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Agriculture.

HINTS TO COTTON-GROWERS.

When Queensland was a cotton-exporting country, the American Civil War was raging, and small supplies of American cotton were only obtainable by English buyers through the medium of blockade-runners, and the demand was so great that the mixed condition of much of the Queensland cotton shipped to England was not too closely scrutinised; hence, a bale of cotton, consisting of several varieties—long and short stapled—mixed together, brought almost, if not quite, as much as a bale of only one variety. It is even on record that a ginowner at Oxley, at the close of the picking season, ginned a large quantity of damaged cotton, which was brought in by farmers when delivering their seed cotton at the gin-house, and used for engine-cleaning. This cotton consisted of immature and weather-beaten stuff, discoloured—red, blue, yellow, and brown. Two bales of this cotton were shipped with other bales. When the account sales arrived, this rubbish fetched the same price as the best, 1s. 0½d. per lb. The only remark of the Liverpool agent was that "a couple of bales appeared to be slightly damaged by salt water"!

Such a case could not well recur, even during the present scarcity of cotton, owing to the war and to the serious decline in the American crop, due mainly to the ravages of the boll weevil, which have resulted in abnormally high prices for all classes of cotton. The production of Sea Island cotton seems to be in a precarious condition, judging by the following article published in "Cotton and Cotton Oil News," of 30th October, 1916, reprinted from "Cotton Record," under the caption "A Crisis in Sea Island Culture"*:—

Three or four years ago there was a crisis in the Sea Island industry. The demand almost entirely ceased, and although the production was not at all excessive, prices fell to a discouragingly low level. Nobody seemed to want Sea Island cotton any more, and it looked as if the cultivation would have to be abandoned.

"Another crisis has developed; and, although the cause is entirely different, the ultimate tendency is the same—namely, the abandonment of the industry. On the former occasion, the industry was menaced through lack of support, consumers appearing to prefer the cheaper imported article. This time it is menaced through impossibility of production.

"Already the boll weevil has reached the Sea Island section, and Sea Island cotton is more seriously endangered than Upland is. The Sea Island is of slower development; it has to be planted about a certain season, and is not so susceptible to forcing. With Sea Island, there is no way of sneaking in a fair crop before the weevil gets to actual work. And, besides, the Sea Island territory does not usually have those extremes of temperature which to some extent restrict the development of the weevil. It appears that by the time the weevil has spread to the whole Sea Island section, the chances for a crop will be almost nil. The weevil will not be starved out by the abandonment of Sea Island culture for a season or two; efforts will be made to grow Upland cotton, and the insect will be perpetuated.

"Even this year's crop is quite disappointing; for, while the acreage was possibly the largest ever planted, the production is hardly an average one. The moderate crop and the increased obstacles in the way of obtaining the foreign cotton have combined to bring about an acute situation in the market, and prices are higher than for many years.

* Sea Island cotton derives its name from the Sea Islands—James, Edisto, Wadmalaw, and John's—off the coast of South Carolina, U.S.A., which are under the influence of the warm Gulf Stream, its warmth giving rise to considerable condensation, resulting in a dampness of the atmosphere and heavy dews, which contribute to the perfect maturing of the fibre. Uplands cotton can thrive even with long spells of dry weather, whereas any long absence of moisture is injurious to the Sea Island plant.

"The demand for cotton of a long and strong staple is constantly increasing. It furnishes the best fibre for making the web of automobile tires, and the call for this purpose is expanding by leaps and bounds. With a tire costing up to $40 or more, and the web an indispensable part of it, what difference would an advance of 5 to 10 cents in the price of Sea Island cotton make to the tire manufacturer? By adding a dollar or two to the price of the tire, he would get back the added cost of the cotton ten or twenty times over.

" Amid the Latin notes to an old Greek text were just two anglicized lines. The Greek author was depicting the scene of a recent savage battle, and the particular incident was a mother, wounded unto death, with her infant at her breast. The two lines in English were these:—

"Suck, little wretch, while yet thy mother lives;
Suck the last drop her fainting bosom gives!"

"For grim pathos it would be difficult to surpass these two ruggedly eloquent lines. Unforgettable, they come back to mind after the lapse of half a lifetime, and seem to suggest an analogy to the present situation in Sea Island cotton.

"Now that the very life of the culture of the staple is menaced, is the trade beginning to realise how very valuable the commodity is? Perhaps, in the course of a comparatively short time, the bosom of mother earth will cease to yield any more. Is it an intuitive apprehension of this peril which makes the formerly indifferent trade so eager to obtain a supply while there is still a little to be had?

"We are not writing an obituary notice or a funeral oration for the Sea Island industry by any means. The industry is threatened by a crisis, but threats are not always fulfilled, and one crisis can be successfully passed through as well as another. Moreover, we have strong faith that the boll weevil problem will eventually be solved."

Queensland farmers who are growing Sea Island or Caravonica this season would doubtless realise very high prices if their crop could be placed on the British or the American market at a reasonable rate. In ordinary times Sea Island cotton was generally quoted at from 1s. 3d. to 1s. 8d. per lb. It is impossible to say what the market price will be in view of the probable total failure and possible cessation of the cultivation of this valuable variety of cotton—probably over 2s. per lb; and Caravonica, being an equally valuable long-stapled cotton, would also participate in a rise in price. Already Upland cotton is bringing 10d. to 1s.; and, were it not for the freight difficulty, growers who send their cotton to the ginned by the Department of Agriculture would find that their cotton crop would be the most valuable of all field crops.

To get on, however, to the main object of this article. What we wish to warn cotton-growers of is that two or three different varieties should not be planted, as we might say colloquially, within "coo-ee" of each other. It should be remembered that bees and other insects are the principal agents in pollinating the flowers, and many of these insects—bees especially—range over a large extent of country. Hence arises the variation in the character of many of our originally choicest fruits.

vegetables, and other plants, including cotton. In proof of this degeneration we may instance a boll of cotton we recently received, supposed to be Russell's Big Boll. It contained twenty-nine seeds, of which thirteen were of Sea Island and sixteen Russell's. Singular to say, these were absolutely distinct, each variety occupying a different section of the boll, and each having its own distinctive characteristics of long and short staple. From a field thus hybridised, only mixed fibre could result, and the price obtained for the ginned cotton would be reduced to the value of shorter staple.

COTTON NOTES.

We have frequently expressed the opinion that the revival of cotton-growing in Queensland is not to be brought about by establishing large plantations, but rather by adopting the American plan of small areas grown by farmers in conjunction with other crops. Under the heading "Don't be a Chump," a Texas journal—"Cotton and Cotton Oil News"—gives the following sensible advice:—

"If our farmers had to buy their corn, meat, hay, and other indispensable supplies they would not be benefited much by 15 or 16 cents cotton.

"The lesson this crop teaches is what the Press, the Government demonstrators, the agricultural schools, and colleges, and a hundred other agencies have tried to teach for many years.

"Let not our farmers forget the teachings of past years. Let them not be tempted next spring to plant all cotton, for no farmer can afford to grow 14 or 15 cent. cotton and go in debt to his merchant for farm and family supplies. Don't be a chump.

"This cotton crop is undoubtedly small, yet it will put more money in our farmers' pockets than any other cotton crop ever grown. What is the reason? There are several. In the first place, our farmers produced the crop at less expense than usual. There are fewer debts to be paid out of the proceeds of the cotton crop.

"Again, farmers practised diversification more generally than ever before; and hence they have more corn, more forage and small grain, more vegetables, poultry, hogs, &c., than they have had since the Civil War.

"The prosperity that now blesses the land is not due to the high price of cotton so much as to the diversification which was practised.

"The boll weevil has very nearly made a clean picking of the cotton-fields of Alabama, yet he is not an unmixed evil, since diversification always follows in his wake.

"Even with cotton at 16 cents, farmers should not rely on buying everything they need with cotton money, but they should hold fast to diversification as the path of safety and the highway of prosperity.

The Southern cotton-grower who plants all cotton next year because it is high this year is a short-sighted chump.

"The world demands at least a 15,000,000-bale crop. The production promises to fall short of this demand by 3,000,000 bales or more. Here is a big demand with a small supply, and the result must be high values for the staple."

[The ten to fifteen million 500-lb. bales of cotton produced in the United States are the result of small areas planted by thousands of farmers, who also produce various other crops, raise millions of pigs, and billions of eggs and fowls. The same thing could easily be done in Queensland.]

MORE COTTON FROM THE COTTON PLANTS.

It is hoped to get a greatly increased cotton crop from the same acreage by means of a method devised by John B. Hall, of Philadelphia, Pa., who has been recently awarded a patent on his system. There is a great deal of loss in the cotton-fields in the shape of cotton-bolls which, for one reason or other, never mature, says "The Scientific American." Mr. Hall contemplates turning the pickers into the fields a little earlier than is usual and picking all the bolls before they are open. They are then treated to a bath of a solution in which starch and talcum enter largely, and in a moderately warm temperature the bolls are artificially opened and the burden of fibre is removed in the usual manner. The cotton recovered in this manner is said to be superior to that allowed to remain longer on the plant, in that it has a beautiful lustre. Another interesting feature of this process is that it is said to bring about the downfall of the boll weevil, which requires to be matured in the boll.

CASTOR OIL PLANT.

Of late there has been considerable inquiry as to the cultivation of oil-yielding plants, particularly of the castor oil, as a payable farm crop. There is ample evidence that the plant will thrive almost anywhere on the coast lands of Queensland. In and around Brisbane it may be seen growing and bearing heavy crops of seed in all sorts of out-of-the-way places—on the river banks, in quarries, on unoccupied allotments, &c.; and this applies as well to other coastal localities in Central and North Queensland. No attention has, however, been given to it with a view to turning a plant, which is looked upon almost as a noxious weed, to profitable account. Most people, especially children, know to their sorrow that castor oil is a most valuable medicine; but not many are aware of the large quantities which are used for lubricating machinery and for illuminating purposes. In India it is used on all the railways in the signal and carriage lamps, owing to the brilliancy and safety of the light. It burns very slowly, and thus is more economic than other oils.

The plant is exceedingly hardy and will stand a wide range of climate. The seeds have extraordinary vitality. Oil seeds, as a rule, quickly lose their germinating power; but the castor seed seems to be an exception. Seeds known to have been kept for fifteen years in a bottle have been sown in Queensland, and have produced healthy plants.

In a tropical or even sub-tropical climate the plant becomes a perennial tree instead of an annual, attaining a height of from 20 to 30 ft. The plant should thrive well in the Kilkivan and Nanango districts. The best soil for castor is much the same as that required for the cotton plant —a rich, well-drained, sandy loam. It will not thrive on heavy, wet soils. As the roots penetrate very deeply, the land must be deeply ploughed and well worked. The seed is planted in rows 6 to 8 ft. apart each way, three or four seeds being planted in a hole. Before planting, they should be softened by having hot water poured over them, and then being left to soak for twenty-four hours. In ten days after sowing the seeds will germinate; and when the plants are 8 or 10 in. high, the three weakest must be taken up where four seeds have been put in. They grow very rapidly, and begin to bear in four months. Like the coffee and cotton plants, the castor plant would grow to an inconvenient height if left to itself. It should, therefore, be kept low by pinching back the main stem. This will have the further effect of causing the plant to throw out many more fruit spikes than it otherwise would do. When the tree gets old, the usual scale insect (the *Coccus*) attacks the bark. They have to be dealt with, as in the case of citrus and other fruit trees, by spraying with kerosene emulsion.

When the capsules turn brown, it is time to begin the harvest. This is done by cutting off the spikes and removing them as soon as possible to the barn. The work of harvesting must be done rapidly, for if the seeds are allowed to ripen on the tree the pods burst open and the liberated seeds fly in all directions. This "popping" of the capsules makes the matter of freeing the seeds a very simple one. All that has to be done is to prepare a drying-ground either in a shed or in the open. The ground should either be boarded or swept quite clean. When the spikes are brought in, they should be spread out on the drying-ground to the depth of from 6 in. to 1 ft., according to the heat of the weather. Should rain occur when out-of-door drying is being carried on, draw the spikes into heaps and cover with a tarpaulin. Turn the spikes over frequently to let all get the benefit of the sun. The capsules will soon begin to burst, and in four or five days they will have shed all their seed. All that remains to be done is to sift or winnow out the husks. When drying in the open it is well to surround the drying spikes with a low rampart of galvanised iron or bagging, for the reason that many seeds fly out very violently, and without some such precaution they would be lost.

The return from an acre is about 20 bushels, a bushel of seed weighing 46 lb.

In an article by Mr. W. Soutter on the castor oil plant, published in this Journal in November, 1901, the matter of extracting the oil is discussed. "Those," he wrote, "who would venture to embark in the production of oil-seeds have to face the fact that the market is too far distant to leave a margin of profit after deducting the freight and other charges. The only remedy, therefore, is to endeavour to bring the market nearer, and this can only be done by bringing the oil-miller alongside the raw material. The actual outlay in erecting an up-to-date oil mill is not large, as will be seen by the following estimate:—

A mill to deal with 30 to 45 cwt. of castor per day would cost £750.
A mill to deal with 40 to 70 cwt. of castor per day would cost £1,050.
A mill to deal with 100 to 150 cwt. of castor per day would cost £2,400.
A mill to deal with 160 to 200 cwt. of castor per day would cost £3,000.

Skilled labour would be required to make the oil''; and Mr. Soutter's idea was to induce ''men with the necessary capital to take the matter in hand, and thus find another string for the farmer's bow.''*

A comparatively simple process can be tried by anyone interested, and a good oil should result. It is as follows:—

First cleanse the seeds from fragments of the husks and from dust, and submit them to a gentle heat, not greater than can be borne by the hand, which process makes the oil more fluid and more easily expressed. A whitish, oily fluid is thus obtained, which is boiled with a large quantity of water, and all impurities are skimmed off as they rise to the surface. The water dissolves the mucilage and starch, and the albumen is coagulated by the heat, thus forming a layer between the oil and the water. The clear oil is then removed, and boiled with a small quantity of water until aqueous vapour ceases to rise and a small quantity taken out in a phial remains perfectly transparent and cool. The effect of this is to clarify the oil and rid it of volatile acid matter. Care is necessary not to carry the heat too far, as the oil would acquire a brownish colour and an acid taste.

In India the seed is crushed between rollers, placed in hempen cloths, and pressed, and then the oil is heated with water in a tin boiler until the water boils. This separates the mucilage and albumen, the product being finally strained through flannel.

Cheap wooden rollers would serve the purpose, and these could be driven by a horse gear.

WEAK POINTS OF SOYA BEANS.

As we have often pointed out, soya beans have their weak points. These are chiefly two. The seed rapidly deteriorates in germination. It is generally unwise to use seed over one season old, and it should not be covered to a depth of over 1½ in. The greatest weakness of the crop is the difficulty in getting good stands. The other serious weakness is that unless it is cut at the right time and handled properly, the beans ''pop'' out or shatter badly in harvesting. They must not be allowed to get too ripe.

The only safe plan is for each farmer to grow a small acreage until he learns how to handle the crop.—''The Progressive Farmer.''

* The cost of such mills to-day would be far higher.—[ED. " Q.A.J."]

The Horse.

CAVALRY HORSES.

A correspondent of the "Live Stock Journal," London, writes on this subject as follows:—

"I should like to refer to what various other countries are using as mounts for their cavalry, all of which goes to point to the fact that horses with a percentage of Arabian blood in their veins are used very largely by our Allies, and also recently by the United States expeditionary force sent into Mexico. The small horse of 15 hands has proved himself always the best for campaigns and long-distance rides.

