Eumundi district, 127·4 bushels per acre being recorded, whilst the average yield throughout reached 69 bushels per acre.

In comparison with the average yield for the State the consistent increase, as shown in the average yield of the plots, is remarkable. It is apparent this is on the up-grade and now stands at thrice that of this State's average yield.

The following data are worthy of note :—

1914-15 the average yield from plots was 39·3. State's average, 24·16.
1915-16 the average yield from plots was 51·3. State's average, 13·68.
1916-17 the average yield from plots was 62·3. State's average, 16·64.
1917-18 the average yield from plots was 85·3. State's average, 26·37.
1918-19 the average yield from plots was 69·0. Incomplete.

The following are tabled results of actual yields of plots, 1918-19 :—

No. of Plots.	Returns per Acre.
3	10-20 bushels.
Nil	20-40 bushels.
7	40-60 bushels.
4	60-80 bushels.
4	80-100 bushels.
3	100-120 bushels.
1	120-140 bushels.

The accompanying graph shows at a glance the progress made as regards yield compared with previous Juvenile Corngrowing Competitions covering a period from 1914-18.

PRIZE WINNERS.

JUVENILE CORNGROWING COMPETITION, 1918-19.

Name and Address of Competitor.	Age in Years.	Yield per acre in bushels.	Quality of maize produced. Maximum Points, 15	Yield of Plot. Maximum Points, 75.	Records of Plots Maximum Points, 10.	Total Maximum Points, 100.	District Prize.
No. 1 District.							
1. A. G. Marks, Alberton	17	106·7	10·7	57·9	6·0	74·6	1st, £5; and 3rd Special, £3
2. R. Swallow, Boonah ..	15	98·3	13·7	53·4	5·0	72·1	2nd, £2
3. A. H. Swallow, Boonah	14	92·7	13·5	50·3	4·5	68·3	3rd, £1
4. Miss E. Marks, Alberton	14	87·0	10·5	47·2	6·0	63·7	
5. A. V. Rachow, Alberton	17	48·0	9·2	26·0	6·0	41·2	
6. A. W. Miers, Pimpama	17	14·0	8·1	7·0	9·0	24·7	
7. P. J. Schlecht, Rosewood	17	13·1	5·2	7·1	4·5	16·8	
Total number of competitors, 18.							
No. 2 District.							
1. A. H. Sims, Eumundi ..	12	127·4	12·0	69·2	7·5	88·7	1st, £5; and Special, £10
2. E. A. Sims, Eumundi ..	14	111·5	13·5	60·6	6·5	80·6	2nd, £2; 2nd Special, £5
3. R. H. Pickering, Eumundi	15	78·4	9·3	42·6	4·5	56·4	3rd, £1
Total number of competitors, 19.							

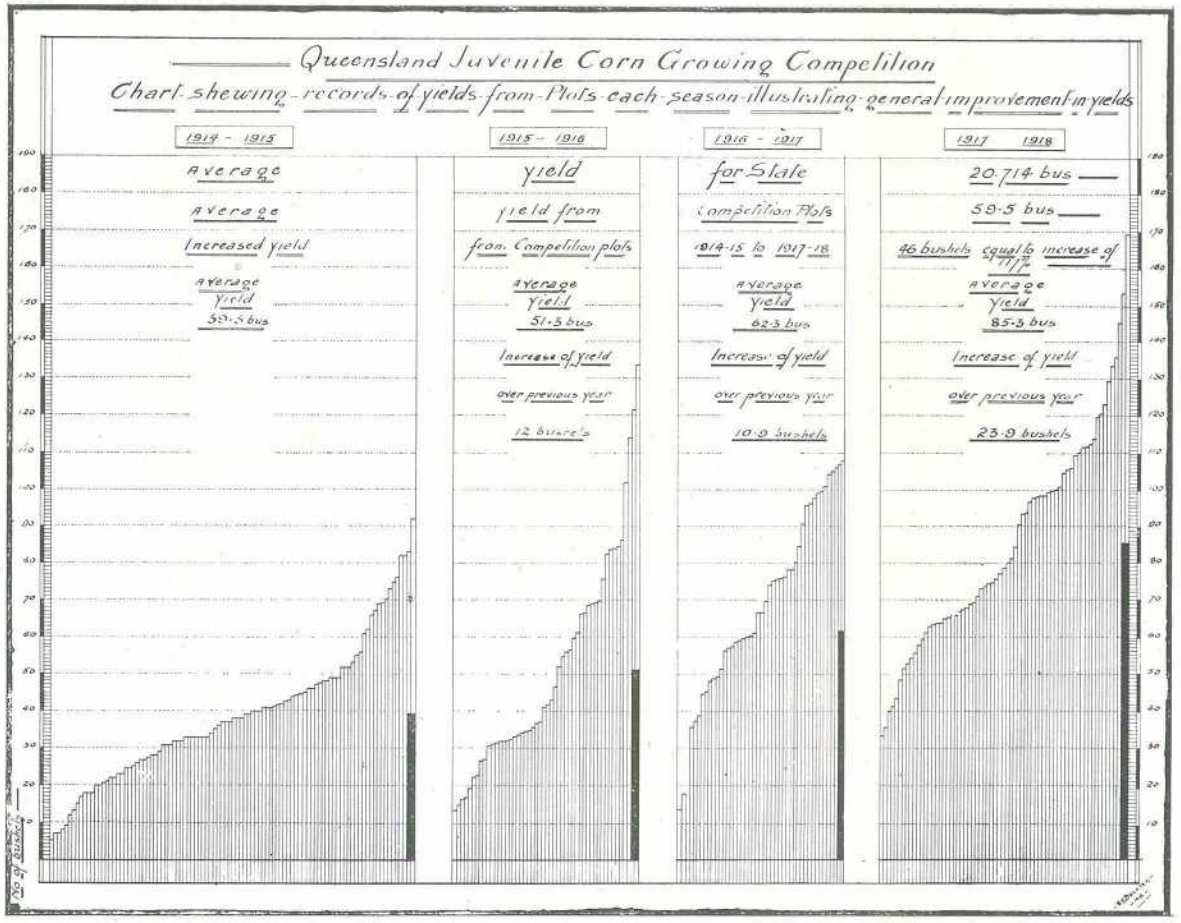


PLATE 1e.—CHART SHOWING RECORDS OF YIELDS FROM PLOTS EACH SEASON.

PRIZE WINNERS—*continued.*

JUVENILE CORNGROWING COMPETITION, 1918-19—*continued.*

Name and Address of Competitor.	Age in Years.	Yield per acre in bushels.	Quality of Maize produced. Maximum Points, 75.	Yield of Plot. Maximum Points, 75.	Records of Plots. Maximum Points, 10.	Total Maximum Points, 100.	District Prize.
No. 4 DISTRICT.							
1. N. A. Campbell, Murgon	14	52·0	11·1	28·2	6·0	45·3	1st, £5
2. P. W. Dossel, Memerambi	15	55·6	8·4	30·2	5·0	43·6	2nd, £2
3. N. J. Dossel, Memerambi	12	42·5	8·2	23·1	5·0	36·3	3rd, £1
4. E. Dossel, Memerambi	10	41·0	8·4	22·2	5·0	35·6	
Total number of competitors, 13.							
No. 5 DISTRICT.							
1. T. C. Williams, Crow's Nest	17	73·5	12·6	39·9	7·0	59·5	1st, £5
2. W. Siebenhausen, Allora	12	79·0	11·2	42·9	4·5	58·6	2nd, £2
Total number of competitors, 25.							
No. 6 DISTRICT.							
1. L. Meredith, Gurgeena	17	52·7	9·9	28·6	2·0	40·5	1st, £5
2. Miss W. Meredith, Gurgeena	14	19	8·4	10·3	2·5	21·2	2nd, £2
Total number of competitors, 8.							
No. 7 DISTRICT.							
1. D. H. Vohland, Quinalow	14	94·7	11·4	51·4	4·0	66·8	1st, £5
2. W. York, Wallumbilla..	15	78·9	9·3	42·8	4·5	56·6	2nd, £2
Total number of competitors, 16.							
No. 8 DISTRICT.							
1. Miss M. Wilson, Yeppoon	17	56·5	9·0	30·7	5·5	45·7	*
* Only one competitor—Awarded a second prize, £2.							
No. 9 DISTRICT.							
1. L. A. Favier, Kairi ..	17	106·2	11·7	37·7	2·5	51·9	1st, £5
Total number of competitors, 2.							

N.B.—No. 3 District, 14 competitors, none of whom completed.

COTTON GROWERS' COMPETITION.

The "South African Sugar Journal" (July, 1919) states that "The British Cotton-Growing Association have again shown their keen interest in developing the cotton industry of the Union by offering £262 10s. as prizes for two competitions to be held during the forthcoming season.

The first competition will be for 50 acres of cotton, and the prizes will be as follows:—First prize, £100; second prize, £50; third prize, £25.

The second competition will be for 10 acres or more, but less than 50 acres:—First prize, £50; second prize, £25; third prize, £12 10s.

The conditions of these competitions will be published later.

MORE ABOUT FLAX-GROWING.

SPREADING.

Spreading of flax should take place shortly after the flax has been removed from the steep, or immediately after it has been carted or carried to the drying ground. A clean grazing ground or grass land with the rough grass all cut away or burned off should be selected and free from the shade of trees. The spreading is chiefly done by women in Ireland, as they are much quicker than men at this work. Spreading should commence as soon as the first load of flax is brought to the drying ground, for, if allowed to become dry in the "beets," it is more difficult to shake it out evenly.

Each spreader, standing with the back to the prevailing wind, and having an open beet of flax in the left arm, takes a handful from it, and lays this down on the grass with the root ends towards himself, spreading it out with the right hand, and shaking it evenly and thinly. If properly shaken, it can be put down fairly thick in the rows running from right to left of the spreadfield, keeping each spreader a few steps in advance of the other following, and the tops of each row overlapping the roots of the preceding one about three inches, as the root ends of the flax are coarse and easily dried, and no injury is done to them. Should any little locks be left unshaken, they may not dry evenly, and the flax will show a streaky unevenness in colour when dressed. If the directions in handling the flax when going through the pulling and threshing processes have been attended to, the spreaders would find no difficulty in spreading without tangling or dragging the stalks. The bands or ties, if properly made ones, should now all be placed on a fence or somewhere to dry, so as to allow them to dry as quickly as the flax. These bands could be made from sisal or from long grass. A considerable loss of material would ensue if the flax has got to be tied with flax bands, when something cheaper might be provided.

LIFTING OF FLAX.

If flax has been properly watered it should be fit to lift or take up off the grass on the second day, the weather being dry.

Perfectly dry flax presents the following appearances:—The "shoves" or woody portion should clean out freely when a few stems are rubbed between the hands, and upon looking over it as it lies on the grass, a great many stalks will be found to have a bow and string look with a consequent bending of the stalks due to contraction of the fibre. When these signs are apparent, it is a fairly sure sign that watering has been properly done.

The lifters, commencing at the end of the field where the spreaders finished off, and each one standing at the root end of the flax he is lifting, take a row from right to left of the field, lifting or gathering the flax with the right hand, and letting the left hand lie on the bundle as it is gathered. Those practised at work for a little, can move along very smartly, but great care must be taken to keep the flax even at the root ends. One lifter is able to keep two boys binding. The flax is bound into beets of about nine inches in diameter, with bands that are perfectly dry. As the lifting proceeds, the flax should be carted under cover to a barn or shed, or built into stacks. If wet weather does not permit the lifting to take place at the proper time, and there is a danger of the flax becoming soft or bleached, it should be taken up, even wet as it is, and set up in conical heaps—or "Chapelles"—and a band put around the tops to prevent the wind from blowing it down. In this way it receives very little injury from the wet weather, as the air passing freely through it dries it very quickly. In showery weather, it should be attended to between the showers, and bound up and secured as soon as it is found dry.

BREAKING.

This operation is best performed by a set of patent breakers. These vary in class and size and the quality of the work they are capable of turning out. They are made in five, eight, and ten pair sets according to the size of the factory, or the amount of straw required to be broken, and consist of fluted rollers between which the handfuls of flax are passed. One time through is sufficient for flax if properly retted. The rollers are geared with side shaft and bevel-gears, also fitted with levers and weights to add pressure if required. In breaking the straw, it is essential that the roots all pass between the rollers evenly together.

With a five-pair set of these rollers, from four to five tons of straw can be broken in a day. This set will be found to be most suitable in this country, as the flax is much easier broken than in Ireland, and no skill is required in the operators beyond the ordinary intelligence of the A'kikuyu who, in a very short time, become expert in the manipulation of this part of the machinery.

After the flax has been passed through in small handfuls, one boy is required to take up the flax at the delivery table, and place it down in bundles on the floor, taking care to keep it straight and even. These bundles of broken flax are carried

back to the strickers, as all flax, after breaking, should be stricked—that is, made into small "stricks" for the scutchers. A "strick" of flax is as much flax as one man can grasp in one hand, arranged evenly by pulling out both ends properly and giving it a slight twist.

This is a system that has not been adopted in some parts of the Protectorate, but, where it has been adopted, it is found that the percentage of flax fibre is increased and the percentage of tow lessened. It is also a great advantage to the scutchers as they lose no time in preparing their own handfuls, and the amount of fibre turned out will be almost double.

SCUTCHING MACHINERY AND SCUTCHING.

Up to the present time most people have been carrying on with a Belgian type of machinery, introduced a few years ago and now made locally, which consists of shafting and scutch rims—or wheels as they are sometimes called—spaced on the shafting three feet apart, each one taking twelve blades. My objections to these are that they are too lightly made up, and they are also very springy, and the blades used for same being troublesome and difficult to keep running true.

At the present time Messrs. Lamberts, Limited, Nairobi, are making improvements by casting a type of scutch rim of much the same pattern as the Irish. These rims will be two feet six inches in diameter, and made from cast metal, weighing from 90 to 100 lb. each. They are made to carry Irish scutch blades, each scutch rim requiring six scutch blades, which can be made from local timber suitable for the purpose. These blades should be two feet long, nine inches broad, and one or one and a-half inches thick, with one of the edges planed away to the required thickness. The scutching stocks, or uprights, are so placed that the scutch blades as they revolve pass near the surface, in which is an opening, at the level of the shaft, where the boy inserts the flax to be scutched. The clearance between the upright and the revolving blades is about half-an-inch.

The rims, when fitted with these blades, can be made to five, five and a-half, or six feet diameters, and make from 150 to 250 revolutions per minute. They should be covered in to prevent dust and accident.

I feel certain that the above-mentioned weighty rims and blades will give satisfactory results, and they will be much firmer, stronger, and less stringy, and will work for a long time without replacing.

SCUTCHING OF THE FLAX.

This operation takes place after the flax has been passed through the breakers and been carefully "stricked." To perform this work, it is necessary to have good boys, and the best method is to give each boy a scutch stock of his own to do his particular part of the work; working the boys in pairs, let one boy do the first turn of rough scutching, taking away all the coarse tow, and passing it on to his partner to do the finishing of the fibre. By this method all the coarse tow, and all the fine tow are kept separate. The latter does not require the same amount of scutching as the coarse tow. As the scutch blades rotate, the operator takes the strick of flax in the left hand, holding it a little nearer the tops than the roots, and feeds it evenly and gently into the revolving blades, care being taken not to give one portion too much, and another portion too little. It is advisable not to allow the scutch boys to work with a large handful of flax, as it is severe on the flax. They will do more work with the small handfuls, and keep them neater and much evener in the ends.

After scutching, the flax should be dressed by hand removing all the remaining tow, giving each handful a slight twist, and putting it in a box to be tied up into bundles of about 14 lb. each. Flax has now been brought to that stage in which it is ready for the market, but, if one can afford storage in a dark, cool place, flax keeps in such a place, and will improve in softness of texture. It must not, however, be allowed to get damp.

HACKLING.

In some parts of this country this practice is carried out, and I don't quite agree with it, because the process of hackling is the business of the spinner, and requires skilled labour to do it properly. An inexperienced hackler will waste a large percentage of good fibre, and, in a good many cases, this fibre will command no higher a price than the unhackled. For this reason flax-growers should aim simply to remove the "shove" or bone, and leave the fibre as whole and as long as possible.

TREATMENT OF TOW.

The tow, especially the coarse sorts, must be scutched over again before it can be used for spinning. It is gathered into bundles of about 7 lb. weight, and well shaken and given a slight twist. It is then ready for running through the

mill, and, by repeated turnings and shakings, it is scutched free of all the remaining shoves or woody matter. Tow, for shipping, must be scutched very clean so as to command a high price in the home market.

It does not pay to ship tow not properly cleaned.

Although, undoubtedly, a critical crop to manage, and requiring the greatest care in manipulation while passing through its many stages, yet, it is to be hoped that, by strict attention to the foregoing plain instructions—which may be relied on as the result of long and extensive practical experience—few can fail to be successful and none need fear to undertake the cultivation of flax.

COTTON: THE EGYPTIAN VARIETY.

It is claimed by Gerald C. Dudgeon, Consulting Agriculturist to the Ministry of Agriculture, Egypt, that Egyptian cotton holds its high position in the world's markets by reason of the combined qualities of fineness, strength, and length which its staple possesses in comparison with that of cotton from other parts of the world.

The climatic and cultural conditions found in Egypt afford the country unique advantages, as far as it is at present known, with respect to the production of the particular kinds of cotton possessing the abovementioned valuable qualities.

Attention is directed to the fact that the life of any variety of cotton in Egypt extends for a few years only, such life being determined by the length of time occupied in the variety becoming so impure that its characteristic advantages are no longer apparent. This loss of purity, which by depreciation in value has frequently rendered the position of the Egyptian cotton industry precarious, has led to the introduction from time to time of new varieties showing improved qualities in comparison with the varieties which have declined, and which they are destined to replace.

These new varieties, in their turn, for want of proper control, proceed to deteriorate in the same manner as soon as their cultivation becomes extensive.

(1) Egypt has, so far as at present determined, unique advantages for the production of a special kind of cotton of high value. Attempts are being made in India and Arizona to emulate Egypt's success in this respect, and attention is drawn to the progress made in America to be regarded as a warning of what may happen if steps be not taken to maintain the purity of the existing Egyptian commercial varieties in this country.

(2) The period of life of an Egyptian commercial variety is not long, owing to the fact that the characteristic qualities which constitute its value are usually rapidly broken down by cross-fertilisation in the field and by careless mixture of seed in the ginneries.

(3) The origin of all Egyptian commercial varieties appears to have been a single plant in each case. These plants may be assumed to have been "mutant" strains, the nature of which, so long as they are each inbred, is to breed true to the parent type. The theory of the commercial varieties being ever-splitting hybrids is therefore apparently untenable. The assumption of the mutational origin of Egyptian commercial varieties is supported by what has been found to occur in experimental breeding from Egyptian seed in Arizona.

(4) The inducement for certain cultivators to select single and remarkable plants in order to propagate new varieties has arisen from a desire for money-making, but this advantage is only coincident with the retention of a monopoly of the seed. Impracticability of keeping this has resulted in the deterioration of the variety as soon as control was lost.

The Egyptian Government's attempts to fix and maintain the purity of existing types are faced with the same fate when the purified seed becomes widely distributed.

(5) Examples are given of the introduction of locally undesirable types of cotton into areas otherwise confined to the cultivation of one special kind; and of the injurious irregularity introduced into the seed for sowing by the fraudulent admixture of two totally different varieties of cotton in the operation of ginning. A statement is made of the success which has attended the efforts of the Egyptian Ministry of Agriculture in the isolation of a purified type of cotton, which has yielded from 620 to 906 lb. of ginned cotton per acre in the last year, and of which samples have been pronounced by buying experts in Alexandria to be of excellent quality.

Attention is drawn to the fact that, in the process of the dissemination of the descendant from the purified type, it must, under present circumstances, become impure, necessitating the incessant selection each year of a new nucleus, in order to overcome the establishment of the inevitably deteriorated descendants.

GRAIN FOR SALE.

(All Previous Lists Cancelled).

SEED MAIZE.

To growers desirous of obtaining a pure and reliable strain of improved seed, the following variety is being offered and represents a limited stock raised from a selected strain of Departmental seed:—

Yellow.—Improved Yellow Dent.

CONDITIONS OF SALE.

Applications for seed, with accompanying remittance (exchange added) should be addressed to the Under Secretary for Agriculture, Brisbane. (*Postal address and name of railway station should be given.*)

Sales are limited to three bushels to any one applicant.

Advice will be sent when seed is despatched.

Purchasers are requested to write promptly after receipt of seed should any matters require adjustment.

PRICES.

To enable applicants living at a distance to benefit, a flat rate of 15s. per bushel is being charged. This price includes all railage to the nearest railway station, but where steamer freight is necessary this and any charges in relation thereto must be paid by the purchaser, and the cost thereof added to the remittance.

Fifteen shillings (15s.) per bushel.

DESCRIPTION OF THE ABOVEMENTIONED VARIETY OF SEED MAIZE FOR SALE.

Improved Yellow Dent.—This is perhaps one of the best known and most extensively grown variety in this State. Numerous strains are met with in nearly all districts, all more or less emanating from the original "Yellow Dent." This variety has for many seasons undergone considerable improvement, and a type suitable to meet many of the State's requirements is now being offered. "Improved Yellow Dent" may be classed as a medium-late maturing variety, from five to five and a-half months, a strong, prolific grower, from 10 feet to 12 feet high, capable of giving large returns both of grain and fodder. The ears are of medium size, 8 inches to 10 inches, stout, cylindrically shaped, borne somewhat high on the stalk, semi-erect in habit, being well protected by a strong, tight, close-fitting husk; they are usually well filled, carrying from 16 to 18 rows of grain packed on the cob. The grain is of a rich amber colour, with a yellow tip cap; of medium hardness, and of a deep, flattened wedge-shaped appearance. The core is usually of a pink colour. This variety adapts itself readily to varying conditions, and has given splendid returns in many of the maizegrowing districts.

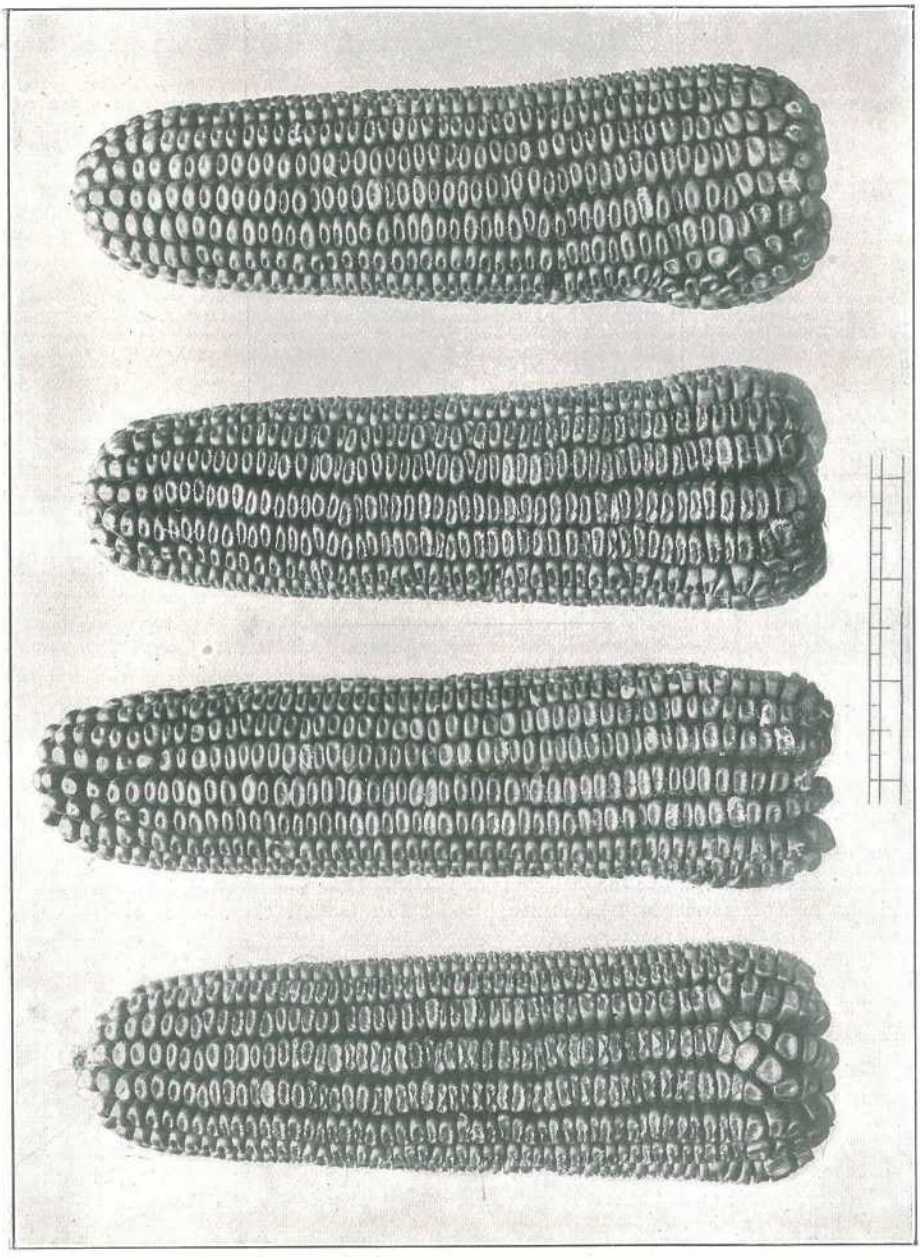
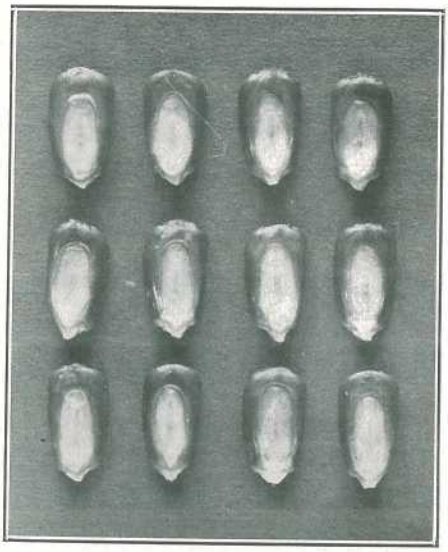


PLATE 19.—IMPROVED YELLOW DENT.