"Many of the horses ridden by the United States cavalry in the recent Mexican rising were Arabs and half-bred Arab-Morgan horses, some being bred by Colonel Spencer Borden at his stud farm at Falls River. It was a long time before the United States Government would consider their use, but Colonel Borden was so sure of what they could do that he persuaded some of the younger cavalry officers to ride some of his Arabs in an endurance test, which they did, beating all comers; the only other one that came anywhere near was a three-quarter bred Arab-Morgan mare, 15 hands. They carried, in most cases, over 12 stone, and had to travel over very bad roads, some of which were covered with snow and ice, as the test took place in winter time.

"The Russians use high-caste Arab stallions for breeding remounts, they having purchased in England among others some years ago the Arab stallion Mesaoud for the figure of 800 guineas from the Crabbett Arabian Stud. The ponies ridden by the Cossacks all have a percentage of Eastern blood in them, and it is well known how easily they endure fatigue and hardship of all kinds. Only a few months ago it was reported that Cossack officers had come through Persia and joined our officers in Mesopotamia after a long ride.

"High-caste Arab stallions are used in the following countries for breeding remounts:—Italy, Portugal, Spain, Java, Sumatra, India, Hungary, Turkey, Egypt, and France. We are about the only cavalry nation that have never tried Arab stallions as sires for our cavalry remounts, although all through the Boer campaign the Arab and the Basuto ponies (half Arab) proved their value on all occasions. One cavalry colonel, who took out five picked Irish hunters and one Arab stallion, had to give the hunters up, as they went to pieces during the first six months, and rode his Arab for the rest of the war, and he never went sick or lame. Hunters, when they came in from a forced march, very often being led by the troopers on account of leg trouble, were unsaddled and turned loose. Instead of having a roll in the sand or dust as the Arab did, they stood about and would not eat, and whinnied for their grooms to come and rub them down and rug them up and give them their feed of corn, whereas the Arab went off and picked up any herbage he could find, and was content.

"During the Omdurman campaign the cavalry had to leave their horses behind and use Arab and Syrian ponies. Out in the Western States of America no one ever thinks of using a big horse on a cattle round-up or on a long-distance journey. If they did they would soon go to pieces, as they could not thrive on the coarse herbage. The Mexican ponies are full of Eastern blood brought over when the Spaniards conquered Mexico. Some years ago, when there was a race across the desert in Egypt between an English T.B. and an Arab, the former broke down about half way, and the latter finished alone not in the least distressed.

"The reason why Arabs are not popular in this country is: Firstly, on account of their size, which is from 14 hands 1 in. to 15 hands, and people, especially officers, state they are not up to weight, which is not correct, as it is well known they will carry 16 stone all day. Secondly, on account of there being brought to this country at intervals Barbs, Gulf Arabs, Dongola Arabs, and Syrians, and sold here as high caste. They are bought and found to stumble; they will not jump, and have, as a rule, not much of a shoulder; and at once the Arab is condemned, although the people who have had inferior ones probably have never ridden a high-caste one. The writer of this article has one which he has ridden from London to Brighton and back twice.

"I might add, in conclusion, that whatever the high-caste Arab is crossed with—*i.e.*, Cleveland Bay, T.B., Hunter, Trotting, Morgan, or Suffolk—he will stamp his likeness, docility, and hardiness on his young stock; and what would make a finer charger than a high-caste Arab crossed with a T.B. or Cleveland Bay mare?"

MOST VALUABLE TREE IN THE WORLD.

Everyone who makes a living from the soil might appreciate such a tree as the *Gantor avocado* in Whittier, near Los Angeles, Cal. In no year since it began bearing has it brought its owner (H. A. Woodworth) an income of less than 2,000 dollars (£400), and the annual average is 3,000 dollars (£600). Ordinarily the proceeds from avocado growing range from 400 dollars to 2,000 dollars (£80 to £400) per tree.

The Avocado is more generally known as the Alligator Pear. It is about the size of the Bartlett fruit, and very dark green in colour. The flesh is about the consistency of a banana, and is prized highly for salads. —"Cotton and Cotton Oil News."

[The Avocado or Alligator Pear thrives and bears well in Queensland, but we have never seen them offered for sale, nor do we think they would bring as much in our markets as prime navel oranges. Tastes differ.—Ed. "Q.A.J."]

The Orchard.

BANANA CULTURE IN THE TWEED DISTRICT.

By G. E. B. WELSH, Mirambeck Farm, Tweed Heads.

For many years sugar-cane has been the main crop grown in the Tweed district, but since black labour ceased to be available sugar-cane growing has gradually declined, and now, on the rough and hilly country, only small areas are to be seen growing because of the heavy cost of white labour, which has absorbed the profits, the grower finding that, after waiting two years for his crop to mature, very little was left over after paying expenses. Some growers sowed down their land with grass and embarked on the dairying industry; others allowed the lantana to grow up, then brushed the lantana, burnt it, and planted bananas. Some of the plantations in this district look extremely well, and it is fortunate that the banana seems a crop which can be successfully grown in very rough country, because some of the sites selected for banana plantations are so steep and rocky that it is an impossibility to cultivate by means of horse labour. In this district can be seen bananas growing most luxuriantly amongst masses of rock and huge boulders.

Some of the essentials for success in banana-growing are a good rainfall, a well-drained and warm soil rich in potash, and a sheltered position; the rain should fall chiefly in the summer when the soil temperature is high, the chief growing period of the banana, also in the spring to give them a start after the winter. Shelter from rough and cold winds is necessary, because of the immense weight of the bunches causing the stems to sway about when the huge leaves catch the wind, and in consequence the sucker is either broken off or uprooted. The leaves become torn in strips by the wind, but their efficiency is not much impaired by the tearing, because the vascular bundles run parallel to each other and are not broken across; thus their functions are not interfered with.

From reliable reports issued from Queensland's Chief Agricultural Chemist we learn that bananas—plants and bunches—remove from soil the following in lb. per acre:—Pure potash, 271·48; phosphoric acid, 22·52; lime, 102·15; nitrogen, 84·54; these figures convey to our minds the immense importance of potash and lime for bananas. Just as the speed of a locomotive is governed by the amount of fuel and water to supply the steam, so the development and quality of the banana depend on the available supply of plant food. The banana plant is naturally a very rapid grower, and the enormous quantity of potash must be readily available. An inefficient supply is known to adversely affect the formation of carbo-hydrates.

As before mentioned, the bananas in this district are being chiefly grown on old sugar-cane land which has been permitted to become over-

PLATE 1.—BANANAS PACKED FOR MARKET.

grown with lantana, and, when burnt, the lantana has furnished a supply of potash in its most available form. This, I believe, explains why, where there has been a heavy growth of lantana followed by a good burn off, the bananas during the first four years thrive so well, the enormous growth of foliage with that dark green, healthy colour, denoting abundance of available plant-food; also, the bunches are large and well-filled. But under this heavy strain of cropping the requisite plant-food becomes exhausted quicker than nature can supply it, the plants assume a yellow-green colour, the bunches are smaller, and eventually the plantation becomes neglected because the crops no longer pay for the labour required. Disease then soon asserts itself, and the grower blames the soil, the weather, the supplier of the stools, or anything but himself.

We must remember bananas are surface rooters, and in comparison to their size their roots do not extend a very long way, whereas the majority of fruit trees establish a system of roots extending in all directions, growing to a great depth as well as covering a large area; they also take several years to establish themselves before the heavy demands of fruit-bearing are made. Trees have been known to send out roots long distances to procure food or water not found close at hand. Bananas are not adapted for this, and if the necessary food is not within easy reach they soon assume an unhealthy and stunted appearance.

We also learn that lime is very necessary for the banana. Having tested samples of soil in this district with dilute hydrochloric acid, I have found it very deficient in lime. Owing to the continued growth of sugar-cane in this district for many years, the soil has become acid in reaction; and it is a well-known fact that microfungi are favoured by an acid reaction, and the action of bacteria which fix nitrogen is hindered. Not only does lime prevent fungoid diseases but it obviates it on soils where they already prevail; dressings of lime also render available both potash and phosphoric acid, which are brought into a more soluble form; and just at this time, when the world's largest store of potash salts is locked up in Germany by the war, it is well to bear in mind that a liberal application of lime to soils deficient in such is a good investment.

It is erroneous to conclude that if superphosphate of lime or bones, which are phosphate of lime, be supplied to the soil, these fertilisers will supply the lime required. Lime or its carbonate is required in the soil to supply a free base. Superphosphate is saturated with sulphuric acid in the process of its manufacture so that there is an excess of acid, and the use of this fertiliser reduces the amount of the carbonate of lime in the soil; in fact, used on land deficient in lime, superphosphate has a favourable influence on the spreading of some fungoid diseases by reason of its increasing the acidity of the soil.

Basic slag is a phosphatic fertiliser which supplies both phosphates and lime to the soil; it is a cheap manure, can be safely stored in bulk, and where land is deficient in lime basic slag will give much better results than superphosphate. Basic slag requires a good rainfall to assist in bringing it into action, and it is a very slow-acting manure, requiring eight to twelve months before its action is seen.

On light porous soils lime exerts a good effect in causing the cohesion of the fine particles; thus the soil becomes more retentive of moisture, enabling crops to better withstand spells of dry weather.

A simple method for testing the acidity of the soil is to procure some blue litmus paper from the chemist and wrap it round a ball of moist soil; should the litmus paper gradually turn red, it denotes an acid soil; if some soil which has received a dressing of lime be wrapped up in the red litmus paper, it will change it back to blue. It is advisable not to handle the litmus paper previous to the test, as such will turn it red and spoil the test. A better and more effective method is to use a flat-bottomed glass, in the bottom of which is placed a round piece of litmus paper, and on top a round piece of white blotting-paper the same size, both resting on bottom of glass; next, place some soil which it is desired to test in the glass, and moisten with clean rain water and stand for an hour or more. Should the colour of the litmus paper be changed to red, it indicates an acid soil; a quick change of colour shows a very acid soil.

As previously mentioned, disease soon asserts itself in a neglected plantation because starvation of an essential food constituent may act as a specific cause of predisposition; the whole matter of immunity from disease is very closely related to the nutrition of the plant and its environment. Queensland fruitgrowers are fortunate in having the advice of a thoroughly qualified staff of experts, but much of their valuable assistance is rendered void to the State simply because some growers are not alive to their own interests. When reports are tendered of diseases and pests, how frequently is the remark made: "It will not pay," or "It is too much trouble." In the case of the merchant with large premises carrying a valuable stock and who neglects to insure such stock, if fire breaks out and consumes his goods, what farmer would not condemn that merchant for taking the risk? Yet, when methods are carefully described and advocated for the prevention and curtailment of diseases and pests, how often the farmer ignores them instead of adopting them, thereby increasing the production of the best crops, free from disease, and thus assisting to meet the demands of home consumption, and in this way preventing the profitable importation of foreign-grown fruit and products and helping to grow an exportable surplus, so that capital may be sent into the country, instead of *vice versâ* to purchase abroad produce inferior to that which can be grown here.

Bananas have many advantages over other crops; they bring in quick returns, their cropping period is more under control and is spread over the whole year, affording a regular income, and they are not so subject to market gluts as fruits which reach maturity only at one season of the year, entailing a great rush of work. Bananas do not suffer to so much extent from insect pests, and are more easily protected from the raids of flying-foxes, as they are cut and marketed when in an unripe state. It is utterly useless to plant bananas within the frost zone or in cold exposed situations, so the grower does not run the risk of losing his whole crop and having to wait another year for returns, as is often the case with peach, plum, and apple growers. Frequently, windfalls cause a serious depletion in the returns of the latter crop. Pilfering in transit has also to be considered. The large consignments of bananas which reach Sydney every fortnight from Fiji indicate the immense demand and popularity of the banana, and there is no reason why the bulk of this demand cannot be met by the banana districts of Queensland and the Tweed if only growers would plant larger areas, organise, and place the whole trade from the production to the marketing on a thorough business footing. What has been done by the Fiji and Jamaica banana-growers can just as easily be done in Queensland when rational labour conditions are again resumed.

THE ALGAROBA BEAN.

(*PROSOPIS JULIFLORA.*)

In the May number of the Journal, 1916, we gave an illustration of this valuable tree, and explained to a correspondent that the seeds he had in his possession were those of the Algaroba or Mezquit Bean, and that another kind is known as the Carob, the Locust, and St. John's Bread. We are still receiving inquiries about the tree; and a perusal of the following paper on "The Carob, by C. W. Beers, County Horticultural Commissioner, Santa Barbara, California" (published in the Monthly Bulletin (Vol. V., No. 8) of the State Commission of Horticulture, Sacramento, Cal.), will be of interest to our correspondents, affording, as it does, the fullest information on the subject:—

THE CAROB—*CERATONIA SILIQUA.*

For several years the writer has been attempting to interest the farmers of California in the above forage tree, and the demand for some available literature on the matter has led to the preparation of this paper.

WHAT IT IS.

The carob is an evergreen tree, growing from 25 to 30 ft. in height, and old trees are reported as 40 in. in diameter. The tree is long-lived, comes readily from seed, and grows with little care after it is once established. In Santa Barbara there are a number of trees, planted eighteen years ago, that are from 15 to 18 ft. high. They are 15 ft. apart in the row, and the branches are interlocking. One tree from the same lot of seedlings has a spread of over 20 ft., and is 30 ft. in height. The carob belongs to the Leguminosæ, and, besides yielding a large amount of highly nutritious forage it enriches the soil by storing up nitrogen through the roots.

ADAPTABILITY.

The carob will grow where other plants make a very poor showing. On high, dry, rocky points, by roadsides, along drives, bordering watercourses, anywhere where vacant spots are to be found, there this beautiful glossy foliage tree may be grown, adding to the landscape attractions and every year bearing an abundance of high-grade forage.

It will endure neglect after once established, and can be planted 60 to 100 to the acre where soil conditions are moderately favourable. A recent visitor to Algeria tells me he saw the carob everywhere. In the lower fertile lands were found fruit trees and crops; on the next higher lands grapes were carefully tended; but on the high dry places the carobs were planted, and make a splendid growth.

G. P. Rixford has a record of a carob that grew in a rock crevice at Campo Seco, Calaveras County. He says:—"It had bid defiance for many years to the sulphur fumes from the neighbouring copper smelter which had killed every vestige of vegetation in the vicinity, except the poison oak—*Rhus diversiloba*. It finally succumbed, not to the acid fumes, but from lack of moisture after the little soil in the crevice had been washed out by rains, leaving the roots bare."

Thousands of acres of our own pasture lands, now averaging less than 1 ton of indifferent forage, can be made to produce upwards to 5 tons of carob pods.

PRODUCTIVITY.

Dr. Aaronshon, of Palestine, who attended the Fresno Convention in 1912, said that seedling trees will produce an average of 350 to 500 lb. per tree. Twenty trees to the acre will thus produce 3½ to 5 tons each year. He reports grafted trees, eighteen years old, bearing 900 to 1,100 lb. each. When one reflects that the carob is easily grafted, the possibilities of a pasture of carobs makes the industry quite worth trying out.

NUTRITIVE CONTENT.

Pods from six seedling trees now growing in Santa Barbara were sent to the United States Department of Agriculture, Washington, and the following analyses were reported:—

	A	B	C
Gillespie	27.14	13.78	91.94
Gould, No. 38	24.82	15.02	89.98
Gould, No. 27	23.39	15.65	92.28
Gould, No. 24	30.20	13.16	91.84
Gould, No. 18	32.58	12.57	90.24
Gould, No. 9	30.34	14.31	92.00

A—Sucrose per cent. B—Reducing sugars per cent. C—Dry substance per cent.

In this report, No. 18 shows a sugar content of 45·15 per cent.; No. 9, 44·65 per cent. sugar; No. 24, 43·36 per cent.; and the Gillespie tree gave 40·92 per cent. The poorest of them is a very rich forage product. Dr. Aaronshon says the pods carry, in addition to the sugar content, a protein supply of 7 to 8 per cent.; and in the Experiment Station Record No. 10, for June, 1905, will be found the analysis of a carob pod that yielded 43·57 per cent. sugar and 15·22 per cent. protein; but allowing only an 8 per cent. of protein and 45 per cent. sugar, and we have the following most interesting and remarkable series of comparisons:—

COMPARISONS.

Wheat is a rich ration, running higher than the carob, pound for pound; but, to equal 5 tons per acre of carob pods, wheat must yield 3 tons of grain to the acre, which is out of the question.

Alfalfa is a splendid feeding product, and stores up nitrogen in the soil while producing the hay. Compared with the carob at 45 per cent. sugar and 8 per cent. protein, the ground must produce 5 tons per acre, and that on rocky, hilly places, without irrigation and without cultivation. Besides, the carob is one of those trees whose rootlets store up nitrogen in the soil.

We Californians feed quantities of barley, both as a grain ration and as hay, and to make a crop we require good soil, good seasonal conditions; and, when threshed, to equal 5 tons of carob pods, each acre must yield 3½ tons of sweet, dry, first-class barley.

Bean straw is carefully husbanded, baled, and housed, and sold at a price that brings good returns; but, to equal 5 tons of carob pods, each acre must yield 6 tons of bean straw.

It requires 30 tons of carrots to provide the same elements found in 5 tons of carob pods. Corn and cob ground requires 3 tons to the acre to equal the product of 1 acre of carobs. Corn meal must weigh 2½ tons to equal in food product 5 tons of carobs.

Oats are found to be a great ration for milch cows; but, if the crop is to keep pace with carobs, there must be delivered at the sacking shoot 3 tons of grain per acre, or of good clean oat hay the land must yield 4 tons.

Men pay good prices for beet tops to sugar factory people, but, to equal the acreage of the carob, each acre of beets must furnish 38 tons of tops. It is difficult to realise the economic importance of such a product. It requires 3½ tons of cotton-seed meal to equal the acre product of carobs. For human food, it is richer than cow's milk, pound for pound.

FEEDING.

Horses, cattle, sheep, and hogs take readily to the pods; and turkeys soon learn to fly into the tree, tear off the pods, break them, and eat them. Chickens will readily feed on the pods when broken up. The Arabs feed the pods to their fine horses. The carob is the main forage for the English cavalry horses in Malta and for the tram horses in Naples, while it is a common sight to see the London cabby give his horse a feed of the brown pods while waiting for a customer. The island of Cyprus grows large quantities of this forage, and it constitutes its largest export.

The carob is a splendid avenue tree, and hundreds of California farmers could add very materially to their forage supply by planting these trees where shade and ornamental trees are desired.

FEEDING VALUE.

Dr. F. W. Woll, Professor of Animal Nutrition, University of California, at the Davis Farm, carried on a feeding test with calves. One bunch of calves received, as their grain portion, ground milo and ground barley, half and half; the other bunch receiving an equal amount of crushed carob pods and ground milo, half and half. This experiment extended over a period of thirteen weeks; and at the close of the period those fed on milo and barley had averaged a gain of 1·70 lb. per day, while those fed on the carob pods and milo averaged 1·81 lb. Those fed carobs required more hay than the others, so, taking it altogether, the carob showed values equal to ground barley. This test was made with pods from seedling trees, the sugar test being no higher than those mentioned above, and probably much below that average.

PROPAGATION.

The seeds come readily. By planting the seed pods on edge, close together, in a sprouting-box, with a slight covering of soil, there will be a succession of seedlings, covering two or three years. This method seems to protect the young seedling from the damping-off fungus, that otherwise causes great loss of the young plants. There seems to be a ferment in the pod that protects the early growth. Seeds stripped from the pod and treated with hot water come quickly, but these young plants are very susceptible to the damping-off fungi.

I. L. Knudson, in the Journal of Biological Chemistry, shows that tannic acid is toxic to a large number of fungi. In the early ripening period of the carob, tannic acid is present in large proportions, making the pod very bitter and astringent, and this suggests to my mind that this tannin may remain in the pod to an extent sufficient to inhibit the deadly action of the damping-off fungi on the young seedlings, when the pod itself is planted. In the Journal American Chemical Society, F. M. McClenahan has shown that in the young walnut a very thin seed coat separates the tannic acid, so abundant in the walnut shell, from the fatty substance of the walnut meat; doubtless placed there to protect the fats from the action of the fungi that would destroy them. It has been shown that the tannic acid of the date, persimmon, banana, and olive is not removed by the ripening process, but is sealed up in some manner that renders it insoluble during the process of mastication, so that, although the fruits are delicious to the taste, the tannin remains in the fruits. While the rôle that fats and tannin play with reference to each other may not be known, is there not a suggestion in the findings of Knudson and McClenahan that, possibly, one relation between them is the inhibition of fungus action of fats and sugars during the formative periods? and then, later, the destruction of damping-off fungi at the period of germination?

Possibly this may account for the fact that seedlings grown from planting the entire seed pod are immune from damping-off fungi, while those from cleaned seeds are very apt to be destroyed by them.

GRAFTING AND BUDDING.

The tree is easily budded or grafted, and the union appears very intimate. Grafted and budded trees bear earlier than seedlings, and produce heavier crops. Only by this method can the nutritive content be determined beforehand, as seedlings do not come true to product; also, the carob is diœcious,* and in seedling trees there is an excess of

* Diœcious—a term used when the flowers are unisexual, and the male and female flowers occur on different plants.—[ED. "Q.A.J."]

staminate trees, and by budding or grafting this can be controlled. It has been found that, by budding a single branch of a pistillate tree to a staminate bud, there will result an abundance of pollen to fertilise all the balance of the tree, thus making every tree a fruit-bearer.

TEMPERATURE RANGE.

Eighteen degrees of frost does not injure the carob to any extent. Frost conditions that did marked damage to citrus trees made no impression on carobs growing within a few feet of them.

CONCLUSION.

And what more shall be said? Do we advocate planting carobs instead of grains? Shall we plough up our alfalfa and put out this thrifty tree? Are we proposing to revolutionise present good systems of farm procedure? Not at all. But we do urge and expect that the good sense of those who may read this will induce some of them to make a respectable planting of this tree in places where now there is small return, and watch the development.

THE AMERICAN PAPAW AND THE TROPICAL PAPAYA.

According to the "Journal of Heredity" for July, 1916, the American papaw is known botanically under the name of *Asimina triloba*. belonging to the family Anonaceæ, which includes the custard apple. It is stated that so little is the papaw known that its very name has been stolen from it and applied, through a confusion in sound, to the tropical papaya (*Carica Papaya*). While this double use of the term is unfortunate, we fear that, as its employment in connection with *Carica Papaya* is world-wide, there is little chance of even the United States ever gaining a monopoly of its use in connection with their northern species of fruit.

The article in question gives an interesting account of the papaw tree, which, in appearance, resembles very much a cacao tree. But the papaw thrives under temperate conditions, and is not in any sense a tropical plant, though many of its near relatives are. One of the promising fields for plant breeding, in connection with the papaw, appears to be in hybridising it with its close relatives, the tropical Anonas—the soursop and the custard apple, for instance. These fruits are larger and finer than the papaw, but too tender to grow in the United States, except in Southern California and Southern Florida. There would appear to be a good chance that they could be crossed with the papaw, and the fruit produced which would be hardy in a large part of the United States, while superior in quality to the papaw itself. So far as is recorded, this cross has never been made.

The above idea of extending the range of a tropical plant by crossing it with its near relatives in a cold country is new and interesting; and there would seem to be no reason why the reverse could not be effected, and some of the more attractive fruit of temperate countries acclimatised by hybridisation to grow in the tropics.—"Agricultural News," Barbados.

Horticulture.

THE GERMINATION OF SEEDS.

At a meeting of the Horticultural Society of Charters Towers, Mr. E. Mann read the following interesting paper in October last:—

"In this paper I will try to explain the observation and experiments I have made in my endeavour to grow and acclimatise plants in our tropical climate. I am going to tell you of things that I know, also of those that I don't know, in the hope of picking up a little information when you discuss this paper. In this meeting I have several times stated you must make the soil firm when you plant your seeds to be sure of good germination. I will tell you for why. It is a well-known fact that the more you cultivate the soil amongst growing crops the less water they require; this is because by stirring the top 2 or 3 in. of soil you dry the moisture out of it and create a loose mulch that prevents the moisture in the soil lower down from rising to the surface by capillary attraction and being lost by evaporation, thus leaving more available for the plants; but in planting seeds you have to reverse the process to some extent, as most seeds germinate best when only just covered with soil; and many flower seeds are so small that planted this way they would be no more than ⅛ in. underground, and in our hot climate the sun will dry the surface of loose soil over 1 in. deep in a day, but by pressing the soil firm you set in motion capillary attraction, which draws the moisture from a lower depth to the surface, as the sun dries it out and so in a great measure protects the seed from being burnt up just as it starts to germinate under the soil. A little light horse manure spread on top of the soil after planting takes the place of cultivation in growing crops, as it protects the soil from the direct rays of the sun, and so retains the moisture at the surface of the soil, where it is most needed; even then our climate is so severe that with small seeds it is better to water twice a day till the plants show through the ground, either morning and midday or midday and evening; never let them go from morning till evening, or you will lose most of them.

"We will now take a few plants in detail. I have no doubt many of you have noticed that while some seeds nearly all germinate at the same time others again come up very irregularly. Phlox is a noticeable example of this, coming up at three or four different times, and it is possible to have plants nearly ready to plant out while others are only just showing through the ground. This is owing to the seed ripening very irregularly on the plant; if you will look at your plants, you will notice the little bunches of seeds are in all stages of ripeness—some have burst and scattered, others are brown and just ready to burst, while others on the same bunch are quite green.

"Well, you know commercially it is impossible to harvest each little pod as it gets ripe, and they are all cut together, so the seed when saved is not all of the same ripeness, and, so far as my observation goes, the ripe seeds germinate first; the others seem to finish their ripening in some way underground before they germinate; hence the various times of coming up. Another point about phlox. I have often imported from Europe, and never averaged more than 10 per cent. of germination; some years it would fail altogether. After writing several letters and making experiments, I found that, owing to their climate being so much cooler and more moist than ours, the seed did not ripen so hard as with us, and was more affected by the sea voyage. If they had a dry summer, the seed might average 15 to 20 per cent. of germination, but in a wet season hardly a seed would grow. I sent seed of my own growing (in our hot climate) to England for a test, and it averaged 85 per cent. of germination. Imported aster seed is worse than phlox in this respect, as in various years I must have spent about £5 on different kinds and bought enough seed to raise 20,000 plants, but all I have raised so far are three plants. A curious check test that came under my notice was the lupin. I got an imported packet containing six seeds; five germinated in about six days after planting. I saved my own seed from one of them, and the following season planted twelve seeds; they did not come up in a fortnight, so I put more in the same box; as they are large seeds I just pressed them in with my thumb without disturbing the soil in case some of the others might make a late start, but none came up. At the end of another fortnight I planted Dianthus on top of them and covered with new soil without disturbing the old; these came up thick, and when large enough to plant out I started to dig them out of the box. I came across two or three of the lupin seeds just as sound as when I planted them. I chipped one with my knife, and it was all right inside; so I raked out five seeds, chipped them all, and planted them again. Four came up in six days; so you see this was just the reverse of the phlox. Our climate ripened the lupin seed too hard to germinate till I cut through the shell of the seed. To prove this, the following season I did not let the seed ripen on the plant, but picked the pods while they were yellow and dried them indoors, and these seeds germinated six days after planting. In a short paper like this I cannot go into details of many of my experiments. I can only mention a few most prominent examples in each class. I now come to the section that so far has puzzled me, and I hope to obtain some information about, as, if these problems were elucidated, I believe they would enable us to acclimatise many more plants in this country that are now beyond us. The sweet pea is a popular flower, and if planted in April it seems to grow along without any check, and flowers just about right for the show in August, but if you want early flowers and plant in March they very often come up all right but die off again when about 2 in. high, only an odd one here and there pulling through.

"The earlier you plant the more pronounced this dying off becomes. I also notice imported seed is more liable to go than my own, but they all fail when planted too early. I have read of some being killed by mildew, but I could not find any trace of it on mine, and, as they always seem to go off just at the same height, I hardly think it is caused by this disease. I am inclined to think, when planted too early and the weather is too hot, they just grow till the nourishment in the seed is exhausted, and then from some cause not yet known to me they fail to draw nourishment from the soil and so die off; those that do pull through invariably come to a standstill at the 2 in., sometimes for as much as fourteen days; then all at once they rush along, sending out new shoots from the ground level, and come into flower well ahead of those planted later, although these receive no check. Another curious example of germination is the petunia. These I have grown for summer flowers and pulled up in February; from that time onward after the borders were planted with winter flowers the petunias would come up right on to September, and then, when the winter flowers were pulled out and summer flowers planted again, they would come up in thousands week after week. The mystery to me is, Why do these seeds germinate at so many different times when practically under the same treatment, and how can this seed remain sound so long in soil that is constantly watered? Lettuce and celery, if planted in hot weather, will act in a somewhat similar manner. A marked contrast to this is the *Linaria marsuana.* If this seed is planted in March, it will flower from July to November; but I pulled mine out in September. This plant seeds freely, but you rarely see a plant come up during summer; and if you pull out your summer flowers in February or early March, you can plant the borders again and water them without seeing any young plants, but as soon as April arrives they will come up in thousands all over the borders. Now, why do these seeds lie dormant so long, and then all answer the call at about one and the same time? and what protects them from decomposition in the constantly watered soil? The last flower I will mention is perhaps not so well known to you, but as regards germination is the most remarkable plant I know. It is called *Ruellia tuberosa.* The flowers resemble the *Mimulus* in shape, but are a slate blue in colour. I got a packet of seed to try, and raised three plants in March. I planted them out in the border with other flowers, but they made no progress till August; then they started to grow, and, as I thought at the time, sent out flower buds; every day, when watering, I noticed the buds, but they seemed to get no farther forward. At last I dropped the hose and had a close look at them and they were seed pods, formed without any sign of a flower—either petal, pistil, or stamen; and yet when I pulled out the borders at the end of September, there were dozens of young plants all round the old one.

"I was disgusted at getting no flowers, so destroyed two plants, but left one for further trial; and as soon as the borders were clear and the sun could get direct to the soil, this plant started to grow strong and blossomed right through the summer, bearing seed pods exactly like the first that were formed. As the plant is not showy enough for small gardens, I do not recommend it; but I tried it two or three seasons, to notice the results, and every year they acted the same—on the turn of spring the seed pods would come alone, and as the weather got warmer the flowers would come and the seed would germinate freely from either. One curious point was brought to my notice during the last few weeks. When importing phlox and aster seed from Europe with such poor results, I noticed petunia seed in the same collections germinated freely. Now where I am growing my flowers the water is very salt, and in a bed I planted part phlox and part petunias; both germinated, but the phlox died away again, while the petunias grew along and are now coming into flower; so evidently the petunia is a good sailor and likes a little salt. When we consider that most of our seeds are imported from Europe, mostly to seedsmen down South, and then shipped up here under very trying conditions on our coastal boats, it is always a wonder to me we get such a good percentage of germination as we do; and only one word can be used to describe the vitality contained in these small seeds—that is, marvellous."