Improved Yellow Dent.

PLATE 20.—SEED MAIZE.

A FEW PRINCIPLES TO BE OBSERVED IN COTTON-GROWING.

1. When preparing the land, plough deeply—twice, if the land is stiff.

2. Plant three or four seeds in each hole, and cover not more than 1 inch deep. Plenty of seed should be used, as they help each other to break through a hard crust caused by rainstorms and subsequent drying winds.

3. As caterpillars like the young plants until they are a month old, let them have plenty, and the farmer will have enough to do to attend to the one plant per hole which is to produce the crop.

4. Earth up the plants well, up to the first joint, and even more.

5. Run the horse-hoe between the rows at least three times; the plants will then take care of themselves.

6. Should the cotton worm appear, plant a couple of rows of maize between every six or eight rows of cotton. This is the worm which is frequently found in corn cobs. It prefers corn to cotton, and the moth producing them will lay its eggs on the corn plant. When that occurs, cut down and burn the maize, or use it for ensilage. In planting this trap crop, care must be taken to have it tassel about December, and it must therefore be planted considerably later than the normal time of planting in spring.

7. Note that cotton is really a six to seven months' crop, although some varieties are very early. Uplands cotton takes, from seed to flower, from eighty to ninety days, and from flower to boll, seventy to eighty days.

8. After picking, the cotton should be spread out in the sun on tarpaulins or stretchers to dry thoroughly and harden the seed.

Pastoral.

IN-BREEDING.

In the issue of this Journal for June, 1916, we published an article on in-breeding by the writer of Poultry Notes in the Rockhampton "Morning Bulletin," in which he opened up a theory on in-breeding in the case of poultry and other stock, which, however contrary to the opinion generally held by breeders—viz., that in-breeding is a cause of the deterioration of farm stock—is yet a theory which has received practical proof in many countries. He dealt mainly with poultry, but his deductions apply equally to other animals, wild and domesticated, as, for instance, the bison of North America, the Chillingham cattle in England, the buffalo of Northern Australia, the reindeer, Polar bear, the Australian dingo, and a host of other animals in all parts of the world—all instances of in-breeding without deterioration.

This article we submitted to Mr. Cuthbert Potts, Principal of the Queensland Agricultural College, and an acknowledged authority on stock-breeding, who replied that the principles set out in it are quite correct, and he agrees with the writer up to a certain point. All good strains of the various breeds, in fact, the various breeds themselves, have been developed by close in—or line—breeding. It is the only legitimate procedure to adopt. In-breeding, however, he remarked, doubles up weak characters even as strong. On this account, it is a dangerous method to adopt unless the breeder is a very keen judge, and has a good knowledge of his subject. This, probably, largely accounts for the fact that in-breeding is looked on with disfavour. The subject is a very large one and might form the basis of a series of articles in the Journal.

The correspondent who forwarded us the "Morning Bulletin" containing the article said: "If that doctrine is true, then it is a pity it is not known all over the world, and would save a lot of money to breeders of all sorts of stock. If it is not true, then it is a pity that any paper widely distributed amongst farmers, advocates it."

Mr. W. G. Brown, Instructor in Sheep and Wool, Department of Agriculture and Stock, gave us the following note on in-breeding which corroborates the doctrine enunciated in the article. He said: "There is no sheep stud of any value in the Commonwealth which does not use the line system of in-breeding. It is very many years, for instance, possibly fifty years, since an out-cross has been used in the Wanganella (Riverina) Merinos. It is certain that no fixed type in stock can be made without intelligent "line" or "in-breeding."

We reproduce the article from the "Bulletin," with the object of opening a way for discussion of the subject.

"How many breeders are there in the 'fancy' to-day who have not at some stage of their experience received definite instructions from customers when forwarding fowls to exercise care in supplying male and female unrelated? The majority of novices issue these instructions, not because from their experience they have proved close relationship in poultry-breeding unsatisfactory in practice, but because it appears to be an accepted fact that no beneficial results can accrue from such a policy. This idea is as widespread as it is erroneous, and will take many years to overcome to any appreciable extent. It has risen in most instances through want of knowledge, and has been to some extent encouraged by many experienced breeders, who, aware of the increased opposition they would have to encounter in competition were in-breeding more generally resorted to, advise the novice in every instance to secure unrelated blood when purchasing a breeding-pen, well knowing that this is the best system whereby to deprive him of the opportunity of achieving satisfactory results.

"So far as can be ascertained, the chief objection raised against in-breeding is that it destroys the fertility and stamina of the stock and results in deformed specimens being produced. That these serious defects are apparent in many instances can readily be endorsed, but that they are due solely to in-breeding is a matter of very grave doubt. Weedy specimens occur in numerous instances in which relationship between the parents is as distinct as the poles, comparatively speaking, so it can be safely attributed to other causes. On the other hand, some of the best show birds that have ever been penned—perfect giants of their race—have been the result of a union between brother and sister for the third successive generation.

"As illustrating the extent to which consanguineous matings can be carried without injurious effects resulting, the case of the ordinary blue pigeon may be cited. A pair of these birds will in a few years found a flock of several thousands,

all bred from the closest possible union; each pair, when able to provide for themselves, taking up their share of the duty of increasing the flock and continuing it for several generations on precisely similar lines. It can be asserted without the slightest fear of contradiction that the keenest scrutiny would fail to detect the slightest difference in size, health, and stamina between one of the original stock and one of, say, the tenth generation. Further illustrations, such as the various native birds, dingoes, rats, and rabbits, can be referred to as proving that in-breeding does not affect the stamina of progeny of closely related parents. Incestuous breeding amongst all the abovementioned is notorious, yet it would require a bold opponent of in-breeding to say that either of the two latter, at any rate, have forfeited any of their vigour, or have decreased in size in comparison with their progenitors of recent decades.

"A solution of the problem appears to be in the fact that many breeders, through careless methods rarely keep their birds in sufficiently good health to ensure vigorous offspring, yet they attach the whole of the blame to the birds by inferring that their want of success was entirely due to the fact of the birds being in-bred. In quite 90 per cent. of the cases wherein the growing stock shows signs of inherited constitutional weakness, it can safely be attributed to neglect on the owner's part by breeding from immature stock, from birds inheriting some serious disease, or from specimens so overburdened with internal fat that their system has become impaired to such an extent that expecting healthy progeny from them was a folly.

"All the above are factors operating against successful results being obtained, no matter whether in-breeding has been resorted to or not, but from birds of a suitable age, and kept in good, clean healthy condition, sound, vigorous stock can always be relied on, even though the closest relationship has existed for unlimited generations. Expert breeders, especially those who rely on poultry-breeding for the whole or greater portion of their income, are fully seized of the fact that in-breeding must be practised to a very pronounced extent if anything approaching permanent success be aimed at. They accordingly, when laying the foundation of their strain, take steps to secure their stud birds from a reliable breeder and insist on having them closely related. The resultant progeny from such show a uniformity of quality that is really surprising and, by the selection of the best specimens to make back to the parents—that is, the pullets to their sire and a cockerel to his mother—the ensuing result is highly satisfactory. In-breeding thus is only advocated, however, when some special quality is desired, and at least one of the birds bears evidence of possessing it. It would be obviously unwise to mate two birds that were closely related, each possessing a decided fault, and expect them to produce perfect stock. It follows, as a matter of course, that every point or feature is strongly impressed by each successive generation. Hence imperfections are intensified equally with desirable qualities where line breeding is adopted, provided the stock have a tendency in that direction. It is advisable, therefore, for the breeder at all times to make himself thoroughly acquainted with the standard requirements of the varieties he fancies, and, when such instruction is thoroughly mastered, its adoption should be aimed at by the most careful selection and making up of stock showing the nearest approach to perfection in the greatest average of points. If sound judgment be brought to bear upon the matter, it will prove a comparatively easy task, for, by judicious in-breeding many points can be fixed in a remarkably short space of time, and a strain can thus readily be brought to within measurable reach of perfection.

"Convincing proof of the advantages of in-breeding lies in the fact that many of the most successful fighting game breeders in England have bred and fought their strains of birds for over twenty years without the introduction of fresh blood into their stock. When this can be accomplished successfully with a breed requiring the strength and courage necessary for pit fighting, it will be readily conceded that nothing but beneficial effects would result from similar lines applied to utility stock.

"It will be unhesitatingly acknowledged by every experienced breeder that a variety of fowl possessing distinctive characteristics can be relied on when bred in line for several years to impress the same qualities on their progeny in a very decided manner. Therefore, it can be most emphatically asserted that in-breeding introduced for any definite object, such as egg production, table properties, or special show points, can be depended upon to achieve most satisfactory results, for not only the energy of the parent stock, but also that of the grandparents and still more remote ancestors, is concentrated in one direction, and thus speedily achieves by prepotency a result that would take years to obtain where fresh blood is continually introduced.

"The majority of amateurs, when embarking in the venture of pure-bred poultry-keeping, generally secure a setting of eggs with which to make a beginning. Such is an excellent plan, and can be strongly recommended when a reliable breeder is selected from which to obtain same. When these chicks are hatched, being more prized than ordinary stock, they receive extra attention and more liberal feeding,

generally on unsuitable and highly stimulating foods that play havoc with their digestive organs and render them wholly unfit to undertake the task of propagation of their species. It is the mating of such birds, together with the consequent disastrous results obtained from them, that has given rise to the cry that in-breeding is injurious; but surely any unbiassed individual must know that birds pampered to an unusual extent must always prove unsatisfactory, no matter whether bred from closely related stock or otherwise? As before stated, lack of vitality is the root of the failures extending over the breeding season.

"In-breeding, therefore, cannot be carried too far, provided always that due attention be paid to the general health and vigour of the stud birds. It is on this point that nature teaches us a most valuable lesson, for, with in-breeding as with other details, she vigorously insists on that admirable law being strictly observed—namely, the survival of the fittest."

In September last, a writer (Halcyon) in the "United Graziers' Journal" wrote as follows on—

IN-AND-IN BREEDING IN RACEHORSES.

In referring to in-breeding in these columns, from time to time, little or no mention has been made of horses in this connection; reference to sheep and cattle has been the invariable rule. On this occasion I will break fresh ground and introduce it as affecting the thoroughbred horses.

It is only too well known to those who know the thoroughbred horse, which is the most symmetrical, and the swiftest animal in the world, that it is greatly in-bred. From an early period in the history of the racehorse its breeders were fully alive to the value of pedigree, and it has always been considered to be considerably in a colt's favour if he should possess in his pedigree the union of several strains of one line of stout running blood.

Britain, of all European nations, was the first to realise the value of pedigree, but in the deserts of Arabia its value in breeding horses was known at a very early date of the world's history, and, consequently, purity of blood was held by them in the highest estimation.

THE BEDOUIN ARAB HORSES.

The Bedouin Arabs possessed five superb breeds, viz., the Kehilan, Leglawi, Abeyan, Hamdan, and the Hadban. The Kehilan was the fastest though perhaps not the hardiest of those five breeds. It should be carefully noted, though, that they bore a very close resemblance in appearance to our present day racehorse. The Darley Arabian, perhaps the only thoroughbred Anizeh horse in the English Stud Book, was a Kehilan type of horse, which traced his pedigree through the sub-breeds, K. Angus, and K. Rus-el-Fe-dawi.

Then again that popular Godolphin Arabian was derived from an outside breed named Jinfan, through the sub-breed, J. Stam-el-Bulad. To prove this fact Omar Pasha took great pains.

As an illustration as to the way English racehorses have been bred, the following dictum of the late Dr. Bathe, who was a great authority on pedigrees of celebrated racehorses, must have great weight. He said: I do not think a better example can be found of excellence, both on the turf and at the stud (the latter being proven through so many generations) than the one that has been called the 'Ace of Trumps' of the Stud Book, viz., Waxy. In this notable animal there was a concentration of good blood. On his sire's side, he was a direct descendant from the Darley Arabian—the fountain head from which our English thoroughbred horse takes its excellence—as his sire, Potsos, was a son of Eclipse, and Eclipse was a grandson of Squirt, who was a grandson of the Darley Arabian. Another strain of the Darley Arabian blood came in on Potsos' dam's side. On Waxy's dam's side the Darley Arabian was returned to by several strong infusions. Maria had two strains of his blood, one of them by Blaze, son of Flying Childers, son of the Darley Arabian—and her dam, Lizette, had also two strains of his blood by her sire, Snap, who was a grandson of Flying Childers.

Another notable instance of in-breeding was Blue Gown, winner of the 1868 English Derby. His sire, Beadsman, came from a union of the Joe Andrews and Waxy lines. Beadsman was by Weatherbit, who united the lines of Joe Andrews and King Fergus. Miss Letty, Weatherbit's dam, was closely related to Orville, great grandson of Eclipse, on the side of both sire and dam. Beadsman's dam, Mendicant, inherited the same blood, through Waxy on her sire's side and Joe Andrews on her dam's side. Blue Gown got a double infusion of the Darley Arabian blood through his dam, Bas Bleu.

The English Stud Book gives numerous illustrations of in-breeding, but what has here been given should be ample to show the mode of breeding adopted by most owners of thoroughbred studs.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1919.

The conditions have again been favourable for egg production. The nights have been mild and the weather generally satisfactory. Rain is badly needed for producing the ever-necessary green feed. At the present time milk thistles are being used, there being no green lucerne available. The health of the birds has been excellent. One death occurred during the month in C. H. Singer's pen, and the bird has been replaced. The following were the highest individual scores:—In Black Orpingtons, birds belonging to R. Holmes, E. M. Larsen, and R. Burns laid 31 eggs in the 31 days, R. Holmes also having two birds which laid 30 each. In White Leghorns, J. M. Manson and T. Fanning each had a hen which laid 28 for the month. Ferguson's C. Langshan laid 27, whilst the A. and F. Barred Plymouth Rocks of the Kelvin P.F. laid 28 and 27 respectively. We omitted to mention in the July report that the score of these Plymouth Rocks probably constitutes a record for that breed's laying. T. Fanning's pen gained the highest aggregate for the month in light breeds and R. Holmes in heavies. The following are the individual scores:—

Competitors.	Breed.	August.	Total.
LIGHT BREEDS.			
*J. M. Manson	White Leghorns ...	155	643
*W. Hindes	Do.	147	628
*T. Fanning	Do.	156	608
*Dixie Egg Plant	Do.	135	601
*E. A. Smith	Do.	145	573
*Dr. E. C. Jennings	Do.	141	558
*G. W. Hindes	Do.	140	552
*Haden Poultry Farm	Do.	136	551
*Range Poultry Farm	Do.	133	531
S. McPherson	Do.	129	531
*Quinn's Post Poultry Farm	Do.	141	510
J. H. Jones (Toowoomba)	Do.	137	504
G. Williams	Do.	136	504
*C. P. Buchanan	Do. ...	131	503
G. J. Byrnes	Do.	121	502
*H. Fraser	Do.	137	495
*B. Caswell	Do.	134	492
*W. Becker	Do.	138	487
W. A. Wilson	Do.	133	470
S. W. Rooney	Do.	122	470
H. A. Jones (Orallo)	Do.	126	467
*L. G. Innes	Do.	145	465
*Mrs. L. F. Anderson	Do.	137	456
*J. J. Davies	Do.	137	454

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	August.	Total.
LIGHT BREEDS—*continued.*			
*W. Lyell	White Leghorns ...	118	454
*Mrs. R. Hunter	Do.	112	428
*Mrs. A. G. Kurth	Do.	138	424
*Thos. Taylor	Do.	139	417
G. H. Kettle	Do.	120	415
Geo. Trapp	Do.	116	408
H. O. Jones (Blackstone)	Do.	124	390
B. Chester	Do.	123	390
Oakleigh Poultry Farm	Do.	110	389
Mrs. N. Charteris...	Do.	113	382
C. A. Goos	Do.	122	381
*O. W. J. Whitman	Do.	127	365
R. C. J. Turner	Do.	107	362
N. A. Singer	Do.	130	344
J. H. Dunbar	Anconas	107	337
J. W. Newton	White Leghorns ...	121	336
W. Morrissey	Do.	111	335
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons ...	167	711
*R. Burns	Do.	158	627
*E. M. Larsen	Do.	145	626
*E. F. Dennis	Do.	156	619
Geo. Nutt	Do.	146	614
*A. E. Walters	Do.	146	598
*W. Smith	Do.	162	586
*A. Shanks	Do.	150	578
*Kelvin Poultry Farm	Plymouth Rocks ...	147	576
*E. Morris	Black Orpingtons ...	143	559
*Nobby Poultry Farm	Do.	136	540
*D. Fulton...	Do.	124	532
*Jas. Ferguson	Chinese Langshans ...	126	503
*T. Hindley	Black Orpingtons ...	146	484
*H. Puff	Rhode Island Reds ..	116	478
*W. H. Reilly	Chinese Langshans ...	119	475
Burleigh Pens	Black Orpingtons ...	133	445
*Mars Poultry Farm	Do.	145	433
A. Homan	Do.	108	421
*T. B. Barber	Do.	121	400
*F. W. Leney	Do.	130	396
R. B. Sparrow	Do.	142	379
C. H. Singer	Do.	84	352
J. A. Cornwell	Do.	102	345
A. Gaydon	Do.	115	317
H. Ashworth	Do.	127	310
Total	...	8,824	32,016

* Indicates that the pen is engaged in single hen test.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
J. M. Manson	107	102	110	110	106	108	643
W. Hindes	118	109	102	91	104	104	628
T. Fanning	112	83	102	108	98	105	608
Dixie Egg Plant	93	94	111	116	91	96	601
E. A. Smith	90	89	111	94	85	104	573
Dr. E. C. Jennings	96	72	97	94	90	109	558
G. W. Hindes	103	78	106	92	83	90	552
Haden Poultry Farm	103	103	99	89	72	85	551
Range Poultry Farm	67	91	105	107	71	90	531
Quinn's Post Poultry Farm ...	77	92	103	96	73	69	510
C. P. Buchanan	68	101	80	76	84	94	503
H. Fraser	60	89	101	84	70	91	495
B. Caswell	69	28	86	108	114	87	492
W. Becker	112	90	103	67	35	80	487
L. G. Innes	53	96	60	87	91	78	465
Mrs. L. Anderson	84	96	60	66	66	84	456
J. J. Davies	63	64	83	85	88	71	454
W. Lyell	64	93	92	69	68	68	454
Mrs. R. Hunter	67	74	80	75	69	63	428
Mrs. A. G. Kurth	95	75	84	69	37	64	424
Thos. Taylor	88	51	48	91	89	50	417
O. W. J. Whitman	52	85	55	52	64	57	365
HEAVY BREEDS.							
R. Holmes	121	125	131	108	133	93	711
R. Burns	106	98	106	133	86	98	627
E. M. Larsen	110	120	102	94	114	86	626
E. F. Dennis	120	81	116	104	77	121	619
A. E. Walters	101	102	112	95	80	108	598
W. Smith	67	117	95	88	122	97	586
A. Shanks	59	69	119	108	103	120	578
Kelvin Poultry Farm	126	83	82	80	108	97	576
E. Morris	97	96	95	97	116	58	559
Nobby Poultry Farm	77	83	77	97	105	101	540
D. Fulton	97	90	96	80	92	77	532
Jas. Ferguson	97	109	68	72	78	79	503
T. Hindley	110	96	48	87	73	70	484
H. Puff	94	54	83	102	71	74	478
W. H. Reilly	70	62	93	97	74	79	475
Mars Poultry Farm	53	103	104	39	41	93	433
T. B. Barber	59	78	64	68	79	52	400
F. W. Leney	54	66	81	106	39	50	396

The following are the winners of the four months' Winter Test :—

LIGHT BREEDS.

J. M. Manson	418 eggs;	average weight	2 oz.
W. Hindes	481 „	„	2 „
Dixie Egg Plant	466 „	„	2 „

HEAVY BREEDS.

R. Holmes	544 eggs;	average weight	2 oz.
R. Burns	469 „	„	2 „
A. E. Walters	452 „	„	2 „

WEIGHT OF EGGS, SINGLE PENS.

——	A.	B.	C.	D.	E.	F.	Pen Average.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
LIGHT BREEDS.							
Mrs. Anderson	2 1/8	2 1/8	2 1/8	2	2 1/8	2 1/8	2 1/8
Haden P. Farm	1 7/8	2 1/8	2	2	2 1/4	2	2
Harold Fraser	2 1/4	2	2 1/8	1 7/8	2	2	2
Dr. Jennings	2 1/8	2 1/8	2 1/4	2 1/8	2 1/8	2 1/4	2 1/8
Range P. Farm	2 1/8	2 1/4	2	1 3/4	2 1/8	2 1/8	2
Thos. Taylor	2	1 7/8	2	1 7/8	1 7/8	2 1/8	2
B. Caswell	2 1/4	1 7/8	2 1/8	1 3/4	2	2 1/8	2
Dixie Egg Plant	1 3/4	2 1/8	2	2	1 7/8	2	2
J. M. Manson	2	2 1/4	2	1 3/4	2	2	2
L. G. Innes	2 1/8	1 3/4	2	2	2 1/8	2	2
T. Fanning	2	2	1 7/8	1 7/8	2	1 7/8	1 7/8
J. Davies	2 1/8	2	2 1/8	1 7/8	1 7/8	2	2
W. Becker	1 7/8	2	1 7/8	2 1/8	2	2 1/8	2
Quinn's Post P. F.	2 1/8	2	2	1 3/4	2 1/8	2	2
O. W. Whitman	2 3/8	2	2 1/4	2 3/8	2 1/8	2 1/4	2 1/4
G. W. Hindes	2 1/4	2	2	2 1/8	2 1/8	2 1/8	2 1/8
Mrs. R. Hunter	2	2*	2	1 7/8*	2	2	2
W. Hindes	2	2	2 1/4	2	2	2	2
W. Lyell	1 7/8	2	2	2*	1 7/8	2 1/4	2
Mrs. A. G. Kurth	2	2 1/8	2 1/4	2 1/8	2 1/4	2	2 1/8
E. A. Smith	2	2 1/8	1 7/8	2	1 7/8	1 7/8	2
C. P. Buchanan	2 1/4	2	1 7/8	2	1 7/8	2	2
HEAVY BREEDS.							
T. B. Barber	2	2 1/8	1 7/8	1 7/8	2	2 1/8	2
Kelvin P. Farm	2	1 3/4	2 1/8	1 7/8	1 7/8	1 3/4	1 7/8
J. Ferguson	1 7/8	2	1 7/8*	2	2	1 7/8*	1 7/8
A. E. Walters	1 7/8*	2*	1 7/8	2	2	2	2
E. F. Dennis	1 7/8	2	1 7/8	2	2	1 7/8	1 7/8
A. Shanks	2 1/8	2 1/8	1 3/4	2	1 7/8	1 7/8	1 7/8
Mars P. Farm	2	2	2	2	1 7/8	2 1/8	2
Nobby P. Farm	2 1/8	2 1/8	2	2 1/8	2	2 1/8	2 1/8
D. Fulton	2	2	2	2	1 7/8	1 7/8	2
R. Burns	2 1/8	2 1/8	2 1/8	1 3/4	2 1/8	2	2
T. Hindley	1 7/8	1 7/8	2	2 1/8	2	2	2
W. Smith	2 1/8	2	2	2	1 7/8	2	2
W. H. Reilly	2	2	2	2	2 1/4	1 7/8	2
F. W. Leney	2	2*	1 7/8	1 7/8	2 1/4	2	2
E. M. Larsen	2	1 3/4	1 7/8	2	1 7/8	2*	1 7/8
E. Morris	2 1/8	1 3/4	1 7/8	2 1/4	1 7/8	2 1/8	2
R. Holmes	2	1 7/8	1 3/4	2 1/8	1 7/8	2	2
H. Puff	2 1/8	2 1/8	2 3/8	2 1/4	2 1/4*	2 3/8	2 1/4

The individual averages are obtained from the weights of six eggs. Cases where less than six eggs have been weighed are marked *. The pen average is taken from the whole 36 eggs. As each average is given to the nearest 1/8 oz., the pen average is not necessarily the average of the individual averages. Examples:—

——	A.	B.	C.	A.	B.	C.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
	2	2	1 7/8	2	2	1 7/8
	2	2	1 7/8	2	2	1 7/8
	2	2	1 7/8	2	2	1 7/8
	2	2	1 7/8	2	2	1 7/8
	1 7/8	1 7/8	1 3/4	2 1/8	2 1/8	2
	1 7/8	1 7/8	1 3/4	2 1/8	2 1/8	2
Average to nearest 1/8 oz.	2	2	1 7/8	2	2	1 7/8
Average of 18 to nearest 1/8 oz.	1 7/8 oz.			2 oz.		