FIGHTING IN THE JUNGLE.

DIFFICULTIES IN THE EAST AFRICAN CAMPAIGN.

In the course of its pursuit of the German forces in East Africa, General Beve's infantry has had some unusually exciting experiences, including encounters with lions and other natives of the jungle. The route lay over indescribably precipitous mountain paths, through dense jungle, and over elephant tracks. General Beve's infantry, abandoning all wheeled transport, without blankets or greatcoats, and subsisting on nothing more than half rations, undertook the pursuit, and was able to join up with General Enslin's mounted brigade on the Moeba River.

The whole force then set out and overtook the enemy, who was again defeated. After the engagement, the correspondent states, the Germans, in the politest possible manner, sent several of our wounded back with a doctor, warning our officers of the danger to wounded men at night from lions, three of which were "put up" in Colonel Nussey's firing line.

A huge python invaded General Beve's quarters, and was despatched with difficulty. Bees also attacked the column, scattering the ammunition mules and horses, and for a time completely checked the infantry advance. The scene of operations was the densest jungle.

Operations have resulted in the complete dislodgment of the enemy from his mountain retreat in East Africa, and the scattering of his remnants. Lindi and Mikindani, the last remaining ports in the German colony, are now occupied by naval forces.—" Exchange."

Tropical Industries.

NOTES ON SISAL CULTURE.

1. For the cultivation of the sisal plant, the most suitable lands are poor, rocky, gravelly soils rich in lime (the latter is absolutely necessary), worn-out sugar lands and arrowroot fields, and lands which no longer yield satisfactory wheat crops. Swampy land must especially be avoided. A very suitable soil is one composed mainly of coral rock. On rich soils, the plant will go larger, but the fibre is less in quantity and quality. Another objection is that the plant rapidly comes to maturity, throwing up its flower pole after three or four years, which is the end of the plant's life, and only one crop is harvested. On the poorer lime soils the life of the plant runs to from ten to fifteen years, yielding as many and more crops.

2. The failure of a crop on suitable land and in a warm climate has never been heard of.

3. The land to be planted should be fenced to keep off stock—for the reason that, in feeding round the plants, these are trampled down or kicked out. The plants to form a plantation should not be higher than 10 or 12 in., or even less. Older plants take a much longer time to start growing. When planting all dry leaves at the base of the young plant should be taken off as in the case of pineapples, and the main roots cut off and pared as closely to the trunk as possible. They must be planted perpendicularly, and only the lower portion of the trunk must be covered. The distance apart in the field is a question of soil. In rich soil the rows may be 10 ft. apart, and the plants at intervals of 6 or 7 ft. In poor ground 8 ft. by 6 ft. is as close as the plants should be set. Roadways should be left at intervals of 5 chains.

4. Once a field is planted, it may be practically left to itself, as there is probably no crop, except the castor-oil plant, which requires less care to bring it to perfection than sisal. At the same time, a little care is needed at the outset until the plants are robust. No weeds should be allowed to grow, nor any to overtop the sisal plants, as they require all possible light, air, and sun. Tall weeds may be mown down.

5. In about twelve months suckers will begin to appear, and in twenty-four months these will be produced at the rate of 100 per plant. These must all be removed for two reasons. One is that they deprive the mother plant of the nutriment it requires to produce large leaves and plentiful fibre. The other is that the suckers are valuable either for extending the area under sisal or for sale to intending planters. To plant up 100 acres 60,000 to 100,000 suckers are needed.

6. The life of the sisal plant is intimately connected with the production of the flower-stalk, technically called the "pole." The life of the agave (sisal plant) is a comparatively long one, but the long life may be

materially shortened by injudicious management. The sign of the termination of its existence is the sending up of the pole. This happens when the plant arrives at the cutting stage and the leaves are left uncut. It may also be the result of over-cutting. Much judgment is required, therefore, to ensure that no pole shall appear for ten, twelve, or fifteen years. When the pole has appeared, it should be notched and bent over as soon as it appears, in order that all the leaves on the plant should be ripened before it dies. In this way the plant is kept available for yielding fibre a year later than it otherwise would be. Immature leaves should not be cut. As a general rule, the ripening leaves gradually fall from the erect to the horizontal position on the plant. Then are the leaves to be cut. It should not be lost sight of that when a mature plant sends up its pole all its suckers at once follow suit and send up slender poles. Hence suckers from a poled plant should never be used in forming a plantation, as it will probably not be six months before the pole appears.

7. According to conditions of climate, soil, and the kind of plant, the first leaves will mature in from three to four years. For harvesting the leaves, account must be taken of their length and state of ripeness. The length of the fibre is one important factor in its fitness for the market. The least length admissable is 2 ft. 6 in., and every additional length increases its value. It is not advisable, however, to cut leaves until they have attained a length of 3 ft. These leaves will average about 3 lb. in weight, but they frequently attain a weight in the Brisbane district of from 5 to 7 lb. If left long after the leaf has reached the horizontal position—*i.e.*, at right angles to the trunk—the leaf droops to the ground, acquires yellow spots, and, when machined, much of the fibre is broken off short at these spots, and is only saleable as tow. The unripe leaves produce a brilliantly white fibre, but these, as stated, must not be cut. The number of ripe leaves per plant when from three to four years old will vary from ten to twenty, according to conditions of planting, rising in subsequent years to forty or fifty. This does not mean that forty r fifty leaves are at once cut from each plant, but it refers to the aggregate of the year's operations. The leaves are cut with a curved knife. Proper cutting consists in cutting the leaves as close as possible to the trunk. Loose cutting results in a considerable loss of the strongest part of the fibre. If 3 in. of each of forty leaves are left on the plant, there is a loss of 10 ft. on each plant or 10,000 ft. on an acre. This is a matter well worthy of attention by sisal planters. One man should cut and tie up an average of 1,200 leaves a day.

8. As to yield of fibre, on average poor soils, plants 7 ft. by 8 ft. (799 to the acre), 7 lb. of fibre per plant, or 5,630 lb. per acre, is obtainable; but it is well to reckon on only 15 cwt. or 1 ton of marketable fibre per acre. At this time (October, 1916), 1 ton of sisal fibre is worth, in England, from £55 to £60 per ton. Once the plants have arrived at the cutting stage, no other labour is required in the field except the cutters and carters.

9. Machining is performed as soon as possible after the leaves are cut, as, if two or three days elapse, the fibre will be spotted and consequently of reduced value. The fibre is extracted by various machines

cheap and expensive, but all work by means of drums and beaters, which, as the leaves are passed in, beat off in one action the whole of the fleshy part of the leaves, leaving the fibre, except for drying, practically ready for market. The cheapest machines cost about £40, and require a two-horse power oil engine. They are made by J. Wilson, engineer, Elizabeth street, Brisbane. Other machines are made in Manchester, costing before the war about £75. The American automatic machines, in which the leaves are laid on a carrier side by side, and pass continuously into the machine, coming out as pure fibre as fast as the leaves can be fed, cost from £400 up to £1,000, and will clean from 70,000 to 150,000 leaves daily. These require from 20 to 45-horse power engines. The capacity of the Wilson machine is about 160 lb. of fibre per day. One of these is working near Gladstone, and a Manchester machine (£250) is to be seen at work at Bajool, near Rockhampton. The smallest machine has long been at work at St. Helena Penal Establishment. This one requires a 4 or 6 horse power oil engine.

Finally, there is no particular time for harvesting sisal leaves. The work may go on all the year round. One thing should be attended to— When the plants have been cut once, a sucker should be allowed to grow up near the parent plant, so that when the latter dies the new plant will have arrived at the cutting stage, thus avoiding the replanting of the field.

BEES AND COCOANUTS.

A. H. RITCHIE.

A very interesting point is brought out by Mr. Frank P. Jepson, the Government Entomologist of Fiji, in a recent circular giving an account of a tour of the cocoanut sections of that colony. As is well known, the cocoanut bears two kinds of flowers: male flowers, which give the dusty pollen, and female flowers, which look like tiny nuts at first, not complete flowers, having both male and female organs present, as is the commoner state of affairs. On further examination, too, we will notice that the male flowers and female flowers on the same stalk or, as botanists would call it, "spadix," never mature at the same time. The males open soon after the spathe or covering bursts, and the females not till later. Generally, too, we find only one set of flowers open, or ready to fertilise or be fertilised, on a cocoanut at one time. This is one of nature's devices which are calculated to guard against in-breeding or self-fertilisation. It insures that fertilisation from another cocoanut palm must take place. Darwin's experiments along this line are well known. The pollen must then be conveyed from the male flowers of one tree to the female flowers of another by one or two agencies—wind or insects. We notice that on certain trees—indeed, on most trees—that a high percentage of the small nuts fall to the ground, using the term "nuts" as the growers use it, meaning the undeveloped female flowers at this stage.

While there may be other causes, Jepson puts forth the idea—and rightly, I think—that this is due to their escaping pollination. We all know that, with melon and pumpkin, fruit will not set unless pollen is transferred from the male to the female flower by insects or hand; the usual plan by market gardeners being to nip off and place a male flower shedding pollen against the female flower. When this is done correctly, almost every female sets and a fruit is produced.

Jepson noticed on those cocoanut estates where bees are kept that the bees swarmed around the open inflorescences in great numbers, and, further, that the yield on these plantations was phenomenally high. Palms of five and six years bore heavy crops, and bunches were well filled. He concludes that the general introduction of bees on to cocoanut plantations is well worth a trial in Fiji. It would be interesting to have the observations of the growers in Jamaica on this subject.—"Journal Jamaica Agricultural Society."

FOR RUBBER PLANTERS.

METROLAC.

For the information of rubber planters, the Rubber Growers' Association (London) has published the following concerning an instrument for recording the amount of dry rubber in latex, in pounds and ounces:—

The following are some of the uses to which the "Metrolac" may be put. The value of the instrument, however, will depend to some extent on local conditions:—

TO CHECK THE ADDITION OF WATER TO LATEX.

1. Results have shown, and it is believed it is now generally admitted, that it is advantageous from all points of view to use little or no water in the collection of latex. The "Metrolac," by giving the amount of dry rubber in the latex, also indicates whether or not water has been added. The amount of dry rubber in latex to which water has not been added will vary with local conditions, methods of tapping, &c., but is usually from 3 to 5 lb. per gallon. The latex of any coolie suspected of having added water can be tested with the "Metrolac" and compared with the latex of other coolies.

2. Where the addition of some water to the latex is allowed, the "Metrolac" will enable a check to be kept on the amount of water added. The addition of small quantities of water has relatively little effect on quality, but where water is allowed some check is necessary to prevent the use of excessive quantities.

BULKING.

3. Where latex is bulked (and this procedure is strongly recommended), tests with the "Metrolac" enable the latex afterwards to be watered down to a standard rubber content, so that, for instance, in sheet-making all sheets are of uniform size and thickness, are smoked equally, and are generally uniform.

4. Closely connected with bulking is the correct apportionment of acid for coagulation, sodium bisulphite, &c. The proportions of these reagents necessarily depend on the dry rubber content of the latex. The "Metrolac" enables this to be rapidly ascertained; and so leads to economy and uniformity in the use of coagents, sodium bisulphite, &c.

Payment by Results.

5. This mostly applies to Ceylon. The amount of rubber brought in by any coolie can be determined by testing with the "Metrolac," and then weighing or measuring the volume of the latex. This has the advantage that, if desired, the latex can be bulked before coagulation, and, secondly, tapping coolies do not need to enter the factory and follow their rubber round in course of washing and creping. It also enables payment by results in the case of rubber for sheet manufacture.

The instrument is graduated in pounds and ounces per gallon; this serves well for testing latex in bulk. For paying coolies by results, it is necessary to measure the latex in units smaller than the gallon; and the unit suggested is the half-pint. The calculation is quite simple, for, as there are 16 oz. to the pound and 16 half-pints to the gallon, the figures on the instrument will correspond to ounces to the half-pint as well as to pounds to the gallon.

It is not always necessary to test each coolie's latex; for, provided that no water has been added, the quality of the latex brought in from the same part of the estate by different coolies will not, as a rule, vary appreciably. Hence it will be sufficient to test the latex of one or two coolies with the "Metrolac."

As a coolie will never know whether his latex will be chosen for testing, he will not run the risk of adding water, or, should be do so, will sooner or later be detected.

6. By means of the "Metrolac" it is also possible to forecast the daily output of dry rubber on the estate.

7. In the case of trees which are tapped too severely or where the resources of the trees are overstrained, the amount of rubber in the latex tends to fall. A check may easily be kept on the quality of the latex by means of the "Metrolac," and, if necessary, a field may be rested or the system of tapping modified at an earlier stage than would otherwise have been.

The "Metrolac is made of brass gilt, and measures about 10 in. long. It is supplied complete with measuring glass for testing, and packed in a box with full instructions for working.

The price of the instrument in Great Britain is 50s., and a discount of 25 per cent. is allowed to members of the Rubber Growers' Association; packing and freight extra.

The sole manufacturers are Messrs. Dring and Fage, 56 Stamford street, London. Orders should be placed with the firm direct.

Note.—The trade mark "Metrolac" is registered in Ceylon, Federated Malay States, Johore, Straits Settlements, India, Dutch East Indies, and British North Borneo.

Science.

EUCALYPTUS TREES AND MALARIA.

S. L. Bostin writes in the "Scientific American":—

"During the later decades of the nineteenth century it was a common practice to plant blue-gum or eucalyptus trees in the districts infected by malaria fever. It was held that the essential oil produced by the leaves combated the harmful vapours rising from the swamps, laden with the poison of the disease. The discovery that the malarial germ is introduced into the blood by a mosquito has settled once and for all the origin of the disease.

"Yet it is only within the last few months that a somewhat mysterious point has been fully settled. The theory that the eucalyptus trees neutralised the poison vapours is nonsense; yet the fact remains that where blue-gums were freely planted there was always a notable decline in the amount of malaria. For instance, in a certain district near Algiers the placing out of thousands of eucalyptus trees completely transformed the conditions. Malarial fever of a peculiarly virulent type had formerly been a constant feature, but within twelve months of the planting of the blue-gums the disease entirely disappeared, and is now unknown.

"What is the explanation of this circumstance? It has been demonstrated that, of nearly all trees, the eucalyptus absorbs the greatest amount of water. Seeing that blue-gums increase in height with great rapidity, often growing many inches a day in a hot position, the amount of moisture taken up increases on a greatly progressive scale. And this is just what brings about the downfall of the malarial mosquito. To complete its life cycle it is necessary that this insect should pass its larval stage in pools of water. With the coming of the eucalypti these pools and indeed all marshy places disappear; the breeding spots of the mosquitos are gone, and in time the insects vanish altogether. The district is then free from malarial trouble simply because the carriers of the disease are not able to keep going."

Chemistry.

"THE FERTILISERS ACT OF 1914" AND "THE FERTILISERS ACT AMENDMENT ACT OF 1916."

BY J. C. BRÜNNICH, Agricultural Chemist.

Slowly but surely the value of artificial fertilisers is becoming recognised by our farmers and fruitgrowers. Unfortunately many factors, like high cost of fertilisers, heavy freight charges, uncertainty of seasons, &c., restrict a more extensive use. Instead of applying fertilisers, including lime, and practising an intense cultivation to obtain the best results, heavy yields and crops of superior quality, the majority of both farmers and orchardists are trying to increase the production by the cultivation of larger areas.

We have numerous instances of the **excellent results** obtained by fertilising and liming of soils, and it is interesting to record that, in spite of highly fertile lands available and in use for pineapple culture in Queensland, record crops were grown on comparatively poor sandy soil by judicious application of **lime** and **artificial fertilisers.** On the same farm timely application of certain nitrogenous fertilisers, recommended by us, to crops, which due to adverse climatic conditions were very backward and promising failure, produced immediate recovery and excellent yield.

The demand for **cheap artificial fertilisers** is becoming acute, and, therefore, it is not surprising to find that for the past few years **crude fertilisers** were sold, without a guaranteed analysis, as such fertilisers did not come under the provisions of "*The Fertilisers Act of* 1914," and were of such a variable composition that in many cases such fertilisers were not worth the freight paid for them.

In many places deposits of such crude fertilisers, like **sheep manure, bat guano, ashes,** &c., exist and could be utilised, but, on account of exposure to all weathers, composition must vary, and only a sale based on the actual amounts of fertilising substances contained therein will be of justice to the farmer. Of equal importance to the agriculturist is **lime,** in its various forms, which acts both directly and indirectly as a fertiliser and also improves the physical condition of the soil. Not only the **purity** of the lime, but also the state of **fineness** in which it is applied, must be taken into account.

In order to include abovementioned cases, "*The Fertilisers Act of* 1914" had to be amended, and, in accordance with "*The Fertilisers Act Amendment Act of* 1916," the **definition** of "**Fertiliser**" now reads as follows :—

"Any substance or compound containing in appreciable quantity nitrogen, phosphoric acid, potash, or lime, manufactured, produced, or prepared in any manner for fertilising the soil or supplying nutriment to plants; also any excrement of animals or any natural substance or natural product which is used for fertilising the soil or supplying nutriment to plants: Provided that the term does not include farmyard manure, stable manure, seaweed, crude nightsoil."

It will be seen that now only such products as **stable** and **farmyard manure, crude nightsoil,** and **seaweed** may be sold as manures without guarantee of composition; any other crude product, or offal, if specially treated or not, will be classed as a fertiliser if sold for the purpose of fertilising the soil.

No person shall sell fertiliser unless he is **licensed** as a **dealer** under the Act.

Any person who desires to become licensed as a dealer shall apply in writing to the Minister for Agriculture and Stock, in the form of Schedule I. of the Act, and transmit the prescribed fee of one guinea. Such license has to be renewed annually.

As under the present amended Act lime and crude fertilisers are included, any person desiring to sell **lime, limestone screenings, coral sand, sheep manure, bat guano, ashes,** &c., to farmers for fertilising purposes must apply for a license.

On or before the 31st January in each year, every dealer shall deliver to the Under Secretary of the Department of Agriculture and Stock a **certificate,** in the form of Schedule III. of the Act, of the specified ingredients of each brand of fertiliser sold by him. Such statement may be amended at any time during the year.

Such **certificate** of **registration** shall set forth the full name and place of business of the dealer, the name of the fertiliser, and the figure, or trade mark, or sign under which such fertiliser is sold, and a chemical analysis certifying that such fertiliser contains certain amounts of specified ingredients, and, in the case of bonedust or bonemeal, basic slag or Thomas phosphate, air-slaked lime, agricultural lime, and gypsum, the percentage of fine and coarse material.

Upon the **sale** of any fertiliser, the dealer shall, at the time of sale or before delivery of the same, give to the buyer an **invoice certificate** signed by the seller or his agent, stating the full name and place of business of the dealer; the name, trade mark, brand, or sign used to mark packages containing such fertiliser and used to identify such fertiliser; the quantity or net weight of fertiliser comprised in the sale; the composition of the fertiliser, setting forth the proportion per centum in which such fertiliser contains the following ingredients:—Nitrogen, phosphoric acid, potash, and lime, and the respective forms in which they respectively occur; and, in the case of bonedust, basic slag, agricultural lime, &c., the percentage of coarse and fine material.

Furthermore, every dealer who sells fertiliser, which term includes offering or exposing for sale and having in possession for sale, shall securely **affix** to each package a printed **label,** clearly and truly certifying :—The number of net pounds of fertiliser in the package; the figure, trade mark, or sign under which the fertiliser is sold; the chemical composition of the fertiliser, in the same manner as stated on invoice certificate; and the state of fineness for certain fertilisers.

A certain amount of **latitude** in the composition is allowed under the Act, in order to allow for slight variations in manufacture; and the **deficiency,** between the amount of fertilising ingredient found and the amount guaranteed on the invoice and label, must, in the case of nitrogen and potash, be not more than 5 per cent. or 1/20 of the total amount of nitrogen or potash certified to be present, and in the case of phosphoric acid and lime not more than 7 per cent. of the total amount.

On all schedules and labels the amounts of fertilising ingredients have to be stated in a uniform manner, as the old expressions—like bone phosphate, tricalcic phosphate, ammonia, ammonium sulphate, potassium sulphate, &c.—are liable to mislead the farmer. The Act provides for the statement of the valuable fertilising ingredients in percentage amounts of **Nitrogen** (N), **Potash** (K_2O), **Phosphoric Acid** (P_2O_5), **Lime** (CaO).

Lime may be used in several forms, and the amended Act provides for four classes—

(a) **Caustic lime**, or burnt lime, or quick lime, containing the lime in form of calcium oxide (CaO);

(b) **Mild lime** or air-slaked lime, containing the lime chiefly in form of hydrate of lime ($Ca(OH)_2$), obtained by slaking of burnt lime with water;

(c) **Agricultural lime,** containing lime in the form of carbonate of lime ($CaCO_3$), and obtained by crushing or pulverising of lime stone, marble, coral, and shells;

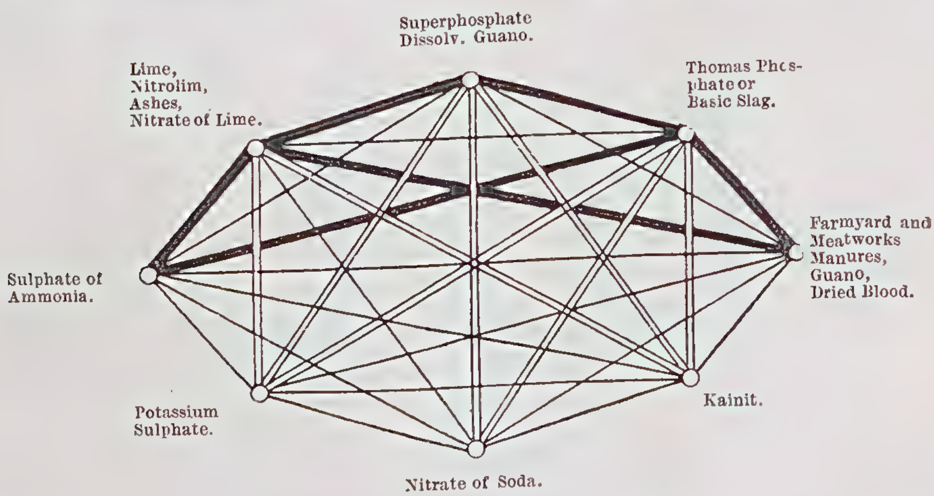
(d) **Gypsum**, containing lime in the form of sulphate of lime ($CaSO_4$).

The action of lime in form of powdered quick lime or air-slaked lime is very rapid and powerful, and application is only recommended to very stiff clayey and very acid soils. The safest form is generally agricultural lime, but on account of its insolubility the limestone, in order to become gradually available, must be ground very finely, so that the largest percentage goes through a sieve with forty meshes to the linear inch or 1,600 meshes to the square inch.

The **conversion** of the amount of **fertilising compound** into another is very simple, and, as many old manuring formulae still give the old denominations, I will herewith give a table which can be used for such calculation :—

Amount of—		Multiplied by—	Gives the Corresponding Amount of—
Ammonia...	NH_3	0·824	
Ammonium sulphate	$(NH_4)_2SO_4$	0·212	Nitrogen, N
Sodium nitrate (Chili saltpetre) ...	$NaNO_3$	0·165	
Potassium nitrate (saltpetre)... ...	KNO_3	0·139	
Nitrogen	N	1·214	Ammonia, NH_3
Nitrogen	N	4·714	Ammonia sulphate
Potassium sulphate	K_2SO_4	0·541	
Potassium chloride	KCl	0·631	Potash, K_2O
Potassium nitrate	KNO_3	0·466	
Potash	K_2O	1·850	Potassium sulphate
Tricalcic phosphate	$Ca_3P_2O_8$	0·458	Citrate insoluble } Phosphoric
Monocalcic phosphate	$CaH_4P_2O_8$	0·607	Water soluble } acid
Tetracalcic phosphate	$Ca_4P_2O_9$	0·391	Citrate soluble } P_2O_5
Limestone, marble	$CaCO_3$	0·560	Lime, CaO
Gypsum	$CaSO_4$	0·411	

When **mixing fertilisers,** such mixtures must be avoided which would lead to decomposition, which, for instance, would take place if ammonium sulphate was mixed with lime (quick lime and air-slaked lime) or with Thomas phosphate, or if lime was mixed with superphosphate ; or, again, mixtures which would lead to caking. A very simple guide for the mixing of manures is given in the accompanying diagram, devised by Dr. Geekens, which I slightly modified, however, to apply to our local conditions :—



Manures joined by a heavy black line should *never be mixed* together ; those connected by a *double line* must only be *mixed immediately before use ;* and those joined by a thin single line may be safely *mixed* together *at any time.*

It must be clearly understood that the lime mentioned in the diagram refers to quick lime and air-slaked lime only. **Agricultural lime** may be **safely mixed** with any of the artificial fertilisers.

It is quite impossible to fix at the present day a **monetary manurial value** per ton, as potash manures are practically unprocurable. It is, however, of interest to note that fertilisers in Victoria may be purchased at a very much lower rate than in Queensland ; and from the Victorian official list published in January, 1916, I note the following quotations :—

Bonemeal and bonedust, from £6 to £7 per ton.
Superphosphate (18 % P_2O_5), from £4 7s. 6d. to £4 10s. per ton.
Concentrated superphosphate (44 % P_2O_5), £12 10s. per ton.
Nitrate of soda, £14 10s. per ton.
Sulphate of ammonia, £18 per ton.
Sulphate of potash, £25 per ton.

Our own local prices are very much higher, and this is largely due to the limited demand and want of competition. If only farmers and fruitgrowers would combine and order their fertilisers direct from the manufacturers, they would effect a considerable saving.

On account of the great **shortage** of **Potassic manures,** it is of importance to save any material rich in potash, and attention must be drawn to the analysis of **ashes of plants** and **woods** given at the end of this article. Such ashes could, in most cases, be directly utilised as fertiliser, although the low percentage would not allow the manufacture of a pure potash salt therefrom. The amount of ashes actually obtained on burning of timber is generally very small.

Several samples of such ashes have been received from time to time, and the Department will be always pleased to have such ashes analysed in order to get at the manurial value. In order to make such information of general value, the name of the plant or tree or specimen for botanical identification should be sent with the sample of ash.

Under the Fertilisers Act samples of the various fertilisers on the market were obtained and analysed. The results are given in the following table, and in the few cases where **deficiencies** in the fertilising ingredients were found the **values** are **printed in heavy type.**

The Acts are framed for the **protection** of the farmer, to ensure him to receive a fair value for his money, and this is only possible when he knows that the fertiliser he buys contains the guaranteed amounts of fertilising ingredients.

Any farmer in doubt about the quality of fertiliser purchased should at once apply to the nearest inspector under the Act, in order to let him draw a sample and submit same for analysis. All inspectors appointed under "*The Diseases in Stock Acts,* 1896 to 1898," "*The Diseases in Plants Act of* 1896," "*The Dairy Produce Acts,* 1904-1911," and the expert and inspector under the Pure Seeds Acts of 1913 and 1914, are officers under the Fertilisers Act.

ANALYSES OF FERTILISERS.

Lab. No.	Fertiliser.	Where Obtained.	Moisture.	PHOSPHORIC ACID, P_2O_5.						Potash. K_2O.		Nitrogen, N.		Remarks.	
				Water Soluble.		Citrate Soluble.		Total.							
				Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.		
			%	%	%	%	%	%	%	%	%	%	%		
	Simple Fertilisers. Potash Manures.														
451	Sulphate of Potash	Webster and Co., Ltd., Brisbane	·40	..	..	..	..	..	..	53·52	50·0	..	..		
434	Ditto	Australian Co-op. Fertilisers, Ltd., Brisbane	·36	..	..	..	..	..	..	53·64	52·0	..	..		
536	Ditto	J. Croker, Mackay	·21	..	..	..	..	..	..	53·86	52·0	..	..		
	Simple Fertilisers. Nitrogenous Manures.														
452	Sulphate of Ammonia	Webster and Co., Ltd., Brisbane	1·57	..	..	..	..	..	..	..	..	20·55	20·0		
540	Ditto	J. Croker, Mackay	1·78	..	..	..	..	..	..	..	..	20·52	20·0		
658	Ditto	Fearnley and Co., Ltd., Cairns	1·45	..	..	..	..	..	..	..	..	20·55	..		
433	Nitrolim	Aus. Co-op. Fertilisers, Ltd., Brisbane	..	..	..	..	..	..	..	..	..	18·00	18·0		
440	Nitrate of Soda	ditto	3·45	..	..	..	..	..	..	..	..	15·24	15·8		
453	Ditto	Webster and Co., Ltd., Brisbane	1·08	..	..	..	..	..	..	..	..	16·00	15·0		
538	Ditto	J. Croker, Mackay	1·15	..	..	..	..	..	..	..	..	15·97	15·5		
	Bone, Blood, Meatworks, Manures, &c.													Coarse. %	Fine. %
464	Bonedust, "Normanby"	E. A. Jordan, Aspley	6·96	..	..	..	..	24·92	24·20	..	..	3·22	3·80		22·4
456	Ditto "Runcorn"	T. H. Wood, Brisbane	6·27	..	..	..	..	24·06	24·20	..	..	3·60	4·00		43·9
501	Ditto	S. Francis, Ipswich	8·09	..	..	..	..	22·74	25·80	..	..	2·91	2·72	49·6	50·4
443	Ditto "Runcorn"	Dalgety and Co., Ltd., Brisbane	8·09	..	..	..	..	23·30	21·85	..	..	3·32	4·00	65·3	34·7
6	Ditto	H. Baxter and Co., Maryborough	8·51	..	..	..	..	23·97	20·50	..	..	3·34	4·63	74·8	25·2
478	Bonemeal, "Wattle"	W. E. Hammond, Toowoomba	6·56	..	..	..	..	27·12	19·00	..	..	2·73	2·80	47·4	52·6
644	Dried Blood, Q.M.E.	J. Tytherleigh, Woombye	9·41	..	..	..	..	..	..	..	..	12·08	12·00	..	..
435	Ditto	Aus. Co-op. Fertilisers, Ltd., Brisbane	8·49	..	..	..	..	..	..	..	..	12·15	12·52	..	..