GROUP PENS.

—	Average Weight of Eggs.	Variation.
LIGHT BREEDS.		
W. Morrissey	2⅛ oz.	1⅞ to 2¼ oz.
J. W. Newton	2 ,,	1¾ to 2⅛ ,,
B. Chester	2 ,,	1¾ to 2⅛ ,,
Chris. Goos	1⅞ ,,	1⅝ to 2⅛ ,,
H. A. Jones	2 ,,	1¾ to 2¼ ,,
Geo. Trapp	2 ,,	1¾ to 2⅜ ,,
J. H. Jones	2 ,,	1⅞ to 2¼ ,,
Geo. Williams	1⅞ ,,	1⅝ to 2¼ ,,
G. H. Kettle	2 ,,	1⅞ to 2¼ ,,
N. A. Singer	2 ,,	1¾ to 2⅛ ,,
Mrs. N. Charteris	2 ,,	1⅞ to 2⅛ ,,
H. O. Jones	2 ,,	1¾ to 2⅛ ,,
W. A. Wilson	1⅞ ,,	1⅝ to 2⅛ ,,
S. McPherson	2 ,,	1⅝ to 2⅛ ,,
Oakleigh P. Farm	2 ,,	1¾ to 2⅝ ,,
S. W. Rooney	2 ,,	1⅞ to 2⅛ ,,
Geo. J. Byrnes	1⅞ ,,	1¾ to 2⅜ ,,
R. J. Turner	2⅛ ,,	1⅞ to 2¼ ,,
HEAVY BREEDS.		
Geo. Nutt	1⅞ oz.	1¾ to 2⅛ oz.
Mrs. M. E. Smith	2 ,,	1¾ to 2⅛ ,,
R. R. Sparrow	2 ,,	1⅞ to 2⅛ ,,
H. Ashworth	2 ,,	1¾ to 2⅜ ,,
C. H. Singer	1¾ ,,	1⅝ to 2⅛ ,,
J. A. Cornwall	1⅞ ,,	1⅝ to 2 ,,
A. Homan	1⅞ ,,	1⅝ to 2⅛ ,,
J. H. Dunbar	1⅞ ,,	1⅝ to 2 ,,
A. Gaydon	2 ,,	1⅞ to 2¼ ,,

In all groups at least 30 eggs were weighed, and for single pens at least 6 eggs (except in cases marked *) were taken. All results are given to the nearest one-eighth of an ounce.

CUTHBERT POTTS,
Principal.

COTTON-GROWING IN THE WEST.

We have on several occasions received from cotton-growers in various districts of Queensland confirmation of the statement that the cotton plant is a drought resister. The Department has received a fine sample of cotton produced from mixed seed supplied to Mrs. E. Conway, of Mulgalone, Amboola (388 miles on the Western Railway line, Mitchell district), in September, 1917. The first lot sown was badly cut by the frost in October, but later-sown cotton did very well. The winter was very severe, and the first planted old bushes did not sprout again until November. There was no general rain until the 3rd of February, yet many of the bushes ripened their bolls. The cotton sample received by the Department was from the old bushes which survived the frosts. Mrs. Conway states that she is quite satisfied that cotton is one of the most certain and suitable crops for the above district, and has prepared 10 acres for planting on 1st October, and an additional 10 acres to be planted at the end of that month. The varieties of seed asked for are Russell's Big Boll and Sea Island or Mascotte. We shall be glad to hear the results of this planting. Much of the finest Uplands cotton has been grown in the Western districts. We do not expect to hear that Sea Island cotton thrives there as well as it would on the coast, owing to the want of a moist, saline atmosphere; on the other hand, the best results accrue from planting good varieties of Uplands cotton such as Duranga, Russell's Big Boll, Jones's Improved, &c.

The Horse.

ITEMS OF INTEREST FROM OUR EXCHANGES.

FIRST AID TO HORSES.

FRACTURES.

It is a mistake to imagine that because a horse breaks his leg he is done for, and should be shot. In many cases, with proper and speedy treatment, it will do well, and even if not always absolutely free from lameness, a mare, at all events, is worth breeding from. When a leg is broken, a temporary splint can be made with the aid of a piece of wood and some kind of bandage. This will often enable the animal to be got home, where the limb can be properly set. It is advisable to put horses so injured in a sling as soon as possible. A quite serviceable sling can be made with an ordinary sack, each end of which is turned over a round piece of wood, longer that the breadth of the sack, and sewn firmly. This is placed under the animal's chest, and fastened to the rafters of the stable by means of ropes attached to each end of the pieces of wood. The object of such a sling is not to lift the horse off the ground, but to afford him support and take weight off the injured limb.

What is apparently a broken back is sometimes only a severe injury to the muscles, such as will prevent the animal from getting up. If the back be really broken, the horse will be unable to move its hindquarters and tail, and those parts will be destitute of sensation. A pin will soon show if that is the case. Such an accident is beyond remedy. If, however, the animal feels the prick of a pin, and can move its hinder parts, he should be allowed to lie quietly until expert advice is obtained. With treatment a complete recovery may be made.

DISLOCATIONS.

The first thing to be done with a dislocated joint is to reduce it, *i.e.*, to get the parts back into their natural position and to keep them there. This is usually done by extending the dislocated joint and slipping it, either by force or persuasive movement, into its place. If it is one of the lower joints of a limb, a bandage will be necessary after the dislocation is reduced.

Probably the most frequent dislocation is that of the stifle. A simple method of treatment is to pass a rope round the hoof of the affected limb, and pull it forward towards the shoulder while the patella (knee-cap) is pushed forwards and inwards by the hand. It will jump into its place with an audible snap, and the animal be able to move again freely.—"Pastoral Review."

SEA ISLAND COTTON.

A correspondent who intends planting cotton wishes to know what variety will pay best—Uplands or Sea Island. Undoubtedly a good variety of Uplands, such as Duranga or Russell's Big Boll, would prove to be the most profitable crop. The long-staple Sea Island variety, although agriculturally and commercially a profitable crop in the West Indies and other tropical countries, has not proved to be so in Southern Queensland, although in the North both that and the Caravonica long-staple cottons have done well. There is no market at Sea Island prices for a large production of this cotton; hence the supply is limited. It commands a higher price than the Uplands cottons owing to its characteristic length and fineness, and is only in demand by spinners for the manufacture of special fabrics. It is most productive on land near the coast, where it gets the benefit of a saline atmosphere.

The Orchard.

PINEAPPLE-GROWING.

BY J. ROSE, Comptroller Soldiers' Settlements.

I propose to deal with this matter under three headings—namely, selection and preparation of land; selection of plants; methods of planting and manuring, and methods of cultivation.

With the great expansion that has taken place in recent years in the pineapple-growing industry, a great demand has been created for suitable land for pinegrowing, and the man who to-day wishes to embark in this industry finds himself up against two serious difficulties. Firstly, the high cost of purchasing a good pine garden as a going concern; and, secondly, the fact that most of the land available at the present time in the virgin state is of a very poor description, and it is almost impossible to secure a first-class site with good allround conditions.

Now I propose to keep all these difficulties in view as I proceed with my paper, and if there are those amongst my readers who got in early and secured the ideal ground and situation, my paper is not to you, but rather to the less fortunate.

In recent years a new element has crept into the industry with the advent of the city business man, who has been told that the best way to get rich quickly is to secure a pine farm; but in this way of divided attention the best results have not always been obtained.

It is a most remarkable fact that pines can be grown successfully upon any class of soil, provided there is a good drainage—that is, provided the grower knows his business, studies the wants of the plants, and provides for all deficiencies.

ASPECT.

I will now proceed with selection of site for garden.

There is a prevailing idea that an easterly aspect is of the utmost importance, and I should like to state that, in my opinion, the garden with a variety of aspects is the ideal one, as the grower will thus get an extended season by reason of the fruit varying about a fortnight earlier on the eastern and northern side of the hill to the southern side. There is no doubt whatever about the fact that the east and north aspect give the early fruit, and the south and west the late fruit. I have also found that the steeper the hill side on the southerly aspect, the later the fruit, and this is accounted for by the fact that these rows would run east and west to cross the hill to avoid wash, and fully two-thirds of the plants would fall down the hill and get very little sun.

It is most desirable that the site should be at a good elevation, especially the farther one gets back from the sea coast. Frost is the enemy of the pine, and low levels, with drifts of swampy country leading into them from the west, should always be avoided. For several years there have been very mild winters, but sooner or later we shall have a return of severe frosts, and growers would do well to bear this in mind.

A great deal of protection can be given to pines on low ground in winter by covering the rows with blady grass; but it is most important when this is done that a good covering be put on, as otherwise the damage is increased by reason of frost settling on this covering.

I do not propose to deal with the matter of clearing land, except to condemn the practice of burning huge heaps of logs in the one place, and thereby destroying the value of that portion of the land for many years.

PREPARATION OF GROUND.

We now come to the most important part of the work, and herein, to my mind, lies the result of a great many failures to grow pines successfully.

It must always be borne in mind that the pine is a permanent crop. It continues bearing roughly from six to ten years and much longer in some cases. It is impossible to carry out the deeper methods of cultivation after the planting has been done, and as the years go on and rows grow in, it becomes more difficult to cultivate, and as far as possible all this must be provided for at the initial stages.

Too much stress cannot be laid upon the importance of thorough working of the soil, especially in districts where the soil is of rather a solid nature. At least three good ploughings are required for the following reasons:—There is only a depth of from 3 to 4 inches of soil on the surface that is of any value as far as plant foods are concerned. The pine is certainly a surface feeder, and will confine itself to this depth, or just so far as there is any attraction or conditions are favourable.

Why do we hear so many complaints about pines growing out of the land and falling over? In many cases it is more the fault of the grower than of the plant, and I am quite convinced that the practice of planting pines in badly ploughed land at the bottom of furrows 6 to 9 inches below the surface does not obviate the trouble, but rather increases it. The point I wish to emphasise is the absolute necessity of thorough mixing of the soil down to a depth of about 10 inches, and not more than 12, as the other extreme is just as bad and would result in the turning up of sour subsoil, which would be injurious to the pines. If this method of preparing land is carried out, some of that surface soil which the plant is so fond of will be carried to a depth of 10 inches, and a greater incentive will be set up for the plant to root freely and forage for a living. Loose soils require this process just as much as heavier ones. There is also the benefit of a better drainage where the land is ploughed to a good depth. Too many of our pines are rushed into the land, and the future is lost sight of. I would suggest that at least six months be taken to prepare the land, and where three ploughings are used, that they be not less than one month apart. The value of allowing the soil to enjoy the benefit of contact of sun and air, and the sweetening process that must of necessity follow, are facts that are overlooked by most growers.

PLANTS AND PLANTING.

We now pass on to the question of plants and planting, and I regret time will not permit of my giving the subject of selection of plants all the consideration it deserves, as it is here, in my opinion, that a wide field of possibilities is opened up to the growers of pineapples. In the first place, the indiscriminate planting of anything in the shape of plants, having no regard for physical defects, such as cripples, and more or less barren plants, is a matter for serious thought. Let me observe a grower's method of planting, and the class of plants he puts in, and I will give you the future of that garden, and the grower that walks about and tells the new beginner that any plant will do, and that these defects will grow out in his pines, is the greatest enemy to the industry that it is possible to find. These remarks apply with a great deal more force to rough and Ripley pines than to smooth leaf. The smooth leaf variety is not subject to deformity, but has all the other defects. Bearing in mind every time the future of my garden, the first essential towards this is a low-set row of plants of uniform growth and type, which can only be obtained by the planting of the true suckers about six to nine months old. I am aware that there are those amongst you that will join issue with me on this question, and to those I would say, that these observations are not the results of single rows, but of careful experiments carried out in plots of pines, not less than 5 acres each, of the different class of suckers, and over a period of six to ten years, which is here regarded as the period of usefulness of a pine crop. One of the greatest troubles to guard against is the growth of huge abnormal plants previous to the first bearing, and where this occurs, the utility of this plant is destroyed. In some cases, all the growth will go into slip, and I have seen cases where there has not been a single sucker six months after fruit was cut.

These abnormal growths always produce their suckers from 6 to 9 inches above ground, and the future of that row is a doubtful one.

I admit that there are exceptions, but slips, and tops especially, are undoubtedly more prone to this habit than any other class of plant. Where slips are planted, a great deal of benefit is derived if these plants are put out thickly in a nursery for about six or nine months, and then removed to their permanent home. In this way excessive growth is checked. The planting of tops in their permanent rows can only result in early failure, and should be discouraged by every practical grower. There is still one other class of plants, known as butts, and plants from which fruit has been cut, and I regard these as the worst type of plant one can put in. My reason for so doing is that this class of plant has spent its energy in the production of its fruit, and is not a fit subject to become the parent plant of future generations. Of this much I am certain: It will not produce a vigorous foot growth, and in every case the first sucker it produces will be so loosely attached that a good breeze will blow it over.

These plants also develop what I term the "corkscrew root," and result in faulty patches all through your rows. This system of rooting is simply the result of this butt being three or four removes from the parent plant, and it is impossible to get its roots into the soil, and as a result the roots wind themselves round and

round the butt of the plant and simply choke it. I have pulled out scores of these plants after a period of two years, where condition and soil have been as nearly perfect as possible, and found that where this corkscrew root is planted so it continues, with disastrous results. I know of no disease in pines in our State beyond defects that can only be described as a condition set up in many cases by sheer neglect. I am of the opinion that a fortune awaits the grower who is prepared to carry out a thorough system of selecting and propagating pine plants of highest order. Again, let me say that the absurdity of propagating from a parent plant that is producing small and deformed fruit, also shy bearing and other defects, is too patent to everyone and against all laws of Nature. I believe it pays to clean a few leaves off the bottom of plants when planting, as I am a great believer in starting the plant off with every advantage that it is possible to give, and, small though this may appear, the great factor is root growth, and it certainly encourages this. I am very much opposed to the hard trimming of plants, except in cases where plants have to be carted long distances. Plants that are hard-trimmed and planted late in the season, just previous to winter, get such a check that it takes a year to recover, and I have known some of these plants to even die. I have never yet known an untrimmed plant to die, and I would ask you to draw your own conclusions.

It is a well-known fact that pines draw a portion of their living from the air, otherwise how could a plant live and make an attempt at growth when it is hung upon a wire fence?

Wherever possible, I would always plant my rows running north and south, as in this position every plant gets the full rays of the sun at some period of the day. Rows running east and west will always show more failures on the southern side of row. Rows as near as possible 3 chains in length facilitate easy handling of fruit.

I am opposed to surface manuring of pines for at least the first two years, and where it is felt that the ground is not capable of producing its first fruit without some assistance, then manure, preferably bone dust, should be placed under the row before planting.

We now pass on to methods of planting, and just here I should like to state that I have never yet seen any good result from deep planting, but rather a great amount of harm. Deep planting must always result in retarded growth till such time as the plant gets into its natural position, and the deep planting of pines in poorly prepared land is starting at the wrong end. I would plant in a moderate furrow, drawn by a one-horse plough, and cover the plant to not more than 3 inches below the surface. I consider it advisable to plant all the rough leaf family in single rows from 9 to 12 inches apart and 8 feet between rows. Smooth leaf in double rows, about 12 to 15 inches apart each way, and also 8 feet between rows.

The chief point to be observed is, that all the rough leaf tribe sucker too freely, and the dense rows of plants do not always produce the most fruit. On the other hand, the smooth pine grows too rank, and, as large pines are undesirable, to obviate this it is wise to crowd the plants and check the growth. It may be argued that 8 feet between the rows is too close to allow of proper cultivation when the rows close in. In more recent years it has been found that better results can be obtained by replanting at an earlier stage. Generally speaking, the yield of pines increases annually up to the end of the first five years after planting, and after that period of time the quality of pines is on the down grade, and the percentage of barren and shy-bearing plants is a growing quantity.

PRODUCTION.

I am fully persuaded that nothing is to be gained by hanging on to a row of pines when their vigour is waning, and would advise to cover up the land with close planting, and the early replanting of same. This will give a more uniform grade of pines and a better yield, which are two very desirable features.

MANURES.

We now come to the question of manures, and to this I can apply myself very forcibly, as I have always been a great believer in systematic manuring, and any success that has attended my efforts as a pinegrower has been solely from this cause. The grower who fails to keep the wants of his plants supplied is not alive to his own interest, and will soon pass out. He will tell you that there are other crops that pay better, and you will find every crop under the sun growing between his pines—to say nothing about the weeds.

We will now pause for one moment to consider the strain that is placed upon the land with our climatic conditions in the growth of pines. Here we have a mass of growth averaging, when in good vigour, from 60 to 80 tons per acre, making a

demand from the soil and producing, without a single break, every day in the year. Is it to be expected that the pine can go on indefinitely performing these functions without some assistance?

Since the supply of potash has ceased, growers have been faced with great difficulty in supplying the wants of the plant, and there has been a general rush for lime during the last twelve months. I would here sound a note of warning to the grower who puts lime into his land solely as a manure. I agree that there are benefits to be derived from the use of lime, and in its place it serves a useful purpose in the sweetening of our soils and the neutralising of some of the acids where the drainage is not of the best, such acids being very injurious to the growth of pines. At the same time, let it be remembered that lime does not enrich the land, and it is only where there is a deficiency of lime in your land that the plant will make use of it as a plant food, and, personally, I am not prepared to accept the statement that lime is a fertiliser and a direct plant food, and practical use of lime must be carried out with a free use of fertiliser at the same time, and the free use of lime, without first ascertaining whether your soil requires it, is surely a gamble. I have previously pointed out that, especially with the smooth pines, a moderate growth is desirable up to the period of production of the first fruit, and we will now take up the running.

Now is the most critical time, as far as that plant is concerned, and a golden opportunity for the grower who knows his business. The plough should be run along at a depth of about 8 inches, and 9 inches from the plant, and a furrow thrown away from the row. Into this furrow I would put, per acre, not less than 15 cwt., and, if possible, one ton of meatworks fertiliser showing the greatest percentage of dried blood. My sole object in manuring has always been the future utility of the row and the production of intermediate pines. The poorly fed rows of pines, with their lack of vigour, wait for the most favourable opportunity to produce their fruit, and these two periods each year are glut ones when low prices prevail, and intermediate fruit, and consequent high prices, are conspicuous by their absence. On the other hand, where the row is well fertilised, and surplus energy is produced, plants are forced out of their usual order, and you will find suckers not only making their appearance when the plant is fruiting, but also popping out here and there, and in many cases springing from below the surface of the ground. These plants bear their fruit very largely in the order in which they make their appearance, and are the sole factor to the future success of your garden.

In the application of manures, it should always be remembered that very little, if any, value is obtained by the plants for the first three months after applying same. There are two periods in the year when we can plough freely in pines, without the danger of knocking off a lot of the fruit which hangs on outside of rows. These months are March and April, and September and October. The former months, in my opinion, are the most desirable, as they help to warm up the land during the winter, and when the spring arrives, the manure is available, and no time is lost by the plant in making use of it at a period of the year when two-thirds of your growth is produced. On the other hand, when manure is put in at the spring of the year, very little good can result, as the best season for growth in the year has been disturbed, and the manure is no sooner available than winter is here, and one has to wait until the following season for results. The practice of applying a little manure, and often, does not meet with my approval, and I very much prefer the one good dressing annually at abovementioned periods. My reason for so doing is that to get value with every application of manure there must be thorough cultivation and working of manure into the soil, and after this is done the plant will require a period of rest to enable it to lay hold of the new supply of plant food. No language is strong enough for me to express my disapproval of the system of middle crops in pines, so prevalent, and to me it is an abomination. Where pines are only a side line, and rows are to be used as a preface to run tomatoes, and other crops, it is all very well, but where the object in view is the establishment of a permanent pine garden, this practice is absolutely suicidal. With the exception of bananas, there is no other crop which makes so great a demand upon the land as pines, and I know of no crop which is so uniform in its yield in and out of season. Drought has little or no effect upon the plant, and grown under proper conditions, it gives the best returns of any crop that can be grown in Australia. These are not mere theories, but undisputable facts. It is a well-known fact that virgin land with a rich supply of humus is of more value to the pine plant than all the artificial means that the growers can bring to their aid, and the point that I wish to emphasise is the necessity of conserving this humus, and not allowing it to be used up by middle crops yielding doubtful profits, but rather to retain it in the soil for the use of the pine as it increases its demand upon the soil. The tomatoes are the greatest offenders in this respect, and not only rob the pine of its food, but, where the foliage is allowed to cover the pines, they simply poison the plant, and the failure of that row of pines is certain. Then again,

the preparation of the land for these middle crops usually takes place in the middle of winter and soil is gathered away from the row to form a nice bed in the centre. Roots of pines are laid bare with open furrows at a period of the year when every plant passes through a crisis, and permanent injury to the constitution of the plant must follow. My advice to every grower is, first of all, to determine what his ground is adapted for, and grow that crop pure and simple. We hear a lot of so-called experts who tell us not to put our eggs in one basket, and the more crops we have, the more chances of success. Don't be led astray with this nonsense is my advice. Cast your eyes around in every walk of life, and you find the man who is making the greatest success of his business is the man who specialises and concentrates the whole of his energies on the one object. I have a good general knowledge of the success that has attended the efforts of the leading fruitgrowers of Queensland to-day, and I say, without fear of contradiction, that single purpose and one crop have been the principal factors of success. I am very much opposed to the ridging of pines, and advise all growers to cultivate on the flat principle. I ask you, in accepting this statement, to keep in mind my practice, as elaborated earlier in this paper, of establishing a low-set row under proper conditions. The principle of packing 6 inches of soil against a row to keep the plants from falling is absolutely wrong. It is both important and necessary that plants should fall, and make their own root growth direct to the soil. Imagine a row of pines six years of age growing straight in the air with several feet of dry shanks, and only one aged system of roots through which the production of all fruit must come, and you must feel at once with me in this statement. Undoubtedly the process of falling is necessary, and the evil lies in the first sucker having too far to fall—in other words, your first growth will determine the life of that plant, and no amount of ridging, or, in fact, any other method, will overcome this defect. When the sucker has fallen, it has its roots out in readiness, and these at once fasten on to the soil, and that plant takes a new lease of life and its real productiveness begins. This is a critical stage in the history of every row of pines, and after this process is properly overcome, the growers' returns immediately double themselves. If the ridging of pines is begun the second year after planting and continued yearly, the position soon becomes unbearable, and can only have the effect of further forcing the plants out of the ground. It will also be found that where this practice is in force, the roots of pines will grow out on to the surface of this ridge on outside, and where roots come on to the surface in this manner, pines will never do well. I believe in one good ploughing between pines annually, and plenty of scuffling with the Planet Junr. with wide sweeps in between times. When the annual ploughing takes place, I do my manuring, and for this purpose I trim leaves hard back to as near the stalk of the plant as possible, taking care in this operation not to cut the top leaves, but cut at an angle close in at bottom and wide at top. My reason for this is to keep the surface of the ground clear of the heavy mass of leaves which the growth of the plants has to pass over as the row extends. Where trimming has been neglected, it is most noticeable in the pulling out of old patches of pines that the roots have travelled all over this layer of leaves and failed to get through, and very much resemble a fibre door mat. This point is a very important one.

Some growers are to be found even to-day who tell you that pines do not require ploughing, and that it is injurious to them, and to that statement I would reply, that the man that does not plough and work his pines will be the first to plough them out. Methods of cultivation are very simple. After the trimming of plants, open furrow away from the row about 6 inches deep, fill in manure, and plough back and finish in centre of row. Your row will now be ridged. Leave in this condition for about a month, and then run the scuffler one turn up each side and pull soil down. By the end of the year your soil will be quite flat, and you repeat the operation. Don't wait till you see the weeds in bloom before you start your cleaning. It may rain, and a hundred other things happen to prevent you carrying out the work, and before you know where you are you have enough seed to keep you in constant work for years. The plough is the only implement that will take weeds up, and the use of all scufflers should be to prevent weeds from growing.

Let me say, in conclusion, that I shall feel rewarded for any trouble I have taken in the preparation of this paper if, as a result, I could instil into growers generally the fixed idea of thoroughness, and always the absolute necessity of providing for the future. My whole being, heart and soul, has been for many years, and still is, wrapped up in the pineapple industry. I have been surrounded for years with nothing but pines to my very doorstep, and lived for nothing else other than the careful observations of the habits of the plant, and the carrying out of the careful experiments with all classes of plants, manures, and methods of cultivation.

A FEW HINTS ON STRAWBERRY GROWING.

BY WILLIAM FRENCH.

Mr. French, who is a successful veteran strawberry grower at Wellington Point, wrote a very informative article on the cultivation of the strawberry, which was published in this journal in January, 1911. During the succeeding years to date he has been continually experimenting with a view to improving the standard of this favourite fruit. His ripe experience, as detailed in this issue of the journal, should prove of great value to those already engaged in this industry, as well as to beginners.

Mr. French writes:—

The strawberry belongs to a genus of low perennial stemless herbs, with runners and leaves divided into three leaflets; calyx open and flat, petals five, white; stamens ten to twenty, sometimes more; pistils numerous, crowded upon a cone-like head in the centre of the flower; seeds naked on the surface of an enlarged pulpy receptacle called the fruit.

It belongs to the great rose family, and the name of the genus is *Fragaria*—from the Latin, *fraga*, its ancient name.

Fragaria vesca is the wild strawberry of Europe; *Fragaria californica* is found growing on the mountains of California; and another variety, *Fragaria chiliensis*, is also found growing wild in Upper India, and is also found wild in Germany.

Therefore, by cross-breeding and fertilisation, those wild weeds, as you might call them, have been raised in thousands of varieties, and to-day the cultivated strawberries rank as one of the leading first-class fruits of the day, and I believe they can still be greatly improved in size, flavour, and productiveness, by which, instead of giving us a harvest of six months' picking, they can be brought to fruit for eight or nine months. Taking into consideration the small plants and the amount of fruit they produce, I consider them a marvel, but "much always wants more." How the name of strawberry came to be applied to this fruit is unknown. Some say it was because children used to string them upon straws to sell; others believe it arose from the practice of placing straw around the plants to keep the fruit clean. But there is nothing conclusive on this point. The strawberry does not appear to have been cultivated by the ancients or even by the Romans, and it is only within this last hundred years that there has been any improvement in the varieties under cultivation.

FIELD CULTURE.

SOIL AND PREPARATION.

In my opinion, the main point to be observed is to secure a depth of soil with good drainage and plenty of nutriment for the plants. If planting in new soil, give nothing less than two ploughings, say, 4 inches deep. After the first ploughing allow the land to lie exposed to all weathers for a month or two, after which give a good harrowing across the furrows, and after a few days run the roller over to break all lumps, the reverse way of harrowing. Then give a second ploughing, nothing less than 8 or 9 inches, or deeper, if possible. Better still, run the subsoiler after the plough, as I find it to be of great advantage in allowing the roots to penetrate deeper, and also in retaining moisture against dry spells.

EXPLOSIVES.

In reference to subsoiling by explosives, I have had good results simply by making a hole 18 inches deep with a crowbar about every 9 to 12 feet apart, attaching a detonator and fuse to a plug of explosives in each hole, and then light, which I consider is a very good way to obtain splendid results, especially when the subsoil is of a stiff nature.

Let it lie for a week or two exposed to the atmosphere. Then, after a shower, roll again, and, if required, harrow again, to make sure that the soil is properly pulverised, as this is, I consider, the foundation of success, and therefore a most important point is to have the soil under proper tilth, or, as the saying is, to have the soil like an ash-heap, so that the roots of the plants can lay hold of the soil at once after they are planted. If the soil is left rough and lumpy, the roots cannot get to work. Therefore, after a few days of wind and sun the plants are parched up, and hence the aggravating work of filling up misses, which I consider is very disheartening and a serious loss of time. New soil is greatly improved by growing a crop of fodder, say, oats, barley, or cowpea, which, if not required for feed, can be ploughed in as a green manure, by which means you will find your soil will work as mellow again.

SMALL GARDEN CULTURE.

Trench the beds about 5 feet wide and 18 inches deep. If the subsoil is of a clayey nature, leave it at the bottom of the trench, but if fairly good mix it with the top spit along with plenty of vegetable matter, rubbish, &c. Let it lie for a month or more to mellow. Then fork and pulverise well until the soil is free from lumps. Now let it rest for a week or two. If farmyard manure is procurable, scatter it on the surface 2 or 3 inches thick, and fork it in well, so as to mix the soil and manure thoroughly. In a fortnight it will be ready for planting. Plant four rows in a bed. By having narrow beds, trampling upon the planted soil is avoided. Set the plants about 1 foot apart in the rows. Planting close in the garden necessitates replanting every year, whereas in field culture more room is given. Several varieties can stand for two years giving good results, by keeping the soil between the rows constantly cultivated, which I maintain must be done if good results are to be obtained.

PREPARING FOR PLANTING IN FIELD.

My plan is to draw out drills with the plough as deep as possible about 2 feet 6 inches apart, and put the manure in the trench. If artificial manure is used, draw a long-toothed rake along the furrow to mix the manure and soil well together. This is not necessary with farmyard manure; merely run the Planet Junr. between the drills to cover in the manure, and leave it as level as possible. If this latter point is not attended to, you will find that after heavy rain the plants in the hollows will be buried with their crowns too deep, and consequently they will be weeks before they make a start into growth.

MANURES.

The strawberry is a plant that will not refuse a fair amount of manure, providing it is presented in a proper form. My experience is that the plants make a start into growth much quicker, and are well established before the winter, where I use the farmyard manure, but I am sorry to say it is too scarce. The principal manure I use to plant on is bonedust, at the rate of about 10 cwt. to the acre. I find that by putting the manure well down below the surface it greatly encourages the roots to strike downwards, and the lower they get down the more moisture they obtain, and are thus not affected by the heat and drought half so much as when the roots are encouraged close to the surface. After the first crop is gathered I mix my own fertilisers, consisting of superphosphate, sulphate of potash, and sulphate of ammonia, in the following proportions:—Two parts superphosphate, 2 parts sulphate of potash, and 1 part of sulphate of ammonia. Make sure to break all lumps so as to have it well mixed, as this is an important part. I have a small hand plough, which I run along the rows, and it makes a furrow about 2 inches deep. Sow the mixture in the furrow, and by running the plough the reverse way it covers over the manure.

PULVERISED LIME.

I find of great benefit in fruit culture, especially in strawberry culture. With the continuous cultivation of the soil, it becomes what is called sulky—that is, it consists of a lot of hard lumps, instead of soil of a free and friable nature, and I find that condition to be most detrimental to such fine fibrous roots. I would advise about 6 to 10 cwt. per acre of pulverised lime to be scattered over the ground before the last ploughing is done.

PLANTING THE STRAWBERRY.

While it is impossible to fix a hard-and-fast time to transplant, as the seasons differ so much, I shall have to leave it to the grower's own judgment. If your ground is in good order and the weather showery, you can start on the 1st of March. I also prefer young runners. Some growers say they get the best results from old crowns split up, but that is not the case with me. I plant about 2 feet 6 inches between the rows and from 1 foot to 18 inches in the rows, to allow the horse and scuffler to go between the rows, so as to keep the soil always open, which I consider of great importance. In transplanting, some recommend shortening the roots by one-half. I consider this practice all right in the cooler countries, where the ground is, practically speaking, always moist and cold below; it is also a good practice in cases where the roots are allowed to get dry or are injured in any way. In such cases a clean cut would, in my opinion, be beneficial. My way of planting is to allow the roots to hang down straight in the hole, the deeper the better on account of coolness and moisture, provided the crown is not smothered. Some cultivators use a dibble for planting, making a round hole, into which the roots are thrust in clumps. Others just scratch a handful of soil off the surface and plaster it back on the roots, the latter lying in a horizontal position, instead of hanging perpendicularly in the hole. Plants might live under such treatment, providing we had showers every day, but careful planting with a trowel is far the better way.

VARIETIES THAT ARE DOING BEST WITH ME.

Phenomenal has stood for years, and is still good for box and jam work, being good in colour, size, and flavour.

I have a seedling which some in the trade call "Frenchii" and which I consider to be equal to any good box berry, with splendid colour and flavour, robust habit; also a long cropper and free from disease. As for jam-making, to use the words of a manager in a leading jam factory, "There is nothing to equal it."

Usher's Special.—There are many still growing this variety, which is late in starting to fruit, but it is a heavy cropper while in season. It, however, does not stand the wet.

Ettersburgh or so-called *Tree Strawberry.*—With me the name only bears any resemblance to its peculiar growth, this being the third year I have grown it. How the Southern people could give it such a name, I fail to see. I have always understood that nothing under 30 feet should be called "Tree." I cannot meet any grower who can say he has been satisfied with this variety. I have crossed it with my seedlings, and so far it is promising well.

Illawarra variety is, I believe, going to turn out good so far as it has gone, this being the first year I have grown it, but a friend of mine grew it last year with splendid results, the berries being large with a fine dark colour, good flavour, and the plant a good strong grower.

The following varieties, I am sorry to say, have fallen back since I read my last paper:—*Glenfield Beauty, Trollop's Victoria, Annetta, Marguerite, Federator, Pink's Prolific, Noble, Royal Sovereign;* and *Aurie,* which I consider was one of the best all-round strawberries in cultivation, I am sorry to say, is one on the wane. I should like to see Mr. C. Court, the originator of the Aurie, bring along another such excellent production.

PROFITS OF STRAWBERRY CULTIVATION.

Persons who have had no experience in raising strawberries for market are desirous of ascertaining in advance the prospects of profits on investments. Unfortunately for the would-be investor, results depend greatly upon circumstances, such as markets within reasonable distance, plenty of labour at moderate prices when needed, land at reasonable prices, also fertilisers, and favourable seasons. The greatest profit made in the cultivation of the strawberry is by small growers within a moderate distance of the towns, who have children to assist in gathering the fruit when needed. An acre of strawberries under high cultivation, with the fruit gathered and marketed in the very best condition, will often yield more clear profit to the grower than 10 acres under opposite conditions.

MULCHING.

Forest oak leaf makes a splendid mulch when procurable. If not, half-decomposed leaves would keep the fruit clean from grit, and also do a great deal of good in furnishing the plant with humus, which is a favourite of the strawberry.

Referring to planting old crowns, I have been making a further test this year with the Marguerite and Trollope's Victoria. A very good variety for colour. Then they took about a month longer to establish themselves than the young runners. Therefore, if the weather is dry, they are very unsatisfactory. Yet they came into fruiting first with a very light crop.

A FEW REMARKS ON SMALL FRUITS.

I consider there ought to be something done regarding the fixing of prices. For instance, for, say, jam berries, prices should be a little more regular than at the present time, so that growers and manufacturers could work with more confidence together, instead of carrying on this cut-throat competition, the outcome of which is certain to grind the hard-working tiller of the soil down, until eventually he is forced to give up growing the small fruits and take to growing large fruits, where less labour is required for cultivation and marketing. I consider this evil could be overcome to a great extent by a conference between manufacturers and growers, considering the demand for this fruit is about 400 per cent. higher than the supply, taking a manufacturer's own statement for it, and also the scarcity of same on our local markets.

STRAWBERRY INSECTS AND DISEASES.

Crown Borer (*Tyloderma fragariæ*, Riley), White Grub.—One-fifth of an inch long, boring into the crown of the plant in midsummer. The mature insect is a curculio or weevil. In reference to this pest, to the best of my belief, Australia is free from it.

Remedy.—Burn over the field after the fruit is picked. If this does not destroy the insects, dig up the plants and burn them.

Strawberry Leaf-blight, Rust, or Sun-burn (*Sphœrella fragariæ*, Sacc., including Ramularia).—Small purple or red spots appearing on the leaves. These eventually become larger, making the leaf appear blotched. Most serious after the first crop of fruit is picked.

Remedies.—Spray with Bordeaux mixture at intervals of two weeks, as soon as the fruit is picked. The leaves are easily destroyed, without injury to the plants, by quickly burning off a thin layer of straw, which is spread over the patch after the fruit is off.

I am pleased to say that we have several varieties, practically speaking, free of this disease. This includes also our locally-raised ones, which I have already made mention of.

The strawberry, as indeed all plants, takes certain substances from the soil—viz., "manurial ingredients." These may be defined as those substances from which the plant derives its supplies of nitrogen, phosphoric acid, and potash. Now, it must be remembered that all plants require adequate supplies of these three manurial ingredients, but different plants require them in different proportions.

For example, sugar-cane requires a great deal of potash, relatively little phosphoric acid, and much nitrogen.

An acre of strawberries will contain—375 lb. potash, 222 lb. nitrogen, 83 lb. phosphoric acid.

In 7 tons of farmyard manure there will be an average of—74 lb. potash, 77 lb. nitrogen, 57 lb. phosphoric acid.

Compare these figures, and it would be seen that farmyard manure would be a badly balanced fertiliser for strawberries, because in order to supply sufficient potash considerable excess of nitrogen would have to be supplied, and a very large excess of phosphoric acid; so that it would appear as if a much more economical manurial dressing could be prepared if, instead of farmyard manure alone, a combination of farmyard manure and artificial be used. But where farmyard manure can be produced on the farm, then, for a first crop, it is preferable to all other manure.

For strawberries, when farmyard manure cannot be obtained, a good dressing consists of—3 cwt. bone dust, 3 cwt. superphosphate, 1 cwt. dried blood, ½ cwt. sulphate of ammonia, 2 cwt. sulphate of potash per acre, or in these proportions.

DISTRICT FOR STRAWBERRY-GROWING.

The writer maintains that the district between Manly and Redland Bay is the most favourable in the State for strawberry-growing, considering it is practically free from hailstorms, and is seldom visited by those hot winds which injure the strawberries after the thermometer passes, say, 85 degrees Fahr. Quoting Bulletin 62 of the Central Experimental Farm, Ottawa, Canada:—"The first ripe fruit had been obtained on 16th June, and the last picking of the latest varieties was on 19th July. The province of Quebec is much later, the first fruit not being ripe until the first week of July, and the season continues to the second week of August."

SEASON.

Thus the strawberry seasons for the two provinces cover about two months. Just for the sake of comparison, I refer to the year after I read my last paper on this subject, 1909, when I took a prize for a box of strawberries at the Chrysanthemum Show, in Brisbane, on 23rd April, 1909. In the following February, about the middle of the month, I finished my season's crop by sending up a keg of strawberries to the factory. Thus only one clear month out of the twelve elapsed that I did not market strawberries. This, I consider, constitutes a record for a strawberry season in Queensland. I can only account for this by the raising of seedlings locally, because the plants are well acclimatised, and will stand the severe changes of the seasons. The North Coast Line seems to be falling off in strawberry-growing, and the growers are taking to larger fruits, in the cultivation of which there is less labour required. There

is certainly no crop demanding such constant attention as the strawberry; but, on the other hand, the grower has not to wait long before he receives the fruits of his labours. By planting in February or March, the early varieties will fruit in three months, providing the season has been favourable for planting and the ground in first-class condition. As to the yield from an acre of strawberries, there is a wide margin to come and go on, as some growers are more successful than others. One factor in the difference of yield is the different varieties grown. One variety will do well this year, yet in the following year the grower will find with the same variety he is 50 per cent. short on his returns. Another point to be considered is the method of marketing the fruit. Strawberries will not stand rough handling, especially during the heat of the summer. As to yield, I will endeavour to strike the happy medium, and set it down at from £80 to £100 per acre. Some, no doubt, will say this is too high; others consider it too low. Between the two I might, perhaps, find my average. Referring to the amount which each individual plant bears, the old average has been ½ lb. fruit to each plant, which I consider a very low average, because, if the ripe fruit on some plants is weighed, the half pound is arrived at without taking the whole of the season into consideration. Turning again to the Bulletin above mentioned, Mr. W. Wheeler, Concord, Mass., states that of some varieties he picked more than 2 quarts per plant. Now, roughly speaking, a pint is equal to 1 lb. in weight. That means that he picked, in round figures, 4 lb. per plant. Our ½-lb. average per plant was struck years ago, when the old sorts were grown, which are now discarded altogether as practically valueless. That will, I think, account for the difference. We may, therefore, reasonably put the average up to 1 lb. per plant. A table in the Bulletin gives the best average weight of 25 berries of 50 varieties at from 4¾ oz. to 8 oz. Our varieties, such as "Usher's Special," are so large that a pint box will only hold from 12 to 15 berries well packed. Allowing 12,000 plants to the acre, that would bring our yield up to 12,000 lb. per acre at the average of 1 lb. per plant, or 5¼ tons.

PICKING STRAWBERRIES.

This is rather a difficult subject to deal with, as a slight difference in the ordinary rates makes a wonderful alteration in the year's account. About two years ago strawberries could be picked for ½d. per lb., but of late 1d. is demanded by the pickers; so I engaged them by the week, and this seems to be satisfactory. Of course, the business pays best where there is a young family growing up. It not only pays better, but it is also healthier for the children than sending them to towns to work. Speaking from my own experience and from what I learn locally, there seems to be no serious difficulty in picking when pickers are engaged for the season. The cost of picking has, as I said, increased by 100 per cent., and the only way I can see by which to balance the account is to go on advancing in higher cultivation, resulting in larger crops and larger fruit, and that means less labour.

TRAYS, PUNNETS,* OR BOXES.

When the strawberry growers first took up this branch of agriculture around the metropolis, the majority used the trays for packing the fruit for market. One reason for this was that they could procure the timber on their own land, and split for themselves—a work which gave employment in making trays for wet days; but, as time rolls on, timber is getting scarcer and the demand greater, for where there was 1 acre of strawberries in those days there or 50 acres to-day. Of course, paper-box manufacturers were quick to note the demand for trays, and stepped into the breach with good results since. As time went on the more land went into cultivation, and the less time there was for making trays. I think that the pint boxes are a great deal more convenient for the shops and also for the individual customer than trays, seeing that the convenience of the public must be studied. If a person wishes to purchase, say, 1 pint or 1 quart of strawberries, the shop has to repack, which is most injurious to the strawberry. The less handling the fruit gets, the better for all concerned. In reference to punnets, I don't think they will ever come into favour in this State. Our great objection to it is the berries lying one upon the other. Some of the varieties will stand it to a certain extent, while others will not carry so packed. If one berry breaks the fruit starts to deteriorate, and, by the time the customer gets them, they are anything but enticing as regards flavour, size, or appearance. Of course, in England the climate is very different to that of Queensland. It is not often that they have a temperature of 80 or 90 degrees in the shade in which to pack strawberries.

* A punnet is a shallow basket used in the London markets, holding about a quart. A pottle of strawberries is a large tapering basket holding rather more than 1½ pints, although it is supposed to contain half gallon.

Viticulture.

THE OHANEZ GRAPE.

THE MAKING OF A BIG INDUSTRY.

When one considers the importance of the fresh grape export trade from Spain to the London and continental markets, and makes allowance for the fact that this huge trade is conducted under what we might term adverse conditions as regards the season of the year when these grapes are offered for sale, it becomes at once clearly evident that could this class of fruit be offered to the British, European, and North American public in the summer months instead of the depth of winter, that the resultant trade would be of far greater dimensions than that already attained by Spain.

The exportable variety of grape is called "Ohanez," though it is more popularly known as Almeria to the British buyer, on account of the heavy shipments of the "Ohanez" variety that come from Almeria in Spain. It is important, however, to distinguish this variety by its correct name.

The export of grapes from Spain begins about July of each year, and continues until December, and during this period some 2,353,000 barrels are shipped. A Spanish barrel contains 53 lb. net of grapes. This will give some idea as to the extent to which this trade has developed.

Australia is so situated geographically that it can supply the markets of the Old World with fruits when the home market is bare, and noting the importance of the grape industry and the scope for development in Australia, the publishers of the "Fruit World," in order to test the carrying qualities of the "Ohanez" variety of grape, arranged with Sir John (then Mr.) Tavernor, the Victorian Agent-General in London, at the end of 1908 to send a keg of "Ohanez" grapes to Melbourne.

An ordnary keg of Ohanez grapes was purchased from the thousands of barrels arriving at that season. This barrel had been shipped from Almeria in October, 1908, and was reshipped for Victoria as *general cargo*, and arrived in Melbourne on the 8th December, 1908. When opened up the grapes were found to be in a perfectly sound condition. (See illustration.) A report published at that time (*vide* "Fruit World," 23rd December, 1908, pp. 344-347) states *inter alia*:—

"The keg of Ohanez grapes from Almeria, Spain, *viâ* London—over 12,000 miles—was opened up at the Department of Agriculture on the 8th December, 1908, in the presence of Mr. Duffus, Secretary for Agriculture; Mr. F. de Castella, Government Viticulturist; Mr. J. G. Turner, Chief Inspector of Fruit; Mr. T. Thomas (Thompson, Thomas, and Co.), and others, also representatives of the daily and weekly Press. . . . Everyone present was delighted with the experiment, which is in reality an object lesson to Australian growers and is sure to pave the way for further developments. . . . The fruit, as illustrated, is very handsome, the flesh is firm and sweet, and when sampled the taste was as fresh and pleasing as if picked the same day; in fact, the bloom was still on the fruit, though picked over twelve weeks.

"Besides its high quality and carrying powers, it also has the distinct advantage of being mould resistant.

"According to Mr. de Castella, the Ohanez variety ought to thrive in Northern Victoria, where the air is drier than that of Almeria, and the resistant character of the Ohanez grape would be well developed.

"*The advantage to Australian growers would be the obvious one of being able to place the fruit on the markets of the other side of the world when Spanish grapes would not be available.*"

A well-known Melbourne wholesale fruit merchant, who has also had experience in Covent Garden Market, England, stated at the time:—

"It will be noted that the Spanish grapes arrive in England *in the winter*. Grapes sent from Australia would arrive *in the early summer*. I have advocated for years the planting of the Ohanez grape vine for the purpose of marketing the fruit across the sea."

OHANEZ GRAPES IN VICTORIA.

The foregoing experiment paved the way for the establishment of the export grape industry in a small way, and considerable success has followed the efforts so far made. The illustration showing a case of grapes is indicative of the quality of the Ohanez under Victorian conditions: the white disc on the illustration is a half-crown, and by comparison the size of the berries can be seen to advantage.

That Australian-grown Ohanez grapes are viewed with favour in the markets of the old country has been demonstrated. What was termed as a "mild sensation" at the time was caused by an Australian grapegrower exporting 228 cases of grapes by the R.M.S. "Otranto" in 1910 which were sold on 14th May in London. The Ohanez grapes brought 21s. to 22s. per case. Two other varieties exported at the same time—namely, Flame Tokay and Purple Cornichon—also brought good prices. A consignment of 104 cases of Ohanez grapes by R.M.S. "Mongolia" in the same season sold at 15s. to 33s. per case. The case here referred to contains approximately 25 to 30 lb. of fruit.

The following comparison with regard to Ohanez grapes will be noted with interest:—

Country of Origin.	Time of Arrival in London.	Prices per lb. Wholesale.
Spain	Winter	2d. to 4d.
Australia	Summer	9d. to 1s. 0½d.