462	Dried Blood, Q.M.E.	W. Hacker, Chermside	10·34	..	..	..	..	..	..	..	..	12·45	12·50
454	Ditto	Webster and Co., Ltd., Brisbane ..	9·00	..	..	..	..	..	..	..	..	11·77	12·0
436	Dried Blood, Birt and Co.	Aus. Co-op. Fertilisers, Ltd., Brisbane	10·12	..	..	..	..	..	..	..	..	12·61	12·83
628	Fertiliser, Baynes Bros.	E. Gleeson, Stanthorpe	8·45	..	..	..	..	19·31	19·75	..	..	4·32	4·27
477	Ditto	G. Searle and Sons, Toowoomba ..	13·94	..	..	..	..	**16·24**	19·75	..	..	5·64	4·27
449	Fertiliser, Redbank	C. Taylor and Co., Brisbane ..	9·47	..	..	..	..	13·78	8·19	..	..	7·28	7·35
461	Ditto	W. Hacker, Chermside	7·16	..	..	..	..	14·59	8·19	..	..	6·66	7·35
463	Ditto	G. Early, Chermside	8·34	..	..	..	..	13·11	8·19	..	..	7·66	7·35
466	Ditto	Farmer	8·18	..	..	..	..	13·10	..	..	..	7·63	..
437	Fertiliser, Redbank (mixed) ..	Aus. Co-op. Fertilisers, Ltd., Brisbane	14·55	..	..	..	..	14·59	8·15	..	..	6·23	7·53
448	Fertiliser, Q.M.E.	C. Taylor and Co., Brisbane ..	5·23	..	..	..	..	**13·46**	16·76	..	..	7·41	6·13
465	Fertiliser, Oxley	Farmer	1·86	..	..	..	..	13·81	..	..	..	6·12	..
535	Fertiliser, Fitzroy	Warry's, Ltd., Maryborough ..	6·48	..	..	..	..	16·45	16·94	..	..	5·52	5·15
643	Fertiliser, Hutton's Special	J. Tytherleigh, Woombye ..	7·10	..	..	..	..	15·50	14·10	..	..	5·06	6·17
659	Fertiliser, Burdekin	Headricks, Ltd., Cairns	4·57	..	..	..	..	19·75	..	..	..	4·11	..

Superphosphates, Basic Superphosphates.

439	Superphosphate, Paton, Burns, Ltd.	Aus. Co-op. Fertilisers, Ltd., Brisbane	5·22	17·07	16·5	..	..	18·32	..	..	..	..	..
450	Superphosphate, Crown	Webster and Co., Ltd., Brisbane ..	4·93	18·94	16·0	..	..	19·87	..	..	..	..	..
447	Superphosphate, Shirley's No. 1 ..	Paul and Gray, Ltd., Brisbane ..	3·37	16·90	17·0	..	..	18·76	..	..	..	..	..
460	Ditto	W. Hacker, Chermside	2·26	16·92	17·0	..	..	17·90	..	..	..	..	..
537	Ditto	J. Croker, Mackay	1·94	16·64	16·5	..	..	17·80	..	..	..	..	..
627	Ditto	E. Gleeson, Stanthorpe	9·23	16·55	16·5	..	..	20·45	..	..	..	..	..
4	Ditto	Corser and Co., Maryborough ..	4·68	17·43	..	..	..	18·04	..	..	..	..	..
476	Ditto	Walsh and Co., Toowoomba ..	7·13	20·07	..	..	..	21·87	..	..	..	..	..
442	Superphosphate, Hasell's	Dalgety and Co. Brisbane ..	5·05	21·08	16·5	..	..	21·58	17·50	..	..	..	..
441	Basic Superphosphate, Paton, Burns Ltd.	Aus. Co-op. Fertilisers Ltd., Brisbane	9·44	10·48	..	19·70	18·0	19·70	19·00	..	..	..	..

Mixed Fertilisers.

	Shirley's—											
458	No. 8	W. Hacker, Chermside	2·29	**10·10**	13·0	..	..	11·08	..	..	..	3·74	4·0
629	No. 8	R. B. Lawson, Stanthorpe ..	4·31	**11·95**	13·0	..	..	12·32	..	..	..	3·90	4·0
5	No. 8	Corser and Co., Maryborough ..	3·90	**11·31**	13·0	..	..	11·52	..	..	..	**3·62**	4·0
444	No. 8	Paul and Gray, Ltd., Brisbane ..	2·57	**11·34**	13·0	..	..	12·16	..	..	..	3·91	4·0
445	No. 10	ditto	5·93	13·62	13·0	..	..	14·69	..	..	..	1·95	2·0
455	No. 10	T. H. Wood, Brisbane	5·91	13·91	13·0	..	..	14·80	..	..	..	2·10	2·0
457	No. 10	W. Hacker, Chermside	4·98	12·78	13·0	..	..	12·90	..	..	..	2·28	2·0
446	No. 20	Paul and Gray, Brisbane	5·47	**8·47**	10·0	10·59	..	12·18	..	**2·13**	4·0	3·90	4·0
655	No. 20	J. Tytherleigh, Woombye ..	6·18	**7·36**	10·0	..	..	9·97	..	**2·18**	4·0	**3·58**	4·0
459	No. 20	W. Hacker, Chermside	5·02	**7·53**	10·0	9·90	..	10·36	..	**2·14**	4·0	3·88	4·0
539	Easterby's Mixture	J. Croker, Mackay	1·32	6·95	7·0	..	..	7·06	..	8·65	7·0	8·87	7·0

NOTE.—All figures in heavy type are below the deficiency allowed under the Act.

Wood and Plant Ashes.

—	—	Phosphoric Acid, P_2O_5.	Potash, K_2O.	Lime, CaO.	Per Cent. of Crude Ash in Wood or Plant.
		% In	% Crude	% Ash.	
Apple Tree	..	·34	4·45	29·85	..
Banana Plant	..	1·48	36·64	21·32	..
Belar	..	·02	4·95	49·10	..
Blackbutt	..	·04	2·02	7·27	..
Bloodwood	..	·27	5·25	8·47	..
Bottle Tree	..	·24	29·02	23·48	..
Boxwood	..	·87	1·85	(?)	..
Brigalow	..	..	·89	54·40	..
Cedar	..	·71	·71	48·50	1·00
Cotton Pods	..	2·18	29·93	8·28	5·3
Crow's Foot Elm	Atherton	6·24	5·75	46·91	..
Gidyea	..	·90	1·10	48·70	..
Hardwood (Sawmill)	..	·60	1·90	29·33	·31
Ironbark	..	·82	1·53	(?)	..
Lantana	..	3·57	13·96	16·95	..
Lantana (twigs and leaves)	..	3·50	11·78	11·52	..
Mangrove (leaves and twigs) ..	Russell Island	1·98	8·14	15·95	..
Ditto ditto	Sandgate	2·12	4·42	12·30	..
Mangrove, black	Cairns	·56	1·34	35·88	..
Mangrove, blue	Sandgate	2·52	2·14	16·72	..
Mangrove (*Ceriops Candolleana*) ..	Cairns	·76	3·28	36·80	..
Nettle Wood	Crow's Nest	4·14	6·46	28·65	3·36
Oregon Pine	..	·50	1·31	29·12	·77
Pine	..	·89	9·97	38·05	·82
Pineapple Plant	..	5·88	15·02	7·20	..
Prickly-pear	Dulacca	·48	9·48	19·92	1·2 to 2·6
Red Gum	..	·38	4·17	(?)	..
Sawmill Ashes (chiefly Pine)	..	1·11	8·72	34·14	..
Sisal Hemp	..	4·60	8·00	31·86	..
Spotted Gum	..	·10	·70	(?)	..
Stinking Roger	..	15·81	20·00	27·18	2·62
Sugar-cane Tops	..	4·90	6·49	4·78	..
Sugar-cane Trash	..	3·20	4·90	4·00	..
Tobacco	..	5·36	27·05	46·70	..

ANALYSES OF WOOL SCOUR LIQUID AND OVERFLOW LIQUID.

Samples of woolscour liquid and overflow liquid received by the Department of Agriculture and Stock from the Charleville Woolscour were sent to the Agricultural Chemist, Mr. J. C. Brünnich, for analysis, with a view to ascertaining the commercial potentialities of the content of lanoline and potash. Following is the result as far as the examination of the fluid has gone. The matter is now in the hands of the Government Bacteriologist for further investigation:—

The samples received from Messrs. Armstrong and Carter had the following composition:—

	Woolscour Liquid.	Overflow Liquid.
	Calculated in Pounds per 100 Gallons.	
Total Solids	70·7	15·9
(Of which Condi Lanoline) ..	11·1	trace
Ash	21·6	6·7
Potash (K_2O)	11·5	2·8
Nitrogen (N)	1·8	·7
Lime (CaO.)	·4	—

The woolscour liquid has the well-known composition of woolwash residues, and contains a fair amount of lanoline and potash.

There can be no doubt that such residue has a good commercial value, and should not be allowed to go to waste, but is quite an economic question if such saving can be effected in practice.

19th December, 1916. (Sgd.) J. C. BRÜNNICH.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH NOVEMBER TO 26TH DECEMBER, 1916.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Bluebelle ...	Jersey	22 June, 1916	715	5·0	42·18	
Twylish's Maid	,, ...	2 Nov. ,,	666	5·1	39·91	
Nina ...	Shorthorn... ...	23 June ,,	859	3·8	38·26	
Sweet Meadows	Jersey	18 Aug. ,,	582	5·5	37·85	
Jeannie ...	Ayrshire	27 Oct. ,,	796	3·9	36·42	
Lady Dorset	,, ...	14 Sept. ,,	808	3·8	35·99	
Thornton's Fairetta	Jersey	26 May ,,	586	5·1	35·29	
Comedienne	,, ...	24 Nov. ,,	596	5·0	35·17	
Miss Bell ...	,, ...	1 Aug. ,,	534	5·4	34·08	
La Hurette Hope	,, ...	6 Oct. ,,	563	5·0	33·22	
Lady Annette	Ayrshire	11 Nov. ,,	838	3·3	32·29	
Queen Kate	,, ...	15 June ,,	765	3·5	31·32	
Lady Melba	Holstein	17 Dec., 1915	656	4·0	30 80	
Rosine ...	Ayrshire	6 July, 1916	668	3·8	29·75	
Lilia ...	,, ...	4 Sept. ,,	770	3·3	29·67	
Princess Kate	,, ...	20 June ,,	631	3·8	28·11	
Skylark ...	,, ...	21 March ,,	579	4·1	27·89	
Cocoatina ...	Jersey	17 March ,,	451	5·2	27·69	
Hedges Dutchmaid	Holstein	22 Aug. ,,	667	3·5	27·30	
Auntie's Lass	Ayrshire	4 April ,,	624	3·7	27·05	
Iron Plate ...	Jersey	9 Dec. ,,	407	5·5	26·47	
Charity ...	,, ...	28 May ,,	421	5·1	25·35	
Lady Loch II.	Ayrshire	17 March ,,	532	3·8	23·70	
Mistress Bee	Jersey	21 Jan. ,,	336	5·9	23·46	
Netherton Belle	Ayrshire	11 March ,,	469	4·2	23·14	
Belinda ...	,, ...	27 Feb. ,,	411	4·2	20·28	

The above cows were fed on natural pasture only.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER 28 TO DECEMBER 27, 1916.

Nine thousand seven hundred and eight eggs were laid during the month, an average of 133 per pen. Broodies have again been numerous, while individual birds have started to moult, Mr. Pocock and Meneely divide the monthly prize with 157 eggs each. The following are the individual records:—

Competitors.	Breed.	Dec.	Total.
*J. Zahl	White Leghorns	148	1,183
*T. Fanning	Do.	131	1,162
*Miss M. Hinze	Do.	146	1,158
*J. M. Manson	Do.	148	1,142
*A. T. Coomber	Do.	146	1,142
G. H. Turner	Do.	142	1,124
W. Meneely	Do.	157	1,117
J. R. Wilson	Do.	153	1,111
A. Howe, N.S.W.	Do.	134	1,109
Geo. Tomlinson	Do.	152	1,093
Dr. E. C. Jennings	Do.	140	1,080
*E. A. Smith	Do.	146	1,060
J. M. Manson	Black Orpingtons	142	1,059
*A. E. Walters	White Leghorns	141	1,056
*E. F. Dennis	Do.	141	1,055
*Mrs. J. Jobling, N.S.W.	Black Orpingtons	85	1,040
Mrs. Munro	White Leghorns	142	1,038
*Dixie Egg Plant	Do.	129	1,037
Mrs. W. D. Bradburne, N.S.W.	Do.	140	1,034
Geo. Prince	Do.	136	1,023
A. W. Bailey	Do.	144	1,022
T. Taylor	Do.	133	1,019
Kelvin Poultry Farm	Do.	145	1,014
W. Lyell	Do.	126	1,012
T. B. Hawkins	Do.	119	1,009
*J. H. Gill, Victoria	Do.	151	1,007
*J. F. Dalrymple, N.S.W.	Rhode Island Reds	127	1,004
H. W. Broad	White Leghorns	135	1,004
T. E. Jarman, N.S.W.	Do.	136	1,002
*W. H. Knowles, junr.	Do.	144	998
W. Purvis, S.A.	Do.	150	986
P. Brodie	Do.	142	985
E. Pocock	Do.	157	985
F. Clayton, N.S.W.	Do.	145	979
A. H. Padman, S.A.	Do.	154	978
*C. Knoblauch	Do.	133	978
*E. West	Do.	128	974
R. Burns	S. L. Wyandottes	129	974
Mars Poultry Farm	White Leghorns	139	969
H. Jobling, N.S.W.	Black Orpingtons	125	966
Cowan Bros., N.S.W.	White Leghorns	152	963
A. F. Camkin, N.S.W.	Do.	130	963
Mrs. C. Davis	Do.	133	962
J. Anderson, Victoria	Do.	144	956

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Dec.	Total.
E. F. Dennis	Black Orpingtons ...	136	954
*Kelvin Poultry Farm	White Leghorns ...	121	953
Cowan Bros., N.S.W.	Black Orpingtons ...	108	951
T. Fanning	Do.	147	950
King and Watson, N.S.W.	White Leghorns ...	130	946
*W. L. Forrest, N.S.W....	Do.	115	938
W. Becker...	Do.	136	926
W. Hirst, N.S.W.	Do.	136	921
C. P. Buchanan	Do.	117	918
S. B. Tutin	Do.	94	917
J. G. Ritchie	Do.	138	910
G. W. Holland	Do.	151	908
Mars Poultry Farm	Black Orpingtons ...	140	898
F. Clayton, N.S.W.	Rhode Island Reds ...	127	893
*J. H. Madrers, N.S.W.	Do.	114	883
*J. W. Macrae	Black Orpingtons ...	122	877
P. Burns	Do.	113	877
J. Goslay	White Leghorns ...	108	854
*J. Anderson, Victoria	Red Sussex	101	844
Moritz Bros., S.A.	White Leghorns ...	150	837
Harveston Poultry Farm	Do.	135	831
H. Hammill, N.S.W.	Do.	144	824
F. W. Leney	Do.	124	819
W. Lindus, N.S.W.	Do.	144	812
W. H. Forsyth, N.S.W.	Black Orpingtons ...	91	795
L. K. Pettit, N.S.W.	White Leghorns ...	119	793
A. T. Coomber	Sicilian Buttercups ...	120	754
F. W Leney	Rhode Island Reds ...	113	719
E. F. Dennis	White Wyandottes ...	94	655
Totals	...	9,708	70,689

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

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
J. Zahl	186	202	213	191	197	194	1,183
T. Fanning	206	204	202	197	181	172	1,162
Miss Hinze	200	179	221	176	198	184	1,158
J. M. Manson	180	217	177	180	206	182	1,142
A. T. Coomber	198	204	200	167	173	200	1,142
E. A. Smith	205	188	171	197	149	150	1,060
A. E. Walters	184	206	170	156	191	149	1,056
E. F. Dennis	165	199	150	199	184	158	1,055
Mrs. Jobling	179	217	152	167	152	173	1,040
Dixie Egg Plant	223	205	213	200	...	196	1,037
J. H. Gill	142	172	162	198	171	162	1,007
J. F. Dalrymple	155	162	187	137	192	171	1,004
W. H. Knowles, junr.	160	161	170	145	187	175	998
C. Knoblauch	151	175	156	150	173	173	978
E. West	199	182	149	149	134	161	974
Kelvin Poultry Farm	150	158	159	138	200	148	953
W. L. Forrest	181	183	52	173	184	155	938
J. H. Madrers	115	172	177	162	132	125	883
J. W. Macrae	117	188	164	152	124	132	877
J. Anderson	160	132	174	81	173	124	844

General Notes.