Victorian growers have received gross returns of from £150 to £200 per acre from this variety.

PACKING THE GRAPES.

The *granulated cork* in which the fruit is packed is very cheap in Spain, being milled from the waste. There would be no difficulty in Australia in obtaining this commodity. Grapes so far sent from Australia have been packed in cork dust, which is regularly advertised for sale.

A prominent expert has pointed out that the climate of Victoria and that of portions of the Spanish Peninsula where cork trees are grown are very similar, and that there are opportunities in Victoria for the still larger development of the cork industry. In Portugal, where there are 525,000 acres of cork trees, producing 50,000 tons of cork, valued £820,000, there are Australian gum trees growing side by side. The cork tree is also valuable from the standpoint of beauty and their usefulness as shade trees. They are commercially valuable for producing cork from ten years of age.

EXTENSION OF THE INDUSTRY.

To develop the grape industry, it is necessary that larger areas be planted in order that there shall be a sufficiently large exportable quantity to command the attention of buyers on the other side of the world, and that these supplies be maintained regularly each season.

A prime necessity for the development of this industry is suitable land, convenient to railway and having an assured water supply.

In this connection a valuable opportunity has been made available by the Australian Farms, Ltd., King street, Melbourne, a company which has already done much to place settlers contentedly on the land, and which is to be congratulated on its latest progressive move with regard to the development of this highly profitable and important realm of viticulture. The Australian Farms, Ltd., have secured an area suitable for the cultivation of the Ohanez grape, the site being on the borders of Kangaroo Lake in Victoria.

Irrigation is available throughout the property, while there is a railway station in close proximity to this land, which is to be subdivided.

With a view to putting this splendid proposition before intending settlers, this company's representative, Mr. R. V. Billis, has left for London, and his London address will be care Mr. W. Delap Goslap, 128 Hamilton House, Bishopsgate, London, E.C.

Australian Farms, Ltd., propose to offer prospective settlers facilities on the following lines:—The company will plant out under expert supervision any area desired by the settler, and until such time as the settler can make the necessary arrangements to reside thereon. The company will provide skilled labour for the cultivation and care and attention required to bring the planted area to a bearing stage, which will be about three years. Having reached a productive stage, it is the intention of this company to provide suitable facilities for the marketing of the crop. Under this method of settlement, with terms and conditions sufficiently easy, the way is open for persons with limited capital to safely and comfortably establish themselves in a profitable going concern.

Apiculture.

MODERN BEE-KEEPING.

We are assured that the Dutch bees now being brought over to this country by the Board of Agriculture will do a great deal to prevent the Isle of Wight disease, but is is very hard to find the slightest scientific support for this rather blatant optimism (writes "An Old Bee-keeper" in the London "Chronicle").

As a practised bee-keeper, I begin to wonder whether the thin machine-made bar-frame hive does not lie at the root of the trouble. We have to remember that bar-frames are made to suit the convenience of the owner of the bees; the bees themselves are not consultd.

Now, in the old days, bee-keepers who kept their stock in straw skeps talked a lot about what they called the May pest, and as far as I have been able to gather, it was a mild form of Isle of Wight disease—in all probability *Nosema apis* was there, but was not as virulent as it has proved in the past few years.

Influenza in the early Victorian times was an affair to laugh at—witness the very earliest volumes of "Punch." To-day it kills its thousands, and leaves a clear road for other diseases. I think that we laymen who lack all scientific knowledge are justified in believing that the intensity of epidemic diseases may vary greatly with the years.

THRIVING COLONIES.

I have noticed in the past few years that bees in church towers and house walls have not suffered. Where the colony lived it still thrives and the swarms that issue are healthy and hardy. Why is this? In all probability, the place they have chosen is warm and dry in winter. The old skeps, for all their disadvantages, could be kept in like state, and in the hands of experienced owners, the bees chosen for survival wintered well.

To-day the most of the bar-frame hives in use are made by machinery, turned out by the hundred. The wood is not always well seasoned; it is sure to be thin, and when winter comes, does not avail to keep the brood box warm. This, at least, is my experience, and it has led me of late to double the normal thickness of the hive floors.

An expert of my acquaintance goes further than this. He claims, and with every justification, that hives should not be kept standing a few inches above the bare earth on cold, heavy soils. He thinks a little concrete or a well-ventilated wooden floor, would probably help to keep the hive warm, and the roof is as important as the floor. The damp may get through and reach the covers under which the bees are wintering. If this should happen, the weak bees will die, and those that remain will not be in the necessary numbers to maintain the proper temperature of the hive.

SOCIETIES, SHOW DATES, ETC.

The Show of the Herbert River Pastoral and Agricultural Association has been postponed from the 8th and 9th August to the 12th and 13th September, 1919. J. W. Cartwright, secretary.

At a meeting of members of the Central Warrego Pastoral and Agricultural Association, Charleville, it was decided to abandon the Show for this year.

NOTE.—Barmoyea, *viâ* Rockhampton. The Caves Farmers' Progress Association to be altered to—THE CAVES:—Cave Farmer's Progress Association, North Rockhampton.

WARWICK.—The next Annual Show of the Eastern Downs Horticultural and Agricultural Association, postponed from 13th and 14th May, 1919, will be held on 10th, 11th, and 12th February, 1920.

Dairying.

HOME MILKING COMPETITION.

The home milking competition, usually carried out in August, during the Show of the Queensland National Association, was proceeded with notwithstanding the abandonment of the Annual Exhibition. The results of the competition on the farms of the competitors were as follows:—

AYRSHIRES.

Anderson, J., Jeanette R. III. of Invercauld, 6.75 commercial butter, 1.
Livingstone, H. McD., Young Duchess 4th, 6.65, 2.
Anderson, J., Garnet VI. of Invercauld, 4.24, 3.

JERSEYS.

Grasmere Stud, Floss 6th of Grasmere, 5.622, 1.
Carr, W. and D., Larkspur (imp.), 5.13, 2.
Grasmere Stud, Golden Lily 4th of Grasmere, 5.015, 3.

MILKING SHORTHORNS.

O'Connor, B., Wakeful of Oakvale, 4.57, 1.
Cochrane, J. F., Orange of Newholme, 3.35, 2.
Cochrane, J. F., Victoria of Dunmore, 3.00, 3.

ILLAWARRAS.

Wade, J. H., Alma of Wadevale, 6.70, 1.
Lawrence, M., Charmer II., 6.07, 2.
Biddles, P., Gentle, 5.37, 3.

GUERNSEYS.

Crowther, G. H., Princess, 3.66, 1.
Crowther, G. H., Ena, 2.68, 2.
Crowther, G. H., Ivy, 2.42, 3.

FRIESIANS.

Hoskins, S. R., Aurora of St. Gwithian, 4.19, 1.
Newman, Geo., Molly of St. Athan, 4.04, 2.
Newman, Geo., Belle of St. Athan, 3.60, 3.

For the special prizes presented by Messrs. Sidney Williams and Co., Ltd., for the cows in the whole competition giving the highest percentage of commercial butter in forty-eight hours:—

Anderson, J., Jeanette R. III. of Invercauld (Ayrshires), 1.
Wade, J. H., Alma of Wadevale (Illawarras), 2.

The necessity of accuracy in making an entry for the competition is shown by the fact that, owing to an irregularity in this respect, the Ayrshire prize would have been won by Mr. F. A. Stimpson's Ayrshire Cow Thyra, her record being 6.88.

HIGH PRICES FOR FRIESIANS.

At a cattle sale at Aylesbury (England), last month, record prices were paid for Friesian cattle, when forty-eight head averaged £524. One imported cow fetched 5,000 guineas and another 3,000 guineas. An English-bred heifer, two years old, sold for 1,650 guineas, another for 1,200 guineas.

PIGS AND THEIR MANAGEMENT.

The dairy industry has made rapid strides, and our butter realises high prices on the home market. Why not make an effort, and try and capture some of the pork trade? There is no spot in the world more adapted to pig-raising than Queensland. We have no severe long winter to contend with, such as in Canada, Denmark, and China; we can breed pigs here all the year round, with little or no shelter, and have many fine winter crops, such as lucerne, rape, &c., on which to graze our herds of swine. With a little judicious management pigs give a better and quicker return than any other class of animal. Brood sows and good sires can be purchased at reasonable prices; they can be cheaply provided for, and in this State they are particularly free from disease.

We have in Queensland to-day, many good pigs of the various well-known breeds, the most popular perhaps being the Berkshire, a pig that has become acclimatised, and suits himself well to the surroundings under which he is kept. In many cases it is wonderful he does as well as he does, under the conditions often obtaining on some farms. It is a symmetrical pig, a good grazer, it fattens rapidly, and if kept growing from its babyhood should be fit for the bacon curer at from 5 to 6 months, and weigh, dressed, 100 to 120 lb. Colour black, with white blaze on face, white feet, and white tips to tail, medium size, head broad and fleshy, well-dished face, thin, pricked ears, rather inclined forward, jowl full and well into the neck; chest wide and deep, back long and straight, rather inclined to arch. (Avoid hollow-backed pigs.) Ribs well sprung, belly full and thick, hams broad, deep and fleshy down to the hocks, legs short and straight; with good bone and well set apart. Action smart and active; a good thrifty, all-round pig.

The Berkshire is a docile, quiet-tempered pig, when properly cared for, and the quieter you can keep your pigs, the easier they are to handle; and quietness is always conducive to laying on of fat.

The Berkshire crosses well with almost any of the other known breeds, especially the Middle White Yorkshire, Tamworth, and Large British Black; for preference, the cross with Middle White Yorkshire. This cross produces good lengthy full-hammed, thrifty, early-maturing pigs. The Berkshire-Tamworth cross makes a splendid bacon pig, early-maturing, good length, strong constitution, and a good meaty pig. In selecting Berkshires, avoid the short lardy pig. Always look for good length, a straight strong back, good full hams, arched strong loin, and a good under line. Berkshire sows are good mothers, fairly prolific, 8 to 10 being considered fair litters. In some cases 12 and 14, but it is better to have a good litter of 8 than of 12. The sow will rear the former well for you, whereas the bigger litter will probably leave you with several runts.

A SUITABLE CROP FOR GRAZING.

Perhaps of all the crops in this State, lucerne ranks first, and Professor Henry says: "Lucerne is destined to become a factor of the greatest importance in pig-feeding operations wherever that wonderful plant will grow."

Lucerne is a most suitable crop for grazing brood sows and young pigs on. Sows grazed on lucerne produce good, strong, healthy pigs, and are in a better condition for farrowing and suckling their young if allowed the run of a lucerne paddock up to the time of farrowing. Young store pigs make rapid growth, forming good bone, muscle, and tissue, when allowed free access to a lucerne run, and fed with a small amount of grain. A lucerne paddock should have had at least three or four cuttings taken off it before allowing the pigs to graze it, as the plant becomes stronger and will stand more than a field of young lucerne. Pigs are particularly fond of lucerne, and it is wonderful how well they will do on it even without other feed.

Green lucerne cut and fed to sty pigs when put in to fatten is greatly relished, and is a valuable adjunct in the mixed ration, as it keeps their blood cool and their digestive organs in order. In a good season pigs will put on condition quickly when running on lucerne, and get very fat; but these are not suitable for producing bacon of the best quality. They must have grain if you want good firm meat and fat.

Green barley, wheat, oats, rye, broad-cast maize are all well suited for grazing on, and well worth your trying for brood sows, weaners, and stores. If allowed the run on these crops they will do well and make good growth; and, if the crops are allowed to ripen, they are still more valuable, as you can run your fatteners on them, or gather the grain, just as you please; but the greater profit will be gained by allowing the baconers to do the harvesting. Maize plots, with pumpkin patches sown between, perhaps make the best fodder areas of all. Mr. Potts suggests planting

some of the climbing varieties of cowpea in the maize rows. This is a splendid idea, as peas are a great addition and furnish the very best of food for producing a high-class bacon. Pigs fed solely on maize in the sty produce an oily fat; but if allowed the run of a maize paddock, they get more exercise, pick up grass roots, weeds, and herbage, and do far better, and produce a firmer, better class of meat and fat. You will probably argue, "Shall I get any better price if I produce this class of animal?" You will say a fat pig is all that is required, but such is not the case. Buyers are always open to give a better price for a good, firm, meaty pig, well topped off, than for a soft, lardy or blubbery pig. Many feeders wonder how it is so many of their pigs go down, or off their legs, when crammed with maize. It is easily accounted for; maize does not produce good muscular development and strong bone, consequently young pigs cannot stand the strain and naturally give way. The remedy, then, is to see they get a good mixed food, such as skim milk, whey buttermilk, peas, sweet potatoes, barley, wheat, oats, pollard, rape, lucerne, or other green feed

DAIRY PRODUCTS AS PIG FOOD.

Skim Milk, Butter Milk, and Whey from Factories.—Owing to the enormous expansion of our dairy industry, these foods are used by nearly every pig-raiser in the State, and form a valuable food when used with other farm products. Skim milk ranks first, being of high value as a flesh-producing food; but to get the best results it should always be fed with grain or pollard. It is not wise to use skim milk straight from the separator. Better let it rest an hour or so, to let the gas work from it. Some farmers prefer sour milk to sweet skim milk, but recent experiments have proved they are of about equal value in feeding. Factory buttermilk is largely used, but care is needed in using it; only the fresh buttermilk should be used, and this should not be allowed to stand any time in a galvanised tank. See that none of the wash water is allowed to be run into it from the factory, as this invariably contains salt, soda, saltpetre, or perhaps other preservatives, which are injurious to pigs. In feeding buttermilk, pollard, barley, crushed wheat, maize, or malt sprouts should be mixed with it, otherwise your pigs will be soft and blubbery.

Whey is only of any value when fed with other mixed foods and grain. If fed alone it is of a poor food value, being about one-half the value of skim milk, and even then it must be fed fresh to obtain this result. Pigs fed on whey can be easily detected by the peculiar odour arising from them. Many become lame, and have stiff joints, when fed solely on whey. An article appeared in the "Grazier" some few months ago, pointing out the number of pigs that suffered from tuberculosis owing to their being fed on dairy by-products, and urging that all skim milk, buttermilk, and whey should be boiled before feeding to pigs. The number of baconers condemned every year by the Government Inspector at our factories is considerable, and amounts to a heavy loss to the curer; and the question here arises whether something more should not be done in having our dairy herds inspected. Tuberculosis is more prevalent in the coastal districts, the Downs and high tableland pigs being practically free from this disease.

Whether your pigs are grazing, or in the pen, see that they get a plentiful supply of rocksalt, charcoal, and wood or coal ashes. It will surprise you to note the amount they will consume. They get a natural craving for them, and must have them if you wish to keep them healthy and give them a good appetite. A dainty pig is never a success; he should be a ravenous feeder, not a pig that sucks up his food but a pig that gulps it up.

BANANA-GROWING AT MOOROOKA.

The accompanying illustrations, supplied to us by Mr. J. E. Friend, who has been for some time growing bananas at Moorooka, a district 5 miles from Brisbane on the South Coast Line, give a good idea of what can be achieved in fruitgrowing, even in poor soils in the neighbourhood of the city, by judicious cultivation, manuring, and irrigation. The soil on which the fine bananas here shown were grown consists of an average of 1 foot of surface soil of a sandy loam nature with a heavy clay subsoil. This has been thoroughly worked and manured and irrigated from a small supply of running water. The first fruit was gathered about December last year, and its excellence was shown by the fact that it fetched 10s. 9d. per bunch, or 10¾d. per dozen in the Roma Street Market, on 26th August last. One of the bunches carried twelve dozen fruits. During the time that the fruit was developing, frosts occurred in June, July, and August, which were especially severe on one or two occasions, although, generally, the mildness of the winter was favourable to the development of the crop.

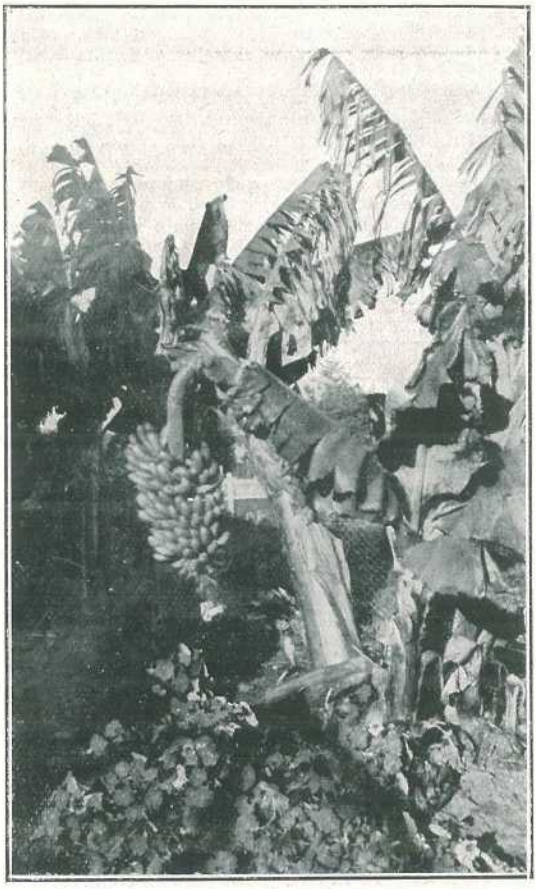


Plate 21.—Banana-growing at Mcorooka.

Tropical Industries.

PROSPECTS OF PLANTATION RUBBER AS A FIELD FOR PERMANENT INVESTMENT.

The present time is, we think, quite opportune to give the views of a well-known member of the London Stock Exchange who has for years specialised in rubber shares, and we consider, therefore, is in a position to speak with true knowledge of the industry and the market. We are tempted to quote largely from this admirable brochure, which has been kindly placed at our disposal.

In considering the rubber planting industry as a field for investment, says a writer in the "Fiji Planters' Journal," it is desirable for purposes of comparison to establish some unit of measurement. What shall it be? The unit most generally adopted in rubber planting circles is the acre of rubber.

An acre of rubber in full bearing yields 400 lb. Well managed companies produce them at 1s. per lb. inclusive of all charges, so a selling price of 2s. per lb. leaves a profit of 400s. or £20 per acre. If it be granted that the rubber planting industry should yield a return of 10 per cent. per annum to the investor, then (if we capitalise on that basis this income of £20 per acre per annum) an acre of mature rubber will fairly represent a capital value of £200, assuming a permanent selling price of 2s. If the price at which we purchase shares represents a purchase of mature rubber at less than £200 per acre, the return on our investment will be proportionately enhanced. Local conditions, of course, may vary. Choice estates will yield as much as 600 lb. at maturity, and poor ones only 200 lb., but, assuming an average of 400 lb. an acre and 1s. per lb. profit on these figures, £200 an acre represents rubber on a 10 per cent. basis.

Perhaps the easiest way to grasp the question of the unit is to ask the question: What does a share in a rubber planting company represent? Let us take a company of £100,000 in £1 shares owning 1,000 acres of mature rubber. Each acre of rubber obviously represents £100 of capital, so each £1 share represents a hundredth of an acre of rubber. A man holding one hundred shares may be regarded as the owner of an acre of rubber.

Now the price at which rubber estates have been planted out and brought to the mature stage varies in a remarkable degree. In times past instances can be found of experienced planters who have achieved this result at £20 per acre. To-day, on the other hand, if a group of ordinary investors were to come together to take up and plant out land they would probably find by the time their rubber was mature it would have cost them about £50 per acre.

The following table will show how great is the variation in capitalisation at par of different companies:—

£1 shares.	Capitalisation per acre at par.
Bukit Rajah	£17
Kuala Lampur	41
Lanadron	57
Tali Ayer	79
Grand Central	90
Seaport	105

2s. shares.	Capitalisation per acre at par.
Cicely	£13
Linggi	14
Vallambrosa	15
Bukit Mertajam	69
Kamuning	83
Sengat	108

Other things being equal, it is obvious that the company with the lowest capitalisation per acre will give the highest return. It is equally obvious that there will be a tendency in the market for the shares of the various companies to attain prices at which the return to the investor will be the same whatever share he buys. But a tendency must not be mistaken for an accomplished fact. With many investors sentiment is as powerful a factor as reason. Investors do not always choose the share which is the cheapest, but frequently that which looks the cheapest to their uninformed judgment.

Suppose, for example, three companies of equal merit each owning 1,000 acres matured rubber. Let A be capitalised at £20 an acre, B at £40, and C at £100. The profit of all three companies (on our previous figures of £20 an acre) will be identical, or £20,000 per annum, but the return will be 100 per cent. on A, 50 per cent. on B, and 20 per cent. on C. Logically, measured by the 1,000 acres of rubber each company possesses, and by the earning capacity of that rubber, the prices at which the £1 shares of A and B ought to stand, if C stands at par, are—A, £5; B, £2; but logical considerations only weigh with some investors, and only partially weigh with others, so it will be found in practice that the share which ought to stand at £5 will very likely stand at £4, and the share which ought to stand at £2 will not stand higher than £1 15s., and the reason is that the £1 share at £1 looks cheaper than the others at £2 and £5 respectively, although in reality it is not.

The writer proceeds to discuss the question of profit thus:—

If the profits on rubber planting be permanent, rubber investments should, we have indicated, go to a 10 per cent. basis. This brings us to the question: Will the present rate of profits be maintained? Must not the return on rubber fall to an ordinary commercial profit?

This question cannot be answered by a simple "Yes" or "No." In theory the answer will be "Yes, ultimately." In practice it will be found that the rubber-producing industry is a peculiar one, embracing factors that tend to postpone indefinitely the "ultimately" that they be at once conceded for the sake of argument. Theoretically, if rubber planting continue to yield a profit of 100 per cent., if rubber be produced at 1s. per lb. and sold at 2s., there will be such a rush of capital into the rubber-planting industry that the result must be a vast increase in production, and a fall in price, with a consequent reduction in profits to an ordinary commercial level. Now capital can be invested in the rubber-planting industry either by the purchase of land and starting of new plantations, or by purchase of shares in existing plantations. It costs to-day (as we have stated) £50 an acre to bring a rubber estate to the producing stage, and for five years the capitalist has to forego all return on his capital. If he can acquire an acre of five-year-old rubber for £100 by a purchase of rubber shares and obtain at once a return of 10 per cent., rising by the end of five years to 20 per cent., per annum, it is obviously a far superior investment to buy shares of existing companies than to go in for a new plantation. Therefore, unless and until rubber shares rise to a level of, say, £150 to £200 an acre, no vast rush of capital into the rubber-planting industry has to be contemplated.

The yield per acre is carefully discussed, and the writer quotes the figures given by Mr. Henry T. Brice in his interesting work in 1911 and repeated in 1914, showing the fair average yields in lbs. per acre for rubber at various stages. Working on these figures the average of 211 lb. an acre all over is arrived at as regards the area planted from 1905 to 1911. Judged by the results of the year 1915 the figures of Mr. Brice are borne out remarkably. A similar calculation for the year 1920 is made out and an average of 385 lb. an acre all over is shown. The presumption is, since the figures in the first table are not continued beyond ten years, that the increase in yield would be 50 lb. per acre every year up to 1920.

The other points touched on and ably discussed are the world's production and the growth of demand. Regarding the latter, the following remarks are made as to America's needs:—

For the past five years the annual consumption of rubber has been allocated, roughly, one half to the United States and one half to the rest of the world. In 1911 the United States took over 46 per cent. By 1915 the proportion had grown to 61 per cent. It is, then, upon consumption in the United States that the future of the rubber industry chiefly hangs. The following table shows how consumption is growing:—

	Increase in World's Production in Tons.	Increases in United States' Consumption.
1911	.. 4,000	.. 2,000
1912	.. 24,000	.. 15,000
1913	.. 9,000	.. Nil
1914	.. 12,000	.. 10,000
1915	.. 39,000	.. 35,500

The development of motor traction is largely responsible for this. His motor-car hitches the backwoods farmer on to civilisation. The dweller in remote districts soon discovers that his automobile is not a luxury, but the best paying investment he ever made, and it is the thing he cannot afford to give up when hard times compel all-round economy.

If demand in the United States continues to maintain its recent rate of growth (and there seems no valid reason why this should not be the case), then it must assuredly before long overtake the prospective supply.

The following summing up is worthy of repetition.

One closing remark by way of afterword. In uninformed circles it is argued that rubber investment cannot be sound because the return is so high. Now that "highest interest means low security" is a sound maximum, but this applies to borrowers. Planting companies are not borrowers in the sense of the proverb, but are associations of shareholders planting their own land with their own capital. Their investment is with Mother Nature, who rewards her children with no niggardly hand. Moreover, the rubber-planting industry is reaping the just reward of virtue in respect of the sound financial basis upon which the great bulk of the companies were formed. Promoters' profits were small, there is little or no watered capital to pay a return on, so it is natural, right, and just that shareholders should get a large return on their investments on rubber. The rubber market is as safe a one for investment to-day as any other industrial market in the Stock Exchange, and safer than most. It has no troubles to contend with from organised labour; climatic conditions affect it to but a trifling extent. Months of flood or drought involve simply a slight curtailment of crop. Demand for the staple article produced is persistent both in peace and war, for it is a necessity of both. Synthetic bubble after synthetic bubble has been exploded until the present low cost of production of rubber itself is safeguard against even a genuine synthetic product, were one forthcoming. On all of these grounds then the rubber share market is bound to be recognised in the future as a great field for investment, and that of the soundest and most solid description. Either other industrial securities will have to fall in price till they yield as big a return as rubber, or rubber securities must rise till they yield as small a return as other industrial securities. There is no escape from this dilemma. Rubber shares will not continue permanently on a 10 to 15 per cent. basis. —"The Fiji Planters' Journal," May, 1917.

CANE *VERSUS* BEET SUGAR.

A QUESTION OF REFINING, NOT QUALITY.

The "Barbados Agricultural News" has some interesting remarks to make on the use of cane as opposed to beet sugar. As was mentioned in the "South African Sugar Journal" recently, British makers of such commodities as jam, chocolate, and condensed milk have experienced difficulties in the manufacture of those commodities, which they attribute to the use of cane sugar in place of the beet sugar which they formerly employed in their industries.

This is unfortunate, says our Barbados contemporary, as it may lead to some preference being manifested for beet sugar, and to a desire in some quarters to obtain access once more to supplies of continental beet sugar furnished by enemy countries.

It would be well, the "Agricultural News" proceeds, if the facts were carefully investigated, so that the nature of the difficulties may be clearly understood, and steps taken to remedy them.

It is understood that the experience of some makers of jam and condensed milk is that their goods manufactured with the class of cane sugar recently available exhibit a tendency to ferment. This defect cannot be attributed to the sugar as sugar, for it is admitted that pure cane sugar and pure beet sugar are identical substances. The defects, therefore, must lie with such impurities as were contained in the sugar used.

Owing to the fact that the impurities of ordinary beet sugar are extremely unpleasant, having an offensive taste and smell, it is essential that the refining of beet sugar shall be very thoroughly accomplished; if not, the resulting sugar is unpleasant, and is not acceptable to the user.

On the other hand, the impurities incidental to cane sugar are quite pleasant both to smell and taste; consequently, cane sugar may be passed on to the market in a less perfectly refined condition than beet sugar, and still be acceptable to the ordinary user. Indeed, there are many grades of cane sugar in common use which are not refined sugars in the strict sense of the word; they are made direct from the cane juice by careful methods, without being submitted to refining processes.

It is more than probable that the manufacturers' difficulties referred to above are to be explained by the fact that the cane sugars recently placed at their disposal by the authorities regulating the supplies of sugar-cane were cane sugars which had not been submitted to a thorough refining process, such as results from treatment with animal charcoal.

In such a case it is conceivable that organisms capable of causing fermentation exist in the sugar, and so pass into the products of manufacture, ultimately leading to their spoiling. Had the sugar been thoroughly refined, preferably by filtration through animal charcoal, it is expected that these fermentive organisms would have been removed. This being so, it may be asserted that it was not the sugar that was at fault, but its method of refining.

It is well known that in the stress of recent times one difficulty experienced in Great Britain was the obtaining of refined sugar, so much so that unusual steps had to be taken to get supplies of sugar refined in America for British use; British refineries were too few in number and too small in capacity to produce the needed quantities. It will be readily recognised that these conditions were conducive to the furnishing of only partially refined sugars to the manufacturers of jams and condensed milk.

This recourse to American refineries is a consequence of the fiscal policy before the war which led to the closing of almost all British sugar refineries, thus putting a stop to an industry which in the earlier part of last century was of great importance in the United Kingdom. From those extinct refineries, before the swamping of the market by refined beetroot sugar from the continent, there used to be produced sugar of the utmost purity, in loaves and cubes and crystals, much of it refined from crude cane sugars from the tropical parts of the Empire.

That this use of imperfectly refined cane sugar may have been the cause of the troubles complained of is rendered fairly evident by the statement of a manufacturer of chocolate, to the effect that he preferred beet sugar because it is less sticky than cane sugar. Now thoroughly refined cane sugar is no more sticky than is beet sugar, so it must be concluded that his experience referred to the imperfectly refined cane sugar.

In the work of reconstructing industries after the war sugar will play a large part, and the question of the production of cane sugar will be a vital one for many of our colonies. Sugar production in British colonies has been at a great disadvantage in the past in its struggles to compete with beet sugar, a struggle which hinged, not so much upon the qualities of the respective sugars, but upon the fiscal conditions under which they were produced and marketed.

Now that these disabilities are to be removed, it is very undesirable that any undeserved stigma should attach to cane sugar, or that there should arise a preference for beet sugar, on the part of even some British manufacturers, based on erroneous grounds. A body of prejudiced purchasers in the United Kingdom might be a source of serious danger to the colonial sugar industry.

It would be an acceptable and useful national service if one of the associations now springing up in England for the development of the colonial sugar industry, and the investigation of sugar problems, were to take up this question and investigate it thoroughly and to give wide publicity to the results of the investigation as soon as possible.

It is to be remembered that in the consumption of sugar in the major industries concerned with the production of jams, confectionery, condensed milk, and allied commodities, a very large part of the sugar imported into the United Kingdom is used; consequently, anything working to the detriment of cane sugar in this connection is a matter of grave concern.

Mere declamation, or the assertion of the merit of one kind of sugar as contrasted with another, will not suffice; the matter should be thoroughly and carefully investigated.—"South African Sugar Journal."

SISAL HEMP.

We have received inquiries from several returned soldiers as to the advisability of engaging in sisal cultivation. A few notes on the past and present positions of the industry in Queensland will therefore not be out of place. About the year 1904, and even earlier, attention was drawn to this product by various agricultural writers, and with a view to supplying plants of the true Mexican sisal (*Agave rigida*) a few acres were planted at the Penal Establishment at St. Helena. (The plants were imported by Mr. Peter McLean, then Under Secretary for Agriculture.) These rapidly increased, and several thousands of suckers were distributed to intending growers. In 1890 phenomenal prices were obtained in America and Europe for the fibre, which was in great demand for the manufacture of binder-twine, and prices

rose owing to the alarming decrease in the production of Manila hemp or banana fibre (*Musa textilis*) in the Philippine Islands. The ever-increasing demand, with which the production was unable to keep pace, and the expansion of the wheat-growing industry, for which millions of pounds of binder-twine are needed annually, tended to show that those entering upon the sisal industry could not fail to reap a rich reward.

In addition to the thousands of plants distributed from St. Helena, sales were effected by private growers. Between 1904 and 1910 the writer disposed of nearly 300,000 suckers and 200,000 bulbils to intending growers in many parts of Queensland, New Guinea, Fiji, South Africa, the Solomons, &c., &c. In those days there was little trouble on the score of labourers' wages, which, whilst being reasonable, enabled the planter to obtain a fair profit for his enterprise. As time went on and the price of machinery became a serious item in the expenses, and the demands of labour as to wages increased, the sisal planters gradually gave up the industry. The price of the fibre locally was about £25 per ton, and the cost of production about £12 per ton. Eventually the two factors—*i.e.*, cost of machinery and high wages—effected the ruin of the sisal industry. Some farmers who had rooted out sugar-cane to plant sisal then reversed the order, and other crops supplanted the sisal.

During the late war the price of sisal fibre in England rose to £200 per ton. But there were no means of shipping it to England even had the plantations with machinery continued to produce the fibre, and only a comparatively small quantity found a local market.

For the whole duration of the war immense stocks of sisal were held in Yucatan, the Bahamas, Mauritius, Java, &c., ready to flood the markets of the world. Large stocks of Mexican sisal are also held in the United States. The close of the war resulted in a heavy fall in prices. From £200 per ton in 1915 there was a decline to £65 per ton in 1918. In June last, however, stocks were largely depleted, especially in East Africa, and prices remained firm at £69 to £70 per ton.

Sisal is not a crop which can be profitably grown on small areas, owing to the great cost of the necessary machinery. This might be overcome by the establishment of a central mill. But here, again, the heavy cost of cartage to and by rail is a bar to success. Conditions in regard to this industry have so completely changed during the last few years that we would not advise anyone to take it up who intends making a living on a farm. Cotton should be grown for preference.

TO RUN OUT A COIL OF BARBED WIRE.

Those who for the first time use barbed wire for fencing sometimes have difficulty in preventing it kinking. Mr. G. Lloyd Apjohn, Townsville, sends along the following plan of running it out on the fence line without assistance:—Place the coil of wire on the ground, and fasten the end of the wire to the post. Then pass a stout stick through the coil to act as an axle and tie a rope to each end of it. Then walk away with the coil, which will reel off of itself, wheel fashion. In this way the wire may be taken across logs or round corners, so that instead of being a difficult job, the work is easy.

TREATMENT OF COTTON SEED BEFORE SOWING.

The Manager of the State Farm, Roma, has forwarded a sample of cotton seed to the Agricultural Department, which seed has been specially prepared to admit of sowing by means of a seed drill. In commenting on the matter, the Director of Agriculture states that the fluffy fibre adhering to Upland cotton seed after "ginning" and "linting" causes the seeds to bunch together, which means that the sowing has to be done by hand, which is a tedious process. This latter difficulty has now been overcome by treating the seed with fine puddled clay, which envelops the loose fibres and leaves the seed in a smooth rounded form, in which condition, after drying it will readily pass through the drill—a process calculated to reduce the cost of planting operations.

Illustrations of the seeds, prepared and unprepared, will appear in the next issue of the Journal.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

No. 16.

A "RATTLE POD" (*CROTALARIA SERICEA*, RETZ).

Description.—An erect undershrub of 2 to 3 ft. or more. Stems ribbed, usually with a purplish bloom. Leaves obovate-lanceolate, the apex apiculate, glabrous above, clothed with fine, silky hairs beneath, 1½ to 3 in. long (the lower leaves on old plants much larger), stipules persistent, conspicuous. Racemes of flowers attaining over 1 ft. in length. Flowers yellow, large (about 1 in. across), bracts large (up to ½-in. long), ovate, pedicels as long as, or longer than, the calyx. Pod stalked, much inflated, 1½ to 2 in. long, seeds numerous, brown, and glossy, somewhat kidney-shaped.

Distribution.—A native of India; it is a very common weed in Queensland, being found along the coast from Brisbane to the far North, but difficult to say whether native or introduced, though the collecting of specimens from such distant habitats as Newcastle Range (A. H. Blackmann) and Bloomfield River (Rev. W. Poland) would point to the former.

Botany.—This plant for some years went, in Queensland, under the name of *Crotalaria alata*, and under such, F. M. Bailey ("Queensland Flora," p. 372) referred to it as "Naturalised in many localities," and also (Annual Rept., Dept. Agric., Brisbane, 1891-2, p. 49) as "A naturalised plant from India, suspected of poisonous properties in some localities." The true *C. alata*, however, is a very different plant, with broadly winged stems, due to the conspicuous broadly decurrent stipules of the leaves. *C. sericea* is very closely allied to *C. retusa*, a species fairly common in North Queensland and the Northern Territory, but differs from that species in the conspicuous, persistent stipules of the leaves, and in the large broad bracts subtending the flowers.

Properties.—It is a showy, rather attractive plant. A record of it as a suspected stock poison has already been referred to. Though not definitely proved to be poisonous, and though very rarely touched by stock, in view of the fact of the well-known poisonous character of some of the genus, it may be well to cut it out from paddocks where stock have access.

Eradication.—Though abundant, it cannot be said to be an aggressive weed and should not call for any particular methods of eradication where it becomes necessary to get rid of it.

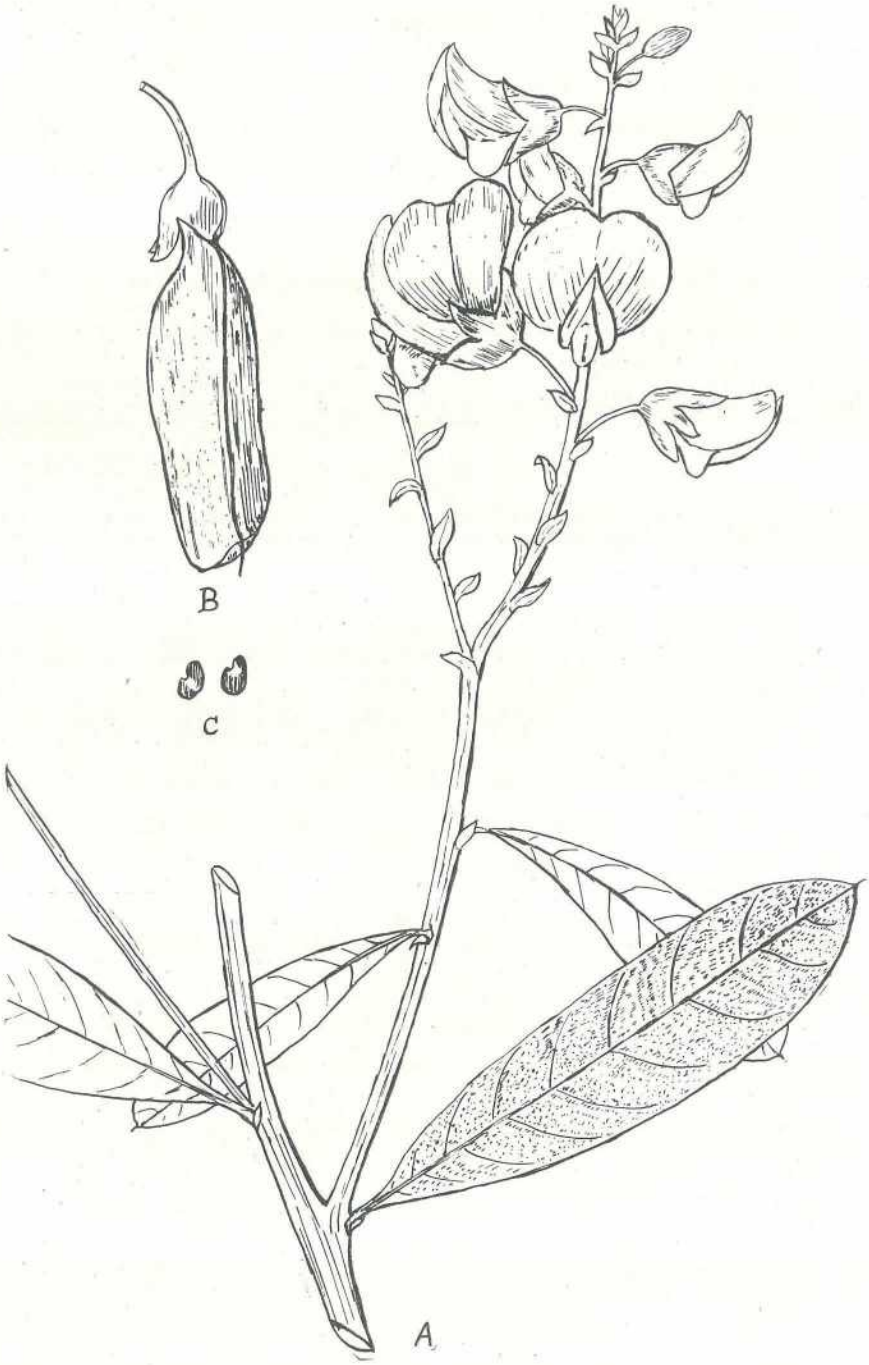


Plate 22.—A Rattle Pod (*Crotalaria sericea*)—flowers yellow.

A.—Flowering shoot. B.—Pod. C.—Seeds. All natural size.

Entomology.

INSECTS ATTACKING PEANUTS IN QUEENSLAND.

BY EDMUND JARVIS, Assistant State Entomologist.

Although little or nothing has hitherto been published with regard to the insects affecting peanuts in Australia, we shall probably find in future years, when they come to be grown extensively, that various indigenous species will develop a liking for this crop in the field, while others, including introduced cosmopolitan pests of more or less economic importance, will doubtless attack the stored nuts, oilcake, &c.

The Queensland insects described in this article were noticed by the writer at Meringa, near Cairns, affecting some peanuts grown for home use, of the variety known as "Spanish."

The only one occasioning decided loss in the field was a mealy bug on the nuts, which has accordingly received illustration. (Plate 23.)

The remainder (excepting *Isoden puncticolle* and possibly *Chloridia obsoleta*), although of comparatively minor interest at present, have not, I believe, been previously recorded as being injuriously associated with this plant.

INSECTS AFFECTING THE LIVING PLANT.

PSEUDOCOCCUS SP. (FAMILY, COCCIDÆ).

About 30 per cent. of the crop was found to be more or less infected by this insect.

In some cases, most of the nuts on individual plants had perished, the blackened shells, where partially hidden under white mealy powder, being of a purplish colour, while the foliage appeared stunted and unhealthy looking.

This crop, which had been in the ground about five months, was planted at the end of December on red volcanic soil, and throughout January and most of February growth had been somewhat checked owing to dry weather. On the 23rd of the latter month heavy rain set in, and during March and April the plants grew rapidly.

The mealy bugs occurred on the roots and underground portions of vines at a depth of from 1 to 4 in., and were congregated in thousands on the nuts, so thickly at times as to completely hide the shells from view. They were of all sizes, from tiny larvæ to adult viviparous females of the summer brood, measuring about 3 mm. in length (⅛-in.).

Before describing the species, it may be stated, for the enlightenment of readers not familiar with this class of insect or the technical terms associated with it, that mealy bugs, being covered with powdery or flocculent secretion, cannot be satisfactorily identified until such obstruction has been removed. This is effected very simply, either by placing the insect in chloroform for a few seconds to dissolve the wax, or passing it quickly once or twice through the flame of a small spirit lamp. The true colour is then apparent, and after preparing and mounting the specimen in balsam, one is able, with the aid of a microscope, to examine structural details.

Specific differences occur principally on the pygidium, a term used to denote the surface of the extremity of the anal or last abdominal segment. The form and position of various tubercles, and the often fanciful arrangement of pores and bristles on this portion of the body, vary somewhat in different species of mealy bugs. Other distinguishing features are found in the number and length of the antennal joints, structure of the legs, &c.

IDENTIFICATION OF THE SPECIES.

In general appearance this insect is not unlike our common citrus mealy bug (*Pseudococcus citri*, Risso), but upon close inspection, one notices specific differences in colour and vestiture.

Having examined mounted specimens, I find that this peanut mealy bug is very close to, if not the same with, *P. trifolii*, Forbes, an insect previously described from South America, where it chiefly affects the common red clover *Trifolium pratense*.

Its occurrence in Queensland on *Arachis hypogæa*, a closely related leguminous plant, has not, I believe, been previously recorded.

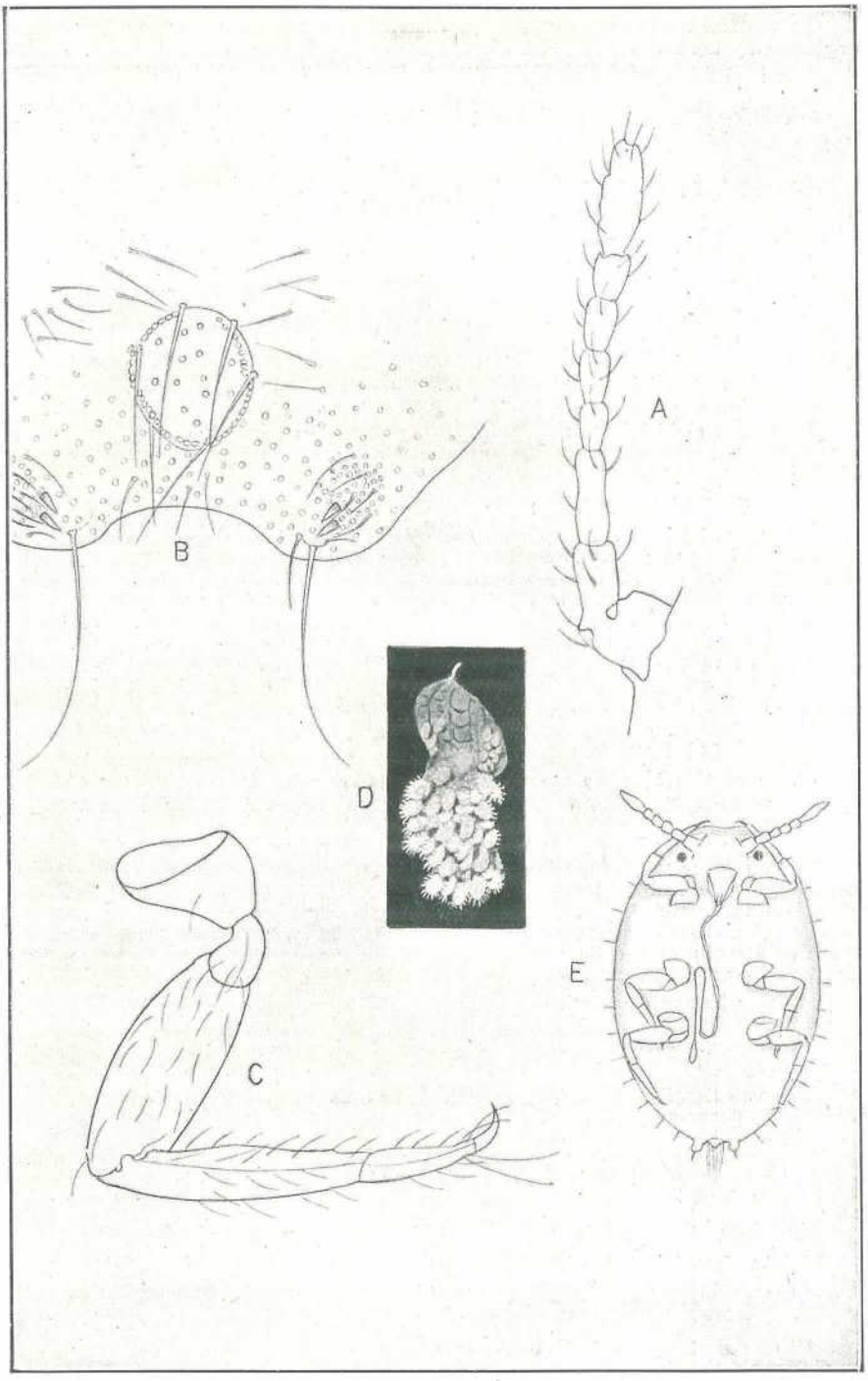


PLATE 23.—PEANUT MEALY BUG.

A.—Antenna of Summer Female. B.—Pygidium of same. C.—Hind leg of same.
D.—Mealy Bugs attacking peanut (natural size). E.—Larva. (All drawings original).

THE LARVA.

In the few specimens of this stage examined the antennal articulation may be expressed by the formula—6, 2, 1 (3, 4, 5).

The anal tubercles are rather prominent, each bearing two short, acutely conical processes, about five times longer than their basal width. The femur of the hind leg is decidedly longer than the tibia, and the tarsus slightly exceeds the femur in length.

NOTES ON THE SUMMER FEMALE.

The adult female is dark reddish-yellow (in *P. citri* the body colour is pale ochraceous), very convex above, flattened beneath, and covered with a white powdery secretion that, whilst partly hiding the true colour, allows the segmentation to be clearly seen. The waxy filaments fringing the sides number from 16 to 17, those on the hinder segments being longer than the others. At the tail-end there are usually from four to six of about equal length, two or four of which sometimes measure from one-quarter to half the length of the body. All these lateral filaments are generally cylindrical, straight, and practically filiform, while in *P. citri* they are somewhat flattened, distinctly broader at the base, slightly flocculent, and inclined to curl at times. The above distinctions, together with the absence of a brownish mid-dorsal band occurring in *citri*, will serve to separate the females of these mealy bugs.