NATURE IN FARMING.

BY JOHN W. PATERSON, B.Sc., Ph.D., Professor of Agriculture in the University of Western Australia.

We have received from Mr. Thomas C. Lothian (the Lothian Book Publishing Company, Melbourne) a copy of the above work, which, in our opinion, ranks high amongst agricultural text-books, not only for students proposing to enter on a farming career but also for those who have been engaged in agriculture all their lives. The past generation of farmers in this fertile land of Australia raised their crops with scanty appliances and little or no experience in farming, and the rich soil bountifully responded to the most barbarous methods of cultivation. But they left their successors, as an inheritance, the duty of restoring the land to its original fertility. How this is to be done is amply described in the book under notice, and, what is most important, the student is given therein the reason why; and this is really the principle on which the very valuable instruction given in every page of the work is based. Many agricultural text-books are so scientifically constructed that much of the instruction they are intended to impart is lost in a fog of scientific language, rendering them of little value to the student. Such cannot be said of this book. As the author says: "In Australia a book is wanted on agricultural science which shall take cognisance of local conditions and deal in a fair sense of proportion with the various problems which confront us." This is precisely the book which fulfils the conditions, and we confidently recommend it to all agricultural students, not alone for the explanation of how things are to be done but for the underlying principle why they are done.

The price of the book is 4s. 6d.

THE FARMERS HANDBOOK.

Five years ago the agricultural literature of the Commonwealth was enriched by the compilation and publication, by the Department of Agriculture of New South Wales, of the first edition of the Farmers' Handbook, which met with such appreciation of its value to the man on the land and to agricultural colleges and other educational establishments as a text-book that the edition was soon exhausted, and it was proposed to issue a reprint of it. Recognising, however, the advances made in practical and scientific agriculture, and the changes and improvements in agricultural practice, the Department of Agriculture of New South Wales very naturally and wisely came to the conclusion that a second edition of the book, even with modernised additions, would not entirely meet the farmers' needs at the present day. To bring the book up to date, therefore, the principal articles—dealing with crop production, practical agriculture, and stock breeding and feeding—have been re-written by officers of the department, whilst good use has been made of various articles which have appeared in the "Agricultural Gazette" of New South Wales.

The book is divided into sections, the first dealing with the climate, soils, timber, grasses, &c., of New South Wales. Section 2 is devoted to manures of various kinds, whilst the subjects of clearing and fencing, water conservation, farm buildings, and shade trees are well treated in section 3. Sections 4 and 5 go fully into the cultivation of cereals; and root, leguminous, vegetable, and miscellaneous crops, together with native and introduced grasses, are discussed in the next six sections. Section 12 (fourteen pages) gives full information concerning silos, silage, and silage crops. The remaining sections treat of seed and seed testing, weeds, carpentry, blacksmithing, harness repairs, and farm bookkeeping. A copious index enables any subject to be at once found in these pages. The value of the book to the farmer cannot be overstated, and the Department is to be congratulated on the ability of the writers and compilers thereof.

PISÉ BUILDINGS FOR FARMERS.

Having taken up a selection either for farming or grazing, the settler in the old days of the "colony" of Queensland, forty or fifty years ago, either rigged up a tent for his first home, or, if in a locality where there was plenty of splitting timber or tea-tree, he rose to the dignity of a humpy of low log walls roofed with tea-tree bark, or stripped some sheets of stringy bark and built a bark hut; later on, perhaps, he split slabs and shingles, and dwelt in a fairly comfortable house. In the primeval scrub or forest, this question of housing himself, and perhaps his family, was easily solved. But it was otherwise when the farm happened to be situated on the plains. Then it meant either continuous tent life, or, as the alternative, a galvanised iron or a sawn timber structure, both very expensive in the pre-railway days. Yet, all the time on the treeless plain, all the materials were at hand for the construction of a comfortable weather-proof house, warm in winter, cool in summer, which could be erected by the farmer himself, the only tools needed being a pick, shovel, and rammer, and half a dozen planks.

The material for the construction of the walls, chimney, and flooring was the soil itself. All that the settler need do is to dig out the soil and shovel it into rough wooden moulds, ramming it down solid in layers of 4 or 6 in. When the mould or box is full and well rammed, it is taken to pieces and erected on another portion of the building, and the work proceeds until the walls and partitions are completed. Any inexperienced man can thus construct a comfortable dwelling, as the actual pisé work presents so little difficulty that it can be done by anyone who has sufficient strength to shovel earth and wield a rammer, and is careful to see that the moulds or boxes into which the soil is shovelled are kept plumb and in straight lines. The services of a carpenter, unless the settler has some knowledge of that trade, will be found necessary to make doors and window-frames and construct the roof, and see that these are set correctly and in their proper places.

The whole process is well described in the "Agricultural Gazette of New South Wales" by Mr. G. L. Sutton, Cowra Experimental Farm, 2nd May, 1907.

In some of the South American States there are numbers of such buildings constructed either of rammed soil or of adobé or sun-dried bricks (for which material like clay can be used), which is unsitable for pisé work. For the latter, almost any soil containing a fair amount of loam is suitable; but a pipeclay loam, with which gravel is intermixed, is best. Soil which cakes after a heavy rain, or which, if ploughed or dug when dry, turns up in hard clods, is very suitable. Any vegetation growing on the surface of the earth selected must be removed, as also should any roots, bits of stick, or vegetable matter likely to decay. The earth is best used as it is dug, and, if too dry, should be brought to the correct moist condition by watering it about two days before it is to be used. The earth should be just moist enough to be crumbly, and yet adhesive enough to retain the impression of the fingers when pressed in the hand.

We have culled the above preliminary notes on pisé building from Mr. Sutton's exhaustive description in the abovenamed "Gazette." It is stated that pisé buildings are much cooler than buildings constructed with solid brick walls. Some idea may be formed of the durability of pisé by the fact that there is at present, at North Logan, a stable built of pisé which has been in constant use for over sixty years, and which is to-day in good order, notwithstanding the fact that the external walls are unprotected from the weather. Pisé buildings are said to have a life of 150 years.

It is, however, advisable to protect the walls from moisture, especially from rain, which should be guarded against by surrounding the building with verandas or by overhanging eaves. Pisé buildings not so protected are, however, very common.

SOCIETIES.

The title of the Mooloolah and Glenview Farmers' Progress Association has been altered to "The Mooloolah and Glenview Branch of the Queensland Farmers' Union," Mr. C. Ballard, secretary, *vice* Mr. W. Ellison.

Gayndah.—Gayndah P.I.A. and H. Society. Show dates: 5th and 6th June, 1917.

Warwick.—Eastern Downs H. and A. Association's Jubilee Patriotic Show, 13th 14th, and 15th February.

The annual show of the Pine River Agricultural, Horticultural, and Industrial Association will be held on 8th and 9th June, at Lawnton.

Nerada (*viâ* Innisfail).—Nerada Farmers and Settlers' Progress Association. A. Andrickson, secretary.

Mr. J. A. Hunter has been appointed secretary of the Dalby Pastoral and Agricultural Association, *vice* Mr. W. R. Hunter.

GINSENG.

By an oversight the illustrations of the Ginseng plant and root were omitted from our November issue, in which the cultivation of this valuable root was described. We ask our readers to accept the belated photograph.

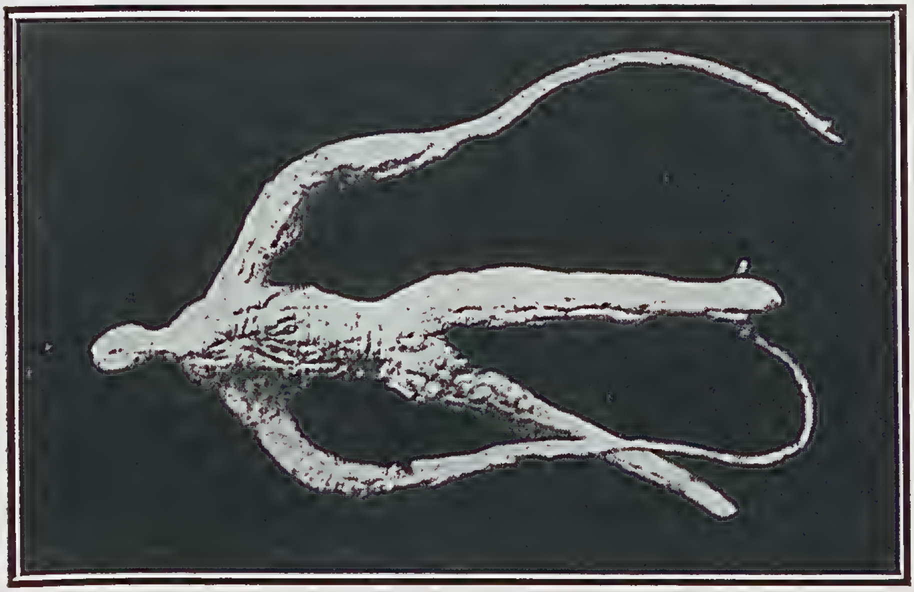


PLATE 3.—HUMAN FORM SPECIMEN OF THE GINSENG ROOT.

PLATE 2.—AMERICAN GINSENG.

The Markets.

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

Article.		DECEMBER. Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	4s. 3d.
Bran	ton	£5 5s.
Broom Millet	"	£22 to £24
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£1 5s.
Chaff, Oaten	"	£5 15s.
Chaff, Lucerne	"	£4 3s. to £4 5s.
Chaff, Wheaten	"	£3 5s.
Cheese	lb.	8d. to 8½d.
Flour	ton	£12 10s.
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	...
Hay, Lucerne	"	£2 10s. to £3
Honey	lb.	5d. to 5½d.
Maize	bush.	3s. to 3s. 3d.
Oats	"	2s. 6d. to 3s.
Onions	ton	£6 10s. to £7 10s.
Peanuts	lb.	3d. to 4d.
Pollard	ton	£5 5s.
Potatoes	"	£6 to £6 6s.
Potatoes (Sweet)	cwt.	3s. 6d.
Pumpkins (Cattle)	ton	£1 10s. to £1 15s.
Eggs	doz.	8d. to 10d.
Fowls	pair	5s. to 8s. 9d.
Ducks, English	"	4s. to 6s.
Ducks, Muscovy	"	6s. to 8s. 6d.
Geese	"	8s. 6d. to 9s. 6d.
Turkeys (Hens)	"	12s. to 14s.
Turkeys (Gobblers)	"	25s. to 28s. 6d.
Wheat	bush.	4s. 10d. to 5s. 2d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	8d.
Cabbages, per dozen	9d. to 1s. 6d.
Beans, per sugar bag	6d. to 1s. 6d.
Beetroot, per dozen bunches	9d. to 1s.
Carrots, per dozen bunches	4d. to 9d.
Cauliflowers, per dozen	...
Chocos, per quarter-case	1s. 6d. to 2s.
Celery, per bundle	1s. 3d. to 1s. 9d.
Cucumbers, per dozen	3d. to 6d.
Custard Marrows, per dozen	6d. to 1s.
Vegetable Marrows, per dozen	6d. to 1s.
Lettuce, per dozen	4d. to 9d.
Parsnips, per dozen bunches	6d. to 9d.
Peas, per sugar bag	1s. to 3s.
Sweet Potatoes, per sugar bag	1s. 3d. to 2s.
Table Pumpkins, per dozen	1s. 6d. to 2s.
Tomatoes, per quarter-case	6d. to 4s.
Turnips, per dozen bunches	1s. to 1s. 6d.
Rhubarb, per dozen bundles	6d. to 1s.

SOUTHERN FRUIT MARKETS.

Article.	DECEMBER. Prices.
Bananas (Queensland), per case	13s. to 16s.
Bananas (Fiji), per case	18s.
Bananas (G.M.), per case	19s. to 21s.
Custard Apples, per tray	...
Lemons (Local), per bushel-case	6s. to 10s.
Mandarins, per case	7s. to 10s.
Mangoes, per bushel-case	6s. to 10s.
Oranges (Navel), per case	12s. to 18s.
Oranges (other), per case	7s. to 10s.
Passion Fruit, per half-case	...
Pears, per case	5s. to 15s.
Papaw Apples, per double-case	5s. to 10s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	6s. 6d. to 7s. 6d.
Pineapples (Ripleys), per double-case	6s. to 7s. 6d.
Pineapples (Common), per double-case	6s. to 7s. 6d.
Tomatoes (Queensland), per half-bushel-case	10s.
Strawberries (Local), per dozen punnets*	10s. to 21s.

* 1 punnet = 1 quart.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	DECEMBER. Prices.
Apples, Eating, per case	10s. to 14s.
Apples, Cooking, per case	7s. 6d. to 8s. 6d.
Bananas (Cavendish), per dozen	3d. to 5½d.
Bananas (Sugar), per case	6s. to 8s.
Cape Gooseberries, per case	4s. 6d. to 9s.
Citrons, per cwt.	12s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	5s. to 6s.
Granadillas, per quarter-case	...
Lemons (Lisbon), per quarter-case	8s. to 12s.
Limes, per quarter-case	...
Mandarins, per quarter-case	10s. to 13s.
Mangoes, per case	...
Oranges, (Navel), per case	9s. to 16s.
Oranges (other), per case	6s. 6d. to 7s. 6d.
Oranges (Seville), per cwt.	10s.
Papaw Apples, per case	2s. 3d.
Passion Fruit, per quarter-case	6s. to 10s.
Peaches, per quarter-case	...
Pears, per half-bushel-case	...
Peanuts, per pound	3d. to 4d.
Persimmons, per quarter-case	...
Plums, per case	...
Pineapples (Ripleys), per dozen	1s. to 3s.
Pineapples (Rough), per dozen	1s. to 2s. 6d.
Pineapples (Smooth), per dozen	1s. 6d. to 2s. 9d.
Quinces, per case	...
Rockmelons, per dozen	...
Rosellas, per sugar-bag	...
Strawberries, per dozen boxes	2s. 6d. to 5s.
Tomatoes, per quarter-case	1s. 6d. to 4s. 6d.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1916.