Both have eight-jointed antennæ, but in my species the formula for the joints (from eye measurement of a few specimens only) appears to be 8, (2, 3,) 1, (5, 6, 7) 4; while the articulation in *citri*, according to Essig,* is 8, 3, (1, 2, 7,) (5, 6,) 4. In all the peanut coccids examined by me the fourth antennal joint was noticeably shorter and narrower than any of the others. (Fig. A.) The anal tubercles (Fig. B) bear one long spine and a group of seven smaller ones surrounding the two conical processes. Numerous circular pores are scattered over the surface of the pygidium (Fig. B), and a number of spines in positions shown on drawing. The six circumnal spines are half the length of those on anal tubercles. The femur and tibia of the hind leg are of equal length, the tarsus about half as long as the tibia, and terminating in a simple curved claw (Fig. C). The four digitules are exceedingly slender, but clearly distinguishable in well-mounted specimens. When fully grown, the body of this mealy bug measures about 3.50 mm. in length, and is equally rounded at each end.

(2.) LEAF-EATING CATERPILLAR (FAMILY PYRALIDAE).

Larvæ of this Pyrale moth were observed during March webbing the foliage together, and feeding under such cover on the young shoots and unfolding leaves.

THE CATERPILLAR.

Shining greenish-brown, with three dorsal, two subdorsal, and two spiracular, longitudinal yellow lines; those on spiracular area broadest. Each segment marked with eight to twelve black, shining tuberculate spots, each emitting a single black hair. Head and first body segment pale green, the latter with a large brownish-black blotch on dorsal area and the former edged behind with black. Ventral surface dull green, prolegs and claspers black. Length 16 mm. ($\frac{5}{8}$ of an inch).

The pupal stage of this insect occupies a period of about two weeks.

Unfortunately, the only specimen of the moth obtained was eaten by a cockroach before identified. From its general appearance at the time of emergence I believed it to be a species of *Glyphodes* or closely related to that genus.

A small caterpillar tunnelling into the ends of the stems has been recorded as injurious to peanuts in St. Vincent.

(3.) LAELIA, SP. (FAMILY LYMANTRIADAE).

Specimens of this moth were bred during February from larvæ found devouring the foliage.

THE CATERPILLAR.

Light yellow, blotched with pale reddish-brown on dorsal surface, the blotches outlined with white; sides of body segments ornamented with two detached lateral white dashes. Segments 4 to 7 with a dense compact golden tuft of hairs rising vertically from dorsal area, and nearly one-eighth of an inch in length. Head pinkish, a pencil of grey hairs about a quarter of an inch long and feathered with black at the tips projecting laterally from each side, and two similar pencils arising close to anterior dorsal edge of anal segment, projecting caudad. Sides of body fringed with long white hairs. Length 1½ in.

* "The Citrus Mealy Bug," Pomona, "Journal of Entomology," Vol. II., No. 4, December, 1910.

THE PUPA AND MOTH.

On 3rd February one of these caterpillars spun a flocculent pale-yellow cocoon on the side of its breeding-cage, through which a brownish pupa was plainly discernable.

The imago, which emerged twelve days later, was identified by Lyell as a species of *Laelia*. Although a common enough caterpillar here, the moth happened to be new to his enormous collection, being probably one of those species that are rarely obtained unless bred from the larval form.

DESCRIPTION.

Fore wings pale-buff, marbled with light brown; a broad band of the latter colour, widening towards costa, and edged outwardly with paler buff, crosses wing about parallel with outer margin; the inner edge of this band, lying in middle of central area, adjoins a pale blotch enclosing 2 to 4 dark lunulate dashes on subcostal portion. Fringe of outer edge blotched with brown, and just inside is a broken line of dark marks close to outer edge of wing. Upper surface of hind wings and under surfaces of both pair chalky-yellow, with a suffused brownish blotch on costa of forewings near tip. Expanse of wings 44 m.m. (1¾ inches).

(4) CHLORIDIA ASSULTA GN. (FAMILY NOCTUIDAE).

Caterpillars of this insect were fairly common, inflicting injuries to the young leaves and softer portions of stems.

THE CATERPILLAR.

When about half an inch long the larva is not unlike that of a pyrale in general appearance, being light greenish-yellow with numerous small pustulate brown dots; and at this early stage, in addition to eating the unfolding leaves, it bores the ends of the stems.

The fully grown caterpillar is light greenish-brown with mid-dorsal thin stripe consisting of a thin yellow line edged on each side by dark-brown; subdorsal area suffused reddish. Each segment marked with wavy, longitudinal, yellow lines more or less interrupted.

Spiracular band reddish-green bordered with bright yellow. Body spotted with numerous black, shining, convex tubercles, smaller and in a transverse row on thoracic segments, and irregularly disposed on abdominal portion, each tipped with a white hair. Centre of subdorsal area of abdominal segments with a small spot of rusty red just above each spiracle. Head ochraceous, spotted with light yellow. Venter pale greenish-yellow speckled with white. Length 42 m.m. (1⅝ inches).

Like many noctuid larvæ, it has a habit, when handled, of assuming a twisted hooklike form, and remaining motionless until believing the danger past.

THE PUPA.

The pupal condition lasts for about two months, a caterpillar that pupated underground on 4th March transforming to the moth stage sixty days later.

THE MOTH.

The imago very closely resembles that of our common cutworm of the tomato and other vegetables *Chloridia obsoleta*, better known under the synonym *Heliothis armiger*.

(5) CHLORIDIA OBSOLETA (FAMILY NOCTUIDAE).

A few caterpillars, of the green variety, of this familiar cutworm were observed slightly injuring the young leaves.

(6) ATRACTOMORPHA CRENATICEPS, BLANCH. (FAMILY ACRIDIIDAE).

(7) CYRTACANTHACRIS SP. (FAMILY ACRIDIIDAE).

The above grasshoppers cause minor damage to the foliage.

The former (*A. crenaticeps*), which is the more plentiful of the two and much in evidence throughout the summer, has been described and illustrated by the writer in Bulletin No. 3 of Queensland Bureau of Sugar Experiment Stations; Division of Entomology, 1916.

(8) ISODON PUNCTICOLLE (FAMILY DYNASTIDAE).

Specimens of this Scarabaediae beetle were recorded by Tryon* in 1915 as occurring at Sandgate "damaging the plants as adults, cutting off the stalks at about 2 inches beneath the surface."

INSECTS ATTACKING THE STORED PEANUTS.

(9) HOMOEOSOMA VAGELLA, ZELL. (FAMILY PHYCITINAE).

This moth was observed infesting a parcel of nuts ("Giant Peanut") procured from Cairns about Christmas time.

The larvæ feed on the kernel, and when fully grown leave the pods and pupate outside in silken cocoons under a mass of webbing covered with excreta.

DESCRIPTION OF MOTH.

Fore wing silvery-grey, irregularly speckled with brown, and having a few obscure blotches of same colour arranged in the form of a broad transverse bar on outer edge of basal area near centre of wing; a nearly central blotch midway between this bar and apex, and a few other indistinct smaller marks on middle and outer areas. Scales fringing outer border, brown, tipped with white. Hind wing whitish, apical area somewhat suffused with grey; edges and nervures outlined in brown. Expanse, 16 m.m.

(10) TRIBOLIUM FERRUGINEUM, FAB. (FAMILY TENEBRIONIDAE).

This cosmopolitan pest of flour and other stored products is a slender reddish-brown beetle about 3/16 of an inch long, of a depressed and almost oblong form. It was found plentifully among the stored nuts.

Tribolium confusum, Duv. which closely resembles the preceding species in size, appearance, and habits, has already been recorded as injurious to peanuts in America.

(11) CARPOPHILUS SP. (FAMILY NITIDULIDAE).

A number of these beetles were attracted to some dried peanuts stored indoors in a tin box. They probably feed on the broken nuts, debris, &c.

DESCRIPTION.

Dark brown, covered with golden pubescence; the basal and central portions of elytra more or less clouded with obscure reddish. The punctures on upper surface shallow and flat-bottomed. Hairs on pronotum radiating fanwise from centre of hind margin. Head and pronotum taken together are about the length of elytra, and the two uncovered abdominal segments the length of pronotum. Legs reddish-yellow. Length of body, 3 x 1.20 m.m.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report on Cane Grub Investigation from Dr. J. F. Illingworth:—

"The long-continued shipping hold-up has had a serious effect upon my investigations. Not only are visits to other localities curtailed, but I am unable to get supplies necessary to start an extensive line of new experiments at Greenhills.

"The weather has continued very favourable to harvesting in the Cairns District, and most of the grub-infested fields have been cut, with fair averages, since little of the cane fell over and deteriorated.

"Looking forward to the next flight of the beetles, I want to make every preparation. I am experimenting with soluble arsenic for killing feeding trees; and in this report I want to make some recommendations in regard to the continuing of the Beetle and Cane Pest Destruction Funds in the various districts affected.

"DESTRUCTION OF FEEDING TREES.

"As is well known, the practice of ringbarking will kill most trees, if done at the right season, but, ordinarily, many of our Eucalypts have a decided tendency to sucker from the roots and the portion of the stump below the cuts. I found this to be the case in a paddock of 5 acres, which I had ringbarked during February of this year. The cuts were made about 30 inches above the ground; and while a few of the weaker trees have already succumbed, by far the greater number have ratooned vigorously from the portion below the wounds. Constant removal of the suckers is a serious undertaking on a large area, so I have turned my attention to a quicker though more expensive method of destroying the foliage.

* Annual Report of Entomologist and Vegetable Pathologist, Department of Agriculture and Stock. Queensland, 1914–15.

"I found a rather extensive literature upon the subject of using soluble arsenic for killing trees in Australia; and this I have made use of in our experiments. The quickness of results is very satisfactory where one wishes to deaden the foliage and prevent suckering.

"We tried a number of methods of applying the poison to determine which was most effective and at the same time economical. Undoubtedly, the best results are obtained by ringing as close to the ground as possible, letting the cuts overlap, so that no portion of the bark remains uncut. A comparatively small amount of the poison is necessary, only enough to thoroughly wet the cut surfaces of the wound—a half-pint being enough for a tree six inches in diameter, while a large tree of three feet diameter requires about half a gallon.

"Suckers from old stumps are easily destroyed by cutting into the live wood and applying a small quantity of the poison. Apparently the killing action extends downward for a foot or more below the point of application. This feature of the problem will be exceedingly useful; anyone who has attempted to clear land covered with a forest of Eucalpyts knows how difficult it is to keep the old roots from sprouting.

"It is best to use a strong solution, for with much dilution the action is not only slow, but the trees in many cases revive. The mixture that gave best results was—

Arsenic, one pound;
Washing soda, two pounds;
Water, one gallon.

With this strength a great deal of the weight of excess water is done away with, and by careful handling, the same amount of ground can be effectively covered.

"BEETLE AND PEST DESTRUCTION FUNDS.

"Vast amounts have been expended through these funds in the various districts for the destruction of grubs and beetles. Hence, from time to time, my opinion has been sought as to the efficacy of this measure. Since I have gradually changed my views as data has accumulated, I desire to again bring the subject before the growers.

"I do not now favour the hand-collection of beetles and grubs because of the expense. However, if some method were devised of securing them at a very small outlay, it might be a profitable procedure. It certainly proved so in Denmark in 1887, when practically all the beetles in the country were collected at an expense of about 1s. to 1s. 10d. per lb.; but this is out of the question under our present conditions.

"One would naturally conclude that every female beetle destroyed before ovipositing would have a beneficial result in the lessening of the pest. Yet we must consider that the grub pest is not primarily located in cane areas, but that this insect is indigenous on the wild grasses; and that those collected in cane areas are such a small fraction that there is no noticeable decrease from our efforts.

"I find that the Cairns District, in 1910-11, collected 22 tons of beetles and 9 tons of grubs, at an expense of about £3,000, and there was no apparent decrease the following year. Furthermore, I made a careful study of the figures of other districts, some of them extending back twenty years, and the results are invariably the same. Wherever there was a marked decrease in the pest, it was due to severe drought or other natural causes.

"Let me say, however, that I am not in favour of doing away with Pest Destruction Funds, for they can be of material assistance in coping with the pest in other ways and in experimentation.

"I am confident that this money could be profitably used in many districts in the removal of feeding-trees for about half a mile to windward of cane areas. This co-operation is necessary to cope with the pest; and the results will be far-reaching, for they will affect every grub-infested region.

"Furthermore, we need many centres of experimentation if we are to secure speedy results, and these could be profitably carried out in the various districts, under the advice of this office. Let me urge that where Pest Destruction Funds have become defunct to revive them and make them work overtime, until the worst pest that ever attacked a field crop is down and out.

"GRUB CONTROL BY PARASITES.

"I recently had a letter from Mr. Frederick Muir, of the Hawaiian Planters' Association, who has again arrived in Australia on a quest of friendly insects. Knowing that I wished to introduce some of the wasps, *Scolia manilae*, which have proved so effective in eradicating the two small species of white grubs in Hawaii

since their recent introduction there, he writes, that he got together a cage of some 600 females from the field to bring along. They kept in good condition until he reached Auckland, where the strike tied up the boat for two weeks. This proved too much for the poor creatures and they all died. This attempt, though unsuccessful, indicates the generosity of both Mr. Muir and his association in their desire to assist us in our need. As he says, we must try again; suggesting that the Oceanic boats will be best to bring them on.

"In a letter which I have just received from the Government Entomologist of Mauritius, there is considerable encouragement on this subject. He writes as follows:—

" 'As far as the control of white grubs is concerned, I can tell you that there exists in Madagascar two species of *Lepidiota*—*Lepidiota lactea* and *Lepidiota pyngidialis*—and several scolids of the size of *Campsomeris tasmaniensis*, so that it is quite possible that you might find there parasites against your *Lepidiota*.

" 'The only method which I recommend is that of catching the wasps and then breeding them in special cases amply furnished with grubs in the soil. The wasps are easily fed during transit with honey; the grubs supplying the necessary material for their reproduction.

" 'The above is the method which I employed for introducing *Scolia oryctophaga* from Madagascar, and it has given me entire satisfaction.

" 'The practice of sending cocoons in damp earth and moss cannot be relied upon. From experience in dealing with importation of scolid wasps, I can tell you that cocoons removed from the earth cells in which they had been spun and sent to long distances never hatch out. They must be spun in the case in which they are to travel and should not be disturbed before their destination is reached; hence the necessity of breeding the parasites in cases containing soil amply furnished with grubs.

" 'Even if the pupal stage of the wasp is less than the time taken to reach destination, the wasps can hatch out and reproduce in transit. Copulation does not seem to be absolutely necessary, for females of *Scolia oryctophaga* have reproduced parthenogenetically in the insectary here.

" 'I do not think that the species existing in Mauritius can be of any use against the Australian cane grubs. You might, perhaps, find these in Madagascar, but when the nature of the country is considered, and its distance from Australia, together with the difficulties of direct and rapid communication, the question would seem not an easy problem.

" 'You must have received by now the Bulletin I sent you—"Importation of *Tiphia parallela*"—in which you will see that attempts to introduce *Tiphia* here, in the pupal stage, have failed.

" 'I am of opinion that much better results might be obtained if better conditions, in the shape of special feed plants for the scolids, were created all along the infected fields. This would congregate in large numbers the parasites and render their action more efficient. The results obtained here, as far as *Tiphia* and *Elis* are concerned, are undoubtedly due to the food plant being extremely common all over the infected area. I am certain that you will greatly improve the present conditions in trying the above suggestions.'

"On the matter of feeding plants for the parasitic wasps, I must state that I have just received a nice fresh supply of the seed of pigeon-pea, generously collected by Mr. E. Freeman, Cane Inspector at Victoria Mill. The flowers of this pea are a favourite for both bees and wasps; hence, I am anxious to grow the plants along the margins of infested areas, as an inducement to the wasps to congregate in these centres.

"THE LANTANA SEED-FLY.

"This tiny Agromyzid fly continues its effective work in the destruction of practically all of the seeds of the troublesome weed *Lantana camara*. I have made some careful experiments to determine the percentage of seeds that would germinate without getting any to show life.

"It will be recalled that the flies were liberated here at Gordonvale, in March, 1917, after their arrival from Hawaii. They quickly became established and widely spread—in fact, they are now in practically every lantana-infested district of North Queensland.

"Recently, in collecting berries for examination, I found it a difficult matter to get any that had remained on the bushes long enough to become mature and ripe. The maggots working inside the kernel cause the fruit to drop easily at the slightest jar; hence, one finds most of the receptacles empty. The few scattered ripe berries were collected and placed in germinating trays without result.

"Microscopic examination of these kernels dissected showed that in every case the seed had been eaten out. Apparently, the kernel of lantana originally developed three seeds, but by a process of evolution two of them have become so small that they do not germinate; they are only rudiments, made up of endosperm. In about 10 per cent. of the kernels examined the maggots had failed to destroy these rudimentary seeds, probably because they are encased in a particularly hard portion of the pith.

"Although I was unable to get any results from these examinations, the flies must inevitably miss a few of the seeds, which accounts for the very slow spread of this pestiferous plant. If it is desired to rid a district of lantana, the flies must be given a hand by cutting out the old bushes and whatever new ones that spring up along fences, &c., where birds have dropped the seed."

Science.

CONSERVING WATER.

The first public lecture under the auspices of the Queensland Popular Science and Art Society was given in the Education Hall on the 16th September, by Mr. R. A. Wearne of the Central Technical College. The following synopsis of the lecture, which was preceded by a short description of the geological history of South-Eastern Queensland, appeared in the "Daily Mail" of 17th instant:—

"Queensland has been more bountifully blessed by nature than any of the other Australian States," said the lecturer. "Her dormant agricultural and mineral wealth is untold. The whole coastal and uplands districts are eminently fitted for intense cultivation. What is required is population to till those lands, and facilities to induce sufficient population to take up the present idle wastes. A farmer cannot be expected to travel 11,000 miles to take up land where periods of excessive drought will swallow up the earnings of his hard-earned toil. The land is here craving for the plough; the rainfall is here craving for conservation; and the farmer is craving for irrigation.

"Australia's continental configuration, her coastal ranges, and the absence of highlands in the interior enforce, as a *sine qua non*, periods of excessive drought such as in 1902 and 1915 and 1918; and periods of excessive drought can only be combated by water conservation and irrigation. The main factors for successful irrigation are an adequate annual rainfall for conservation, water conservation in the foothills of the uplands, and land suitably situated with respect to the area in which the water is conserved, with a fairly even surface and soil adapted for irrigation. Queensland possesses a main dividing range and extensive uplands running parallel to the coast throughout its extreme length. The annual average rainfall over this region ranges from 39 inches in the south to 100 inches in the north. Beautiful extensive alluvial, naturally graded flood plains extend from the coast to the very foot hills of the main range. The slope from the escarpment of the uplands to the coast is gradual and uniform, and a large portion of the surface is level. The coastal district of Queensland is thus ideally constructed by nature for successful irrigation.

"The Fassifern district is one of the most suitable areas in Queensland for irrigation on an extensive scale. River valleys filled with the most fertile soil and separated by wooded sheltered ridges penetrate to the very base of the Main Range. Dame Nature has lent a kindly helping hand. The whole of the eastern coast from the main range to Brisbane has been faulted to an extent of at least 1,500 feet. This coastal faulting and subsequent erosion have produced natural V-shaped reservoirs on the eastern flank of the Main Range, which require but the assistance of man to conserve an unlimited supply of water suitable for domestic and irrigation purposes and hydro-electric scheme.

"Irrigation without water conservation must prove a failure. In periods of drought, when the demand for water is at a maximum, the supply falls to a minimum. In periods of flood, unlimited quantities of water are borne seawards. The conservation of this supply is absolutely necessary for any tangible scheme of irrigation. The State Treasurer has already visited the area at Mount Edward, and a permanent survey is now being made by Mr. Deshon and his staff. On behalf of the local settlers, I thank Mr. Theodore for carrying out the promise made during his recent visit of inspection."

The lecture was splendidly illustrated with lantern slides.

THE "ALICE DANIELS" POTATO DIGGING MACHINE.

For the past thirteen years Mr. Henry Daniels has devoted himself to the task of perfecting a potato-digging machine which should satisfy potato growers in all that concerns the harvesting of the crop with the greatest celerity, combined with economy and effectiveness. Many trials were made with various types of the machine, each trial revealing some defect which had to be studied and rectified. During this year, the latest improved machine has been put through several practical tests, and in August last a final trial took place on Mr. Gaul's farm at Bethania Junction. The ground, owing to the dry weather, was rather hard, and gave opportunity for a severe test of the work done. Two horses were employed and appeared to have no difficulty in drawing the machine, the pull of which amounted to between 8 and 9 cwt. The depth of the furrow was some inches below the crop. As the digger moved along, the tubers were caught up by a traveller and carried to the rear of the machine, whence they fell on the surface, none being buried or cut. The difficulty with the earlier types of the machine was the clogging of the movable parts with weeds and potato haulms. In the present machine, this fault was absent, all weeds being thrown on one side of the furrow, the potatoes lying in full view ready for picking up. During the whole trial the machine was perfectly free from any clogging.

It was estimated that one man and a pair of horses could get over about 4 acres per day. Mr. Gaul's crop amounted to about 5 tons per acre, which meant picking up 20 tons of tubers per day. In the days when the fork was—and, indeed, still is—the only implement used by the farmer for lifting his potato crop, a good day's work for a man was a ton a day, and if they were ploughed out with some form of double mould-board plough, half of the tubers were buried under the soil.

Farmers who witnessed the latest trials were of opinion that the machine was a pronounced success, and would come as a boon to all potato-growers, and Messrs. W. S. Binnie and Sons, Limited, engineers and boiler-makers, Brisbane, whose representative witnessed the trial, decided to at once manufacture a number of the machines to be ready in ample time for the forthcoming potato crop three or four months hence.

The machines will be sold, we understand, at a very reasonable price, at which price the inventor estimates that the farmer using it will be able to pay for the machine with three weeks' work as against the ordinary digging and other matters as at present.

The illustrations show a side and back view of the machine, which has been patented in all the States of the Commonwealth as well as in the United States and other oversea countries.

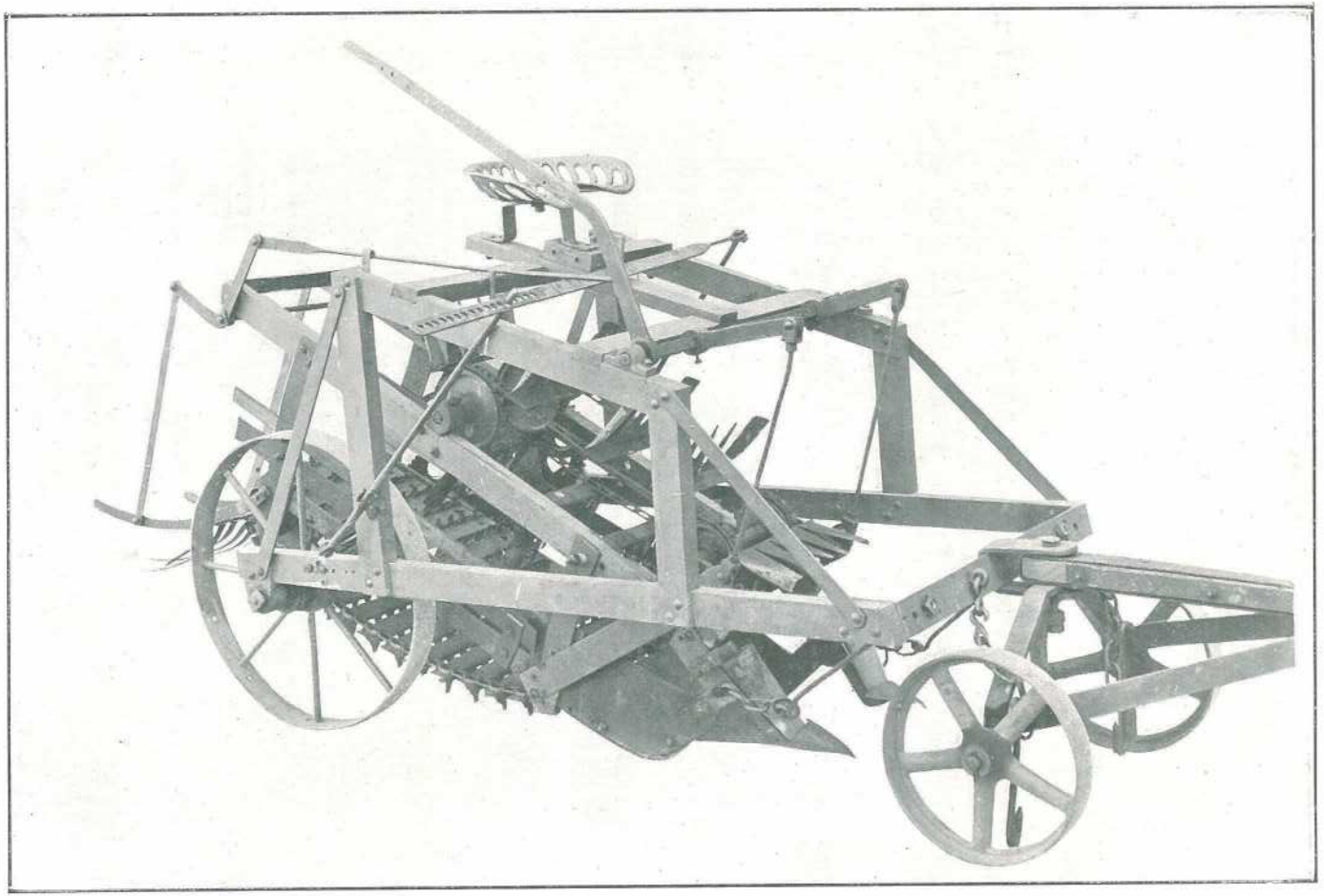


PLATE 24.—THE "ALICE DANIELS" POTATO DIGGING MACHINE (FRONT VIEW.)

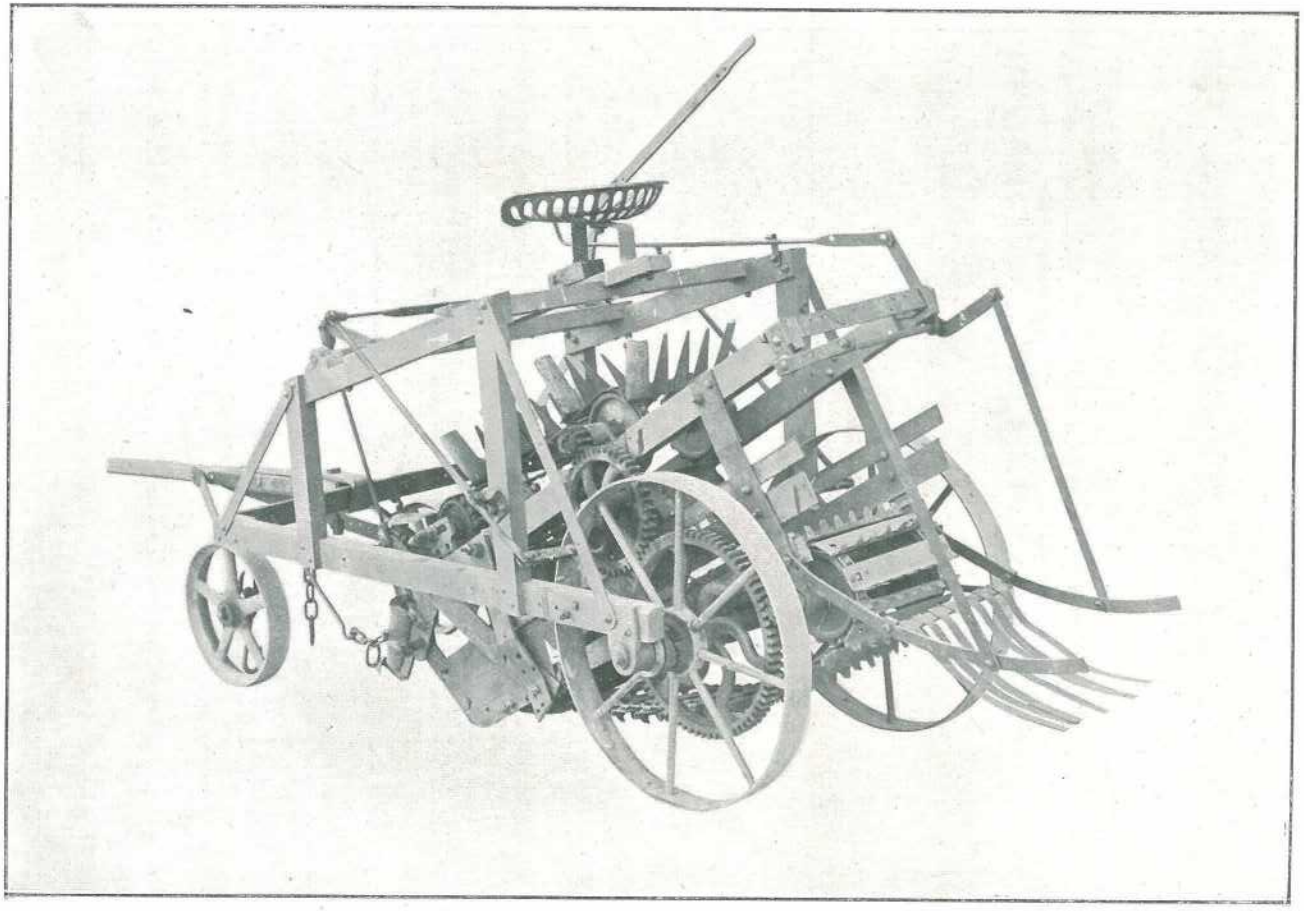


PLATE 25.—THE "ALICE DANIELS" POTATO DIGGING MACHINE (BACK VIEW).

General Notes.

THE NORTH COAST FRUITGROWERS' ASSOCIATION.

William Ellison, Secretary, Bald Knob, Landsborough.

Prior to the formation of the North Coast Fruitgrowers' Association, when each individual fruitgrower disposed of his produce in the Queensland and Southern markets, handicapped by many difficulties as to transport by rail and by sea, delays and consequent deterioration of fruit in transit occasioned serious loss to the growers. When, however, the latter became organised and the transport of fruit to the Southern States by special fruit trains was definitely arranged by the promoters of the above association, it was promptly recognised that the various district associations would greatly benefit by combining their forces with the object of securing the many benefits which it had been shown would accrue from such a combination. Mr. A. H. Benson, Director of Fruit Culture, has, at the request of Mr. William Ellison, Secretary of the North Coast Fruitgrowers' Association, who, in conjunction with his executive, has done sterling service in organising the growers and in perfecting, in conjunction with the Commissioner for Railways, the transport of our Queensland fruits by rail to the Southern States, forwarded to us a copy of a list of the associations that are united to form the present association, which clearly has demonstrated the advantages to be derived from co-operation, and points the way by which the man on the land may obtain the highest reward for his labour.

Affiliated Associations.

Beerburrum Co-operative Fruitgrowers' Association	R. H. Mason, Hon. Sec., Beerburrum.
Beerburrum Fruitgrowers' Progress Association	A. Keers, Hon. Sec., Elimbah.
Bli Bli Branch, Q.F.U.	E. J. Blanch, Hon. Sec., Bli Bli, *via* Nambour.
Bli Bli Fruitgrowers' Association ..	M. H. Wells, Hon. Sec., Bli Bli, *via* Nambour.
Brooloo Fruitgrowers' Association ..	F. Anderson, Hon. Sec., Brooloo, Mary Valley Line.
Buderim Mountain Fruitgrowers' Association	A. Blakey, Hon. Sec., Buderim Mountain.
Coolum Progress Association	Tage K. Scheibel, Hon. Sec., Coolum, *via* Yandina.
Cooloolabin Farmers and Fruitgrowers' Association	A. Drummond, Hon. Sec., Cooloolabin, *via* Yandina.
Cooroy Fruitgrowers' Association ..	J. N. Ross, Hon. Sec., Cooroy.
Currumbin Fruitgrowers' Association ..	D. McLaurin, Hon. Sec., Tomewin, Murwillumbah, N.S.W.
Elimbah Progress and Fruitgrowers' Association	C. Rutter, Hon. Sec., Elimbah, N. C. Line.
Eumundi Fruitgrowers' Association ..	H. E. Hicks, Hon. Sec., Eumundi, N. C. Line.
Eudlo Progress Association	D. Brownlie, Hon. Sec., Eudlo, N. C. Line.
Glasshouse Mountains Fruitgrowers' Association	G. Markwell, Hon. Sec., Glasshouse Mountains.
Golden Valley Fruitgrowers' Association	F. Stalow, Hon. Sec., Golden Valley, North Arm.
Goomboorian and Ross Creek Fruitgrowers' Association	J. P. Jackson, Hon. Sec., *pro tem.*, Goomboorian, *via* Gympie.
Howard and District Fruitgrowers' Association	T. Buffey, Hon. Sec., Glen Esk, Howard.
Landsborough Fruitgrowers' Association	William Ellison, Hon. Sec., Bald Knob, Landsborough.
Mapleton Progress Association	A. A. Probert, Hon. Sec., Mapleton, *via* Nambour.
Montville Fruitgrowers' Association ..	T. H. Brown, Hon. Sec., Montville, *via* Palmwoods.
Nambour Branch, Q.F.U.	J. N. Miller, President, Muir Hill, Nambour.

AFFILIATED ASSOCIATIONS—*continued.*

Nambour Progress and Primary Producers' Association	J. N. Owen, Hon. Sec., Nambour.
North Arm Co-operative Fruitgrowers ..	L. H. Baldry, Sec., North Arm.
North Coast Farmers' League and Yandina Association	J. Steggall, Hon. Sec., Yandina.
P.M.B. Amalgamated Associations ..	F. D. Young, Sec., Palmwoods.
Palmwoods Fruitgrowers' Association ..	—. Brown, Hon. Sec., Palmwoods.
Perwillowen Branch, Q.F.U.	T. R. Miller, Hon. Sec., Perwillowen, Nambour.
Rosemount Progressive Association ..	E. Andreasen, Hon. Sec., Sylvania, Nambour.
Wamuran Progress and Fruitgrowers' Association	R. J. Whiting, Hon. Sec., Wamuran, Kilcoy Line.
Woodford Fruitgrowers' Association ..	H. C. Cowie, Hon. Sec., Woodford, Kilcoy Line.
Woombye and District Fruitgrowers' Association	E. E. McNall, Manager, Woombye.

Note.—Mr. Wilfred Reid has been appointed Hon. Secretary to the Cooroy Fruitgrowers' Association, *vice* Mr. J. N. Ross.

PRESENTATION TO MR. P. G. GILDER.

Mr. P. G. Gilder, who has been for six years editor of the "Agricultural Gazette of New South Wales," was, last month, presented with a gold watch by Mr. W. C. Grahame, Minister for Agriculture, on behalf of the staff of the Department, on his relinquishing that position to join the literary staff of the "Sydney Morning Herald." Mrs. Gilder was also presented with a pair of silver-plated jardinieres.

Answers to Correspondents.

DESTROYING STINGING TREES.

F. J. MARTINE, "Glen Erne"—

It is very doubtful if the spraying of the stinging-trees with an arsenical solution would kill the shrubs right out. Most probably it would cause the leaves to wither rapidly, and thus facilitate the burning of the shrubs, so that they can be grubbed out more easily afterwards. Unless grubbed out they would sucker again.

Use an arsenical spray containing 1½ lb. of arsenic dissolved in the usual way with 3 lb. caustic soda or 4 lb. washing soda, made up to 15 or 20 gallons with water.

RECORD PRICES FOR WHEAT AND BARLEY.

"FARMER"—Toowoomba—

Yes. In June last, wheat and barley were sold at Willowburn grain shed, under instructions from the Minister for Agriculture, for seed purposes, by Messrs. Dalgety & Co. On 21st June a wire was received from Toowoomba to the following effect:—About 3,500 bags of wheat and barley, 2,000 bags being barley, were offered, and the sale was most successful, all previous records of prices for seed wheat being easily broken. The top price realised was 11s. 7d. per bushel for a line of graded Gluyas wheat, and practically all the sales were in the vicinity of 10s. to 11s., or over. Barley did not meet with such demand, malting barley, cleaned and graded, being sold at 6s. 4d. to 6s. 8d. Wheat (sold by sample), on rails at Brisbane: Gluyas, ungraded, from 8s. 5d. to 8s. 7d.; Budd's early, 9s. 3d. to 9s. 8d. Wheat, recleaned (on rails Brisbane), 8s. 3½d. to 8s. 7d.; uncleaned, 8s. 5d. to 8s. 7d.; on rails Bungeworgorai, Marshall's No. 3 graded, 8s. 1d. to 9s. 4½d.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST, 1919, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING AUGUST, 1919 AND 1918, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of Years' Records.	Aug., 1919.	Aug., 1918.
North Coast.	In.		In.	In.
Atherton	0·94	18	0·52	1·39
Cairns	1·90	37	0·61	2·34
Cardwell	1·31	47	0·56	2·05
Cooktown	1·45	43	0·81	1·99
Herberton	0·68	32	0·48	1·17
Ingham	1·47	27	0·31	3·22
Innisfail	5·57	38	2·55	7·38
Mossman	1·43	11	0·79	1·86
Townsville	0·47	48	0·03	1·27
Central Coast.				
Ayr	0·50	32	0·56	1·22
Bowen	0·70	48	0·23	1·05
Charters Towers ...	0·53	37	0·11	0·83
Mackay	1·05	48	0·38	0·89
Proserpine	1·19	16	0·88	2·27
St. Lawrence ...	0·90	48	0·21	0·53
South Coast.				
Biggenden	1·25	20	0·84	0·82
Bundaberg	1·44	36	0·48	1·22
Brisbane	2·21	68	0·69	1·24
Childers	1·30	24	1·17	1·35
Crohamhurst ...	2·43	25	0·82	3·81
Esk	1·69	32	0·79	2·27
Gayndah	1·28	48	0·94	1·90
Gympie	1·94	49	0·36	2·15
Glasshouse M'tains	1·83	11	0·99	2·06
Kilkivan	1·62	40	1·14	0·98
Maryborough ...	1·81	48	1·42	1·29
South Coast—continued:				
Nambour	2·13	23	0·85	4·27
Nanango	1·49	37	0·96	1·78
Rockhampton ...	1·02	32	0·45	0·45
Woodford	1·99	32	0·66	1·68
Darling Downs.				
Dalby	1·28	49	0·76	1·75
Emu Vale	1·28	23	0·67	1·85
Jimbour	1·36	31	0·59	2·16
Miles	1·28	34	0·61	1·02
Stanthorpe ...	1·94	46	0·73	2·53
Toowoomba ...	1·84	47	0·58	1·90
Warwick	1·57	32	0·98	2·32
Maranoa.				
Roma	0·99	45	0·53	1·31
State Farms, &c.				
Bungeworgorai ...	1·08	5	0.47	1·65
Gatton College ...	1·34	20	0·42	1·53
Gindie	0·82	19	0·81	0·15
Hermitage ...	1·55	13	0·87	1·95
Kairi	1·20	5	0·52	1·53
Sugar Experiment Station, Mackay	0·94	22	0·10	0·78
Warren	1·08	5	0·46	0·90

NOTE.—The averages have been compiled from official data during the periods indicated; but the total for August this year, and for the same period of 1918, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR SEPTEMBER, 1919.

Article.		SEPTEMBER. Prices.
Bacon	lb.	1s. 2d.
Barley	bush.	6s. 9d.
Bran	ton	£10
Broom Millet	"	£25 to £45
Broom Millet (Sydney price)	"	£90
Butter (First Grade)	cwt.	177s. 4d.
Chaff, Canary Straw	ton	£10 10s.
Chaff, Lucerne	"	£13 15s. to £19 15s.
Chaff, Mixed	"	£9 to £12 10s.
Chaff, Oaten	"	£13 5s. to £13 10s.
Chaff, Wheaten	"	£11 5s.
Cheese	lb.	11½d.
Flour	ton	£12 5s.
Hams	lb.	1s. 8½d.
Hay, Lucerne	ton	£17 to £18
Hay, Oaten	"	...
Hay, Wheaten	"	...
Honey	lb.	5½d. to 6d.
Maize	bush.	7s. 2d. to 8s. 1d.
Oats	"	7s. 6d.
Onions	ton	£17
Peanuts	lb.	7d.
Pollard	ton	£10 10s.
Potatoes	"	£20 10s. to £22 5s.
Potatoes (Sweet), per sugar-bag	..	8s. to 9s.
Pumpkins (Cattle)	ton	£4 10s.
Turnips (Swede)	"	£6 15s.
Turnips, per dozen bunches	.	1s. to 1s. 3d.
Eggs	doz.	11d. to 1s. 2d.
Fowls	per pair	8s. to 8s. 7d.
Ducks, English	"	4s. 9d. to 5s. 6d.
Ducks, Muscovy	"	8s. 9d. to 10s.
Geese	"	8s. to 10s.
Turkeys (Hens)	"	15s. to 16s.
Turkeys (Gobblers)	"	30s. to 33s.
Wheat (Milling)	bush.	7s. 9d.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar-bag	7s. to 17s. 6d.
Beetroot, per dozen bunches	1s. to 1s. 6d.
Cabbages, per dozen	3s. to 28s. 6d.
Carrots, per dozen bunches	9d. to 1s.
Cauliflowers, per dozen	9s. to 18s.
Cauliflowers (small), per dozen	4s. to 8s.
Lettuce, per dozen	6d. to 1s.
Marrows, per dozen	2s. to 5s.
Peas, per sugar-bag	6s. to 14s.
Potatoes (Sweet), per sugar-bag	5s. to 6s.
Pumpkins (table), per cwt.	5s. to 9s.
Tomatoes, per quarter-case	9s. to 15s.
Turnips, per doz. bunches	9d. to 1s. 3d.
Turnips (Swede), per sugar-bag	2s. 6d. to 3s.

SOUTHERN FRUIT MARKETS.

Article.	SEPTEMBER. Prices.
Bananas (Queensland), per case	25s. to 31s.
Bananas (Special), per dozen	...
Bananas (Tweed River), per case	25s. to 30s.
Lemons, per bushel-case	9s. to 12s.
Mandarins, per bushel-case	12s. to 22s. 5d.
Oranges (Local), per bushel-case	12s. to 20s.
Oranges (Navel) per bushel-case	14s. to 18s.
Passion Fruit, per double-case	16s. to 25s.
Pineapples (Queens), per double-case	17s. to 18s.
Pineapples (Ripleys), per double-case	16s. to 17s.
Pineapples (Common), per double-case	16s. to 17s.
Strawberries (Queensland), per tray	4s. to 7s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel-case	12s. to 17s. 6d.
Apples, Cooking, per bushel-case	10s. to 14s.
Bananas (Cavendish), per dozen	4d. to 1s. 0½d.
Bananas (Sugar), per dozen	4d. to 10d.
Cape Gooseberries, per box	8s. to 15s.
Citrons, per cwt.	7s. to 14s.
Cocoanuts, per sack	15s. to 25s.
Cumquats, per case	4s. to 7s. 6d.
Custard Apples, per quarter-case	6s. to 12s. 6d.
Lemons (Lisbon), per half-case	7s. to 10s.
Lemons (Rough), per cwt.	12s.
Mandarins, per case	15s. to 22s. 6d.
Oranges (Seville), per cwt.	16s. to 18s. 6d.
Oranges (Navel), per case	...
Oranges (Other), per case	14s. to 20s.
Papaw Apples, per quarter-case	2s. 6d. to 8s. 6d.
Passion Fruit, per half-bushel case	8s. to 15s.
Pears, per case	21s.
Pineapples (Rough), per dozen	4s. to 7s. 6d.
Pineapples (Smooth), per case	8s. to 13s.
Pineapples (Ripley), per dozen	4s. to 7s. 6d.
Rosellas, per sugar-bag	...
Strawberries, per dozen boxes	5s. to 20s.
Tomatoes (prime), per quarter-case	9s. to 11s.
Tomatoes (inferior), per quarter-case	4s. to 6s.

TOP PRICES, ENOGGERA YARDS, AUGUST, 1919.

Animal.	AUGUST. Prices.
Bullocks	£20 2s. 6d. to £23 10s.
Cows	£12 17s. 6d. to £16 2s. 6d.
Merino Wethers	43s. 3d.
Crossbred Wethers	50s.
Merino Ewes	30s.
Crossbred Ewes	38s. 9d.
Lambs	31s. 6d.
Pigs (Porkers)	44s.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET.

AT BRISBANE.

1919.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·30	5·47	4·59	6·4	4·46	6·27
2	6·2	5·34	5·29	5·48	4·59	6·5	4·46	6·28
3	6·1	5·34	5·28	5·48	4·58	6·6	4·46	6·29
4	6·0	5·35	5·27	5·49	4·57	6·7	4·46	6·30
5	5 59	5·35	5·26	5·49	4·56	6·8	4·46	6·31
6	5·58	5·36	5·25	5·50	4·55	6·8	4·46	6·32
7	5 57	5·36	5·24	5·50	4·55	6·9	4·46	6·32
8	5 56	5·37	5·23	5·51	4·54	6·9	4·46	6·33
9	5·55	5·37	5·22	5·51	4·53	6·10	4·47	6·33
10	5·54	5·38	5·21	5·52	4·53	6·11	4·47	6·34
11	5·53	5·38	5·19	5·52	4·52	6·11	4·47	6·35
12	5·51	5·38	5·18	5·53	4·52	6·12	4·47	6·36
13	5·50	5·38	5·17	5·53	4·52	6·13	4·47	6·36
14	5·49	5·39	5·16	5·54	4·51	6·14	4·48	6·37
15	5·48	5·39	5·15	5·54	4·51	6·14	4·48	6 37
16	5·47	5·40	5·14	5·55	4·51	6·15	4 48	6·38
17	5·46	5·40	5·13	5·55	4·50	6·15	4·19	6·38
18	5·45	5·41	5·12	5·56	4·50	6·16	4·49	6·39
19	5·44	5·41	5·11	5·56	4·49	6·17	4·49	6·39
20	5·43	5·42	5·10	5·57	4·49	6·18	4·50	6·40
21	5·41	5·42	5·9	5·57	4·48	6·19	4·50	6·40
22	5·40	5·43	5·8	5·58	4·48	6·20	4·51	6·41
23	5·39	5·43	5·7	5·58	4·47	6·21	4·51	6·41
24	5·38	5·44	5·6	5·59	4·47	6 22	4·52	6·42
25	5 37	5·44	5·5	5·59	4·47	6·23	4·52	6·42
26	5·35	5·45	5·4	6·0	4·47	6·24	4·53	6·43
27	5·34	5·45	5·3	6·1	4·46	6·25	4·53	6·43
28	5 33	5·46	5·2	6·2	4·46	6·26	4·54	6·44
29	5·32	5·46	5·1	6·3	4·46	6·26	4·54	6·44
30	5·31	5·47	5 0	6·3	4·46	6·27	4·55	6·45
31	...	...	5·0	6·4	...	...	4·56	6·45

PHASES OF THE MOON.

The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania, unless "summer time" is adopted.

			H.	M.	
3 Sept.	☾	First Quarter	12	22	a.m.
10 „	○	Full Moon	1	54	p.m.
17 „	☽	Last Quarter	7	32	a.m.
24 „	●	New Moon	2	34	p.m.

The Moon will be in Perigee on 13th at 6·6 p.m., and in Apogee on the 29th at 3·30 p.m.

2 Oct.	☾	First Quarter	6	37	p.m.
9 „	○	Full Moon	11	39	p.m.
16 „	☽	Last Quarter	3	5	p.m.
24 „	●	New Moon	6	40	a.m.

The Moon will be in Perigee on 11th at 2·54 p.m., and in Apogee on the 27th at 6·42 a.m.

1 Nov.	☾	First Quarter	11	43	a.m.
8 „	○	Full Moon	8	35	a.m.
15 „	☽	Last Quarter	1	41	a.m.
23 „	●	New Moon	1	20	a.m.

The Moon will be in Perigee on 8th at 11·54 p.m., and in Apogee on the 23rd at 12·21 p.m.

1 Dec.	☾	First Quarter	2	47	a.m.
7 „	○	Full Moon	8	4	p.m.
14 „	☽	Last Quarter	4	2	p.m.
22 „	●	New Moon	8	55	p.m.
30 „	☾	First Quarter	3	25	p.m.

The Moon will be in Perigee on 7th at 12·48 p.m., and in Apogee on the 20th at 1·36 p.m.

The Moon will cause an annular eclipse of the Sun on Nov. 23rd, but it will not be visible in Australia. There will also be a partial eclipse of the Moon on Nov. 8th which will be visible in England but not in 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 are nearly the same as those for Brisbane.

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

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

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

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

Farm and Garden Notes for November.

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

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

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

Orchard Notes for November.

THE SOUTHERN COAST DISTRICTS.

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

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where the land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended

to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple, Mussel, Circular Black, and Glover scales. Fruit fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

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

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

THE TROPICAL COAST DISTRICTS.

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

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

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

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

THE SOUTHERN AND CENTRAL TABLELANDS.

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

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

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

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

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

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