Animal.	OCTOBER. Prices.
Bullocks	£17 7s. 6d. to £21 12s. 6d.
Bullocks (Single)	...
Cows	£10 15s. to £14 10s.
Merino Wethers	33s. 3d.
Crossbred Wethers	35s.
Merino Ewes	25s. 6d.
Crossbred Ewes	29s. 3d.
Lambs	35s. 3d.
Pigs	73s.
Pigs (Slips)	...

TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1916.

Animal.	NOVEMBER. Prices.
Bullocks	£17 15s. to £21 12s. 6d.
Cows	£11 17s. 6d. to £14 7s. 6d.
Merino Wethers	33s. 9d.
Crossbred Wethers	33s. 9d.
Merino Ewes	29s. 9d.
Crossbred Ewes	33s.
Lambs	32s. 9d.
Pigs	69s.

LONDON QUOTATIONS.

LONDON, November 4.—The market for frozen rabbits is steady, and prices are unchanged.

Jute: November-December shipment from Calcutta, £35 10s. per ton.

Hemp: October-December shipment, £51.

Rubber: Fine hard Para, 3s. 5d. per lb.; plantation, first latex crepe, 2s. 6⅝d.; smoked sheet, 2s. 6¼d.

Copra: South Sea, October-December shipment, £35 15s. per ton.

Raw linseed oil: Spot pipes, £46 per ton.

The Liverpool quotations for middling American cotton, November-December shipment, is 12·07½d. per lb.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Nov.	No. of Years' Records.	Nov., 1916.	Nov., 1915.
North Coast.	In.		In.	In.
Atherton	1·90	15	5·21	1·68
Cairns	4·22	34	2·13	1·51
Cardwell	4·20	44	4·46	3·20
Cooktown	2·97	40	1·06	0·61
Herberton	2·45	29	2·39	0·50
Ingham	3·84	24	5·25	0·51
Innisfail	6·55	35	2·23	0·37
Mossman	2·39	4	2·36	1·66
Townsville	1·63	45	3·75	0·33
Central Coast.				
Ayr	1·35	29	5·14	0·12
Bowen	1·25	45	1·57	0·86
Charters Towers ...	1·51	34	2·89	0·04
Mackay	2·90	45	3·93	7·16
Proserpine	3·13	13	2·42	1·14
St. Lawrence ...	2·27	45	1·93	4·64
South Coast.				
Biggenden	2·32	17	4·93	2·42
Bundaberg	2·51	33	6·16	1·08
Brisbane	3·60	65	6·17	2·46
Childers	2·55	21	6·65	0·63
Crohamhurst ...	4·25	23	6·38	4·21
Esk	2·96	29	5·43	3·62
Gayndah	2·75	45	5·76	2·82
Gympie	3·07	46	3·80	5·19
Glasshouse M'tains	3·44	8	2·28	1·72
Kilkivan	2·51	37	3·44	1·13
Maryborough ...	3·02	45	6·60	1·25

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Nov.	No. of Years' Records.	Nov., 1916.	Nov., 1915.
South Coast—continued:	In.		In.	In.
Nambour	3·44	20	4·21	4·18
Nanango	2·39	34	7·34	1·59
Rockhampton ...	2·08	29	3·33	2·62
Woodford	2·92	29	5·53	2·74
Darling Downs.				
Dalby	2·47	46	7·59	0·82
Emu Vale	2·38	20	4·85	0·03
Jimbour	2·30	28	0·91	5·74
Miles	2·27	31	7·28	0·69
Stanthorpe ...	2·74	43	2·89	0·14
Toowoomba ...	3·13	44	7·48	1·34
Warwick	2·48	29	5·22	0·05
Maranoa.				
Roma	2·04	42	6·42	0·99
State Farms, &c.				
Bungeworgorai ...	2·16	4	6·84	0·55
Gatton College ...	2·41	17	4·96	0·76
Gindie	1·79	17	4·90	1·01
Hermitage ...	2·16	10	5·60	0·09
Kairi	2·06	4	5·64	...
Kamerunga ...	1·77	4	2·55	1·82
Sugar Experiment Station, Mackay	2·44	19	...	5·22
Warren	2·31	4	4·59	2·98

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

GEORGE G. BOND,
Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON FOR THE FIRST FOUR MONTHS OF 1917.

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

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

			H. M.
8 Jan.,	○	Full Moon	5 42 p.m.
16 „	☽	Last Quarter	9 42 „
23 „	●	New Moon	5 40 „
30 „	☾	First Quarter	11 1 a.m.

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

7 Feb.,	○	Full Moon	1 28 p.m.
15 „	☽	Last Quarter	11 53 a.m.
22 „	●	New Moon	4 9 „

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

1 Mar.	☾	First Quarter	2 43 a.m.
9 „	○	Full Moon	7 58 „
16 „	☽	Last Quarter	10 33 p.m.
23 „	●	New Moon	2 5 „
30 „	☾	First Quarter	8 36 „

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m.

7 Apr.	○	Full Moon	11 49 p.m.
15 „	☽	Last Quarter	6 12 a.m.
22 „	●	New Moon	12 1 „
29 „	☾	First Quarter	3 22 p.m.

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

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

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

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 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.

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish Blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflowers, mustard, cabbage, celery, radish, for Autumn and Winter use. Sow celery in shallow, well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower beds gay and attractive during the Autumn and Winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost, then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle life them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosine spray, all of which imply a certain amount of morning and evening work, the flower garden in Autumn and Winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so they are apt to become fly-infested.

Watermelons and rock melons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the Autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth, examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

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Agriculture.

COTTON V. WHEAT.

A Victorian farmer, writing lately to the "Producers' Review," stated that, with a crop of 27 bushels of wheat per acre, grown and harvested under ruling union rates of wages, the net profit at 4s. 9d. per bushel on 345 acres amounted to £1,222 4s. 7d., or £3 10s. 10¾d. per acre. A wheatgrower at Warwick said that, with a return of 20 bushels per acre the profit on wheatgrowing, after paying every possible expense, was £2 4s. 1d. with wheat at 4s. per bushel. He gave as the cost per acre £2 5s. 11d., including 10s. interest.

If a Queensland farmer harvested 27 bushels per acre from 345 acres and sold at 4s. 6d. per bushel, he would realise £2,095 17s. 6d. Deducting expenses on the scale given by the Victorian farmer—viz., £2 5s. 11d. per acre, or £792 1s. 3d.—the net profit would amount to

£1,303 16s. 3d., or, per acre, a fraction over £3 15s. 6¾d. According to the Government Statistician's figures published in 1916, the mean wheat return for this State for the past ten years was 11·39 bushels per acre. The highest average per acre was 15·81 bushels in 1912, and the lowest, 4·42 bushels in 1915. The cash value of this latter yield per acre at 4s. 6d. per bushel would be 18s. 11⅓d., representing a loss of 6s. 11⅔d. per acre. On 345 acres the loss would be ruinous.

Taking the highest average, that of 1912, the cash return per acre is about £3 11s. 4d., less expenses £2 5s. 11d., leaving a profit of £1 5s. 5d. per acre.

How does this compare with a crop of cotton off the same area? Taking the average yield of seed cotton at only 1,000 lb. per acre, the yield on 345 acres would amount to 345,000 lb. At 2d. per lb., the gross return would be £2,875, and the expenses £2 16s. 11d. per acre, made up as follows:—First ploughing, 4s.; second ploughing, 3s.; first harrowing, 9d.; drilling, 1s.; second harrowing, 9d.; rolling (optional), 9d.; seed, 5s.; picking, at ½d. per lb., 1,000 lb., £2 1s. 8d.

The total outlay would thus amount to £981 16s. 3d., leaving a net profit of £1,893 3s. 9d., or a fraction over £5 3s. 11d. per acre.

The cotton-grower has many advantages over the wheatgrower. The only implements he needs are the usual ploughs, harrows, and seed-drill. The plant is drought-resisting, and will also stand up against heavy rain. Practically, there is no disease of the cotton plant in this State. The only trouble is, occasionally, the boll-worm; this insect can be easily controlled by planting a few rows of corn amongst the cotton, as it is the same pest which attacks the grain in the upper part of the maize cob. The cotton plant may be pruned after the crop is off, or it may be ploughed out and re-sown in the spring. If the cotton-field is within carting distance of a ginnery, no bags or bales are needed. The cotton may be put straight into a boxed-in dray, and delivered at the ginhouse weighing-machine, as is done in the cotton-growing States of America.

The cost of picking will be greatly reduced if the lately invented cotton-picking machines are placed on the market. Meanwhile, the light work is easily performed by men, women, and children. At ½d. per lb., pickers, according to their ability, can make from 8s. to 12s. per day. Expert white pickers in America can pick as much as 400 lb. in a day, in the height of the season, thus earning 16s. 8d. a day at far easier work than canecutting.

We have taken 1,000 lb. of seed-cotton as an average crop; but, in 1907, several farmers at Wallumbilla, Tallegalla, Vernon, and Mackay made crops of 2,000, 1,700, 1,500, 1,300 lb., the value per acre being from £8 11s. to £11 13s. A 2,000-lb. crop adds little or nothing to the expense except £2 1s. 8d. for picking the extra quantity.

With the revival of cotton-growing in Queensland, the establishment of ginneries will naturally follow. Ginning in a good cotton district is a profitable business both for the ginowner and the farmer, as the latter can get rid of his crop practically at his own door.

Taking the yield of lint from 1,000 lb. of seed-cotton as 400 lb. and of seed as 600 lb., the result from 345 acres would be 138,000 of lint and 207,000 lb. of seed.

At 10d. per lb., the average price of cotton in the British market in December, 1916, this is worth	£5,750
92½ tons of seed at £6 per ton	561
	£6,311

In addition to this, the woolly seeds of Upland cotton are passed through a special gin, which removes all the short lint, amounting to about 30 lb. per 600 lb. of seed. Thus the seed produced on 345 acres furnishes 10,350 lb. of the short cotton known as "linters," which sells at about £9 per ton, and adds £36 to the gin return, making a total return of lint of £6,347. The expenses of working the ginnery are:—

	£	s.	d.
Ginning for long lint, at ¼d. per lb.	359	7	6
Second ginning for linters, including wages, oil, &c. ..	10	0	0
Loss in weight owing to impurities in the seed-cotton, 5 lb. per 100 lb. of clean lint, 6,900 lb.	287	10	0
345 bales for long lint, at 4s. 2d. each	71	17	6
6 bales for linters, at 4s. 2d. each	1	5	0
Bailing and pressing	35	0	0
	£765	0	0
Purchase of seed-cotton, at 2d. per lb.	2,875	0	0
	£3,640	0	0

Net profit, £2,707.

THE COTTON CROP OF 1916.

The total quantity of cotton dealt with at the last ginning by the Department of Agriculture and Stock on the growers' account was 29,230 lb., from which there was obtained 10,066 lb. of lint, 18,284 lb. of seed, and 880 lb. of waste. The number of pounds of raw cotton required to produce 1 lb. of lint was 2·904 lb., and for 1 lb. of seed 1·6 lb. The percentage of lint to raw cotton was 34·4 per cent., and 1 lb. of raw cotton produced ·344 lb. of lint. The lint was sold locally at an average gross sale price ex store of 6·9d. per lb., the price obtained for the best lint being 7d. per lb. The seed was purchased by the Department for redistribution for planting, and after deducting ginning expenses the growers received a net return of 2·54d. per lb. of raw cotton, which, at the low average of 1,000 lb. of raw cotton to the acre, is equal to £10 11s. 8d. an acre.

Inquiries show that the average cost of planting, cultivating, and harvesting a crop of 1,000 lb. of cotton, per acre, is £2 16s. 11d. Thus the net return to the grower is £7 14s. 9d. per acre. Given a 1,500 or

2,000 lb. crop, such as has often been obtained in Queensland, the farmer's profit is still greater, as the only additional expense is that of picking the extra 500 lb. or 1,000 lb. of raw cotton. In the days of the civil war in America there were 14,000 acres under cotton in Queensland, and the farmers were paid 3d. per lb. for Uplands cotton. This paid them better than any other crop they could grow. To-day the farmers who sold their cotton to the Department of Agriculture at 1¾d. per lb. have realised nearly 3d. per lb. since the cotton was sold. This compares well with maize and wheat growing, especially wheat, of which the highest average yield for the past ten years was 15·81 bushels in 1912, and 4.42 bushels in 1915.

QUEENSLAND GUANO.

For a long series of years, supplies of guano were obtained from the Chincha Islands, off the coast of Peru. These barren islands, three in number, were covered with a deep deposit of guano, the deepest being about 300 ft. The guano was mined from the sea-level upwards. When we visited the place in 1860, there were at least 1,000 ships, all sailing vessels, loading or waiting to be loaded. In those days a ship was allowed about 100 laying days before she could begin taking in cargo. The trade has long since vanished, the guano deposits being exhausted, and no more is obtainable for export. We find, from an article in the "Brisbane Courier," that large quantities of bat guano exist in the caves in the neighbourhood of Rockhampton. The article says:—

"Mount Etna and the adjoining ridges are situated about 16 miles north from Rockhampton. The mountain and spurs consist of blue-grey limestone, and in the centre of the mountain sides are numerous caves and winding tunnels. The roof is white limestone, like slabs of polished marble. Over forty of these caves have been discovered, and myriads of bats have made them their home. Large deposits of guano have partly filled the caves, and in many instances the deposit is at least 20 ft. deep. It is here that the Mount Etna Caves become commercially interesting. The value of guano is well recognised the world over. A Sydney company, the Guano Fertilisers, Limited, has recently purchased the machinery, plant, and lease of the Mount Etna Caves. Skips have been laid to take the guano from one chamber to another, and to the hoist to be raised through the shaft to the side of the mountain. The guano is then conveyed by wire cable to the factory, where it passes through rotary screens, and the coarser material is elevated to pass through a crusher, which reduces it to powder. The factory is less than a mile from Phosphates Siding, on the main line. A motor tractor will be used to convey the guano from the factory to the railway trucks. Already large orders from New South Wales and New Zealand are reported. The Queensland agency has been entrusted to the Australian Co-operative Fertilisers, Limited, Roma street, and stocks will be available very shortly."

HARVESTING SUNFLOWER SEED.

Harvesting is effected either by cutting the heads of standing plants or by cutting or uprooting the plants, and in any case should be done before the seeds are quite ripe, so as to avoid loss of seed. The heads are dried to prevent them becoming mouldy, and the seed is removed either by holding the heads against a revolving cylinder studded with spikes or by special machinery. A simple and easily made device consists of a strong wooden disc about 2 in. thick and 3 ft. in diameter bound by a stout iron rim and worked by a pedal and crank (or by a belt if power is available). It is mounted in a similar fashion to an ordinary grindstone. Stout nails are driven through the disc parallel to the axis and near the periphery, and are allowed to project about ½ in. on each side. A band about 6 in. wide is formed in this way, in which the nails are not more than about ½ in. apart. The seeds are removed by holding the flower head against the nails while the disc is in motion. The seed can be separated from dried florets and other light impurities by winnowing, and should be carefully dried in order to prevent fermentation during storage.—"Cyprus Journal of Agriculture."

A NEW CROP FOR QUEENSLAND.

The introduction of new commercial crops is a matter which the Department of Agriculture and Stock has had under consideration for some little time. Inquiries have elicited the fact that prices for flax (linseed) of commerce, like many other primary products, have materially advanced, and reached a stage when it should be remunerative to the grower, provided anything like a normal season is experienced.

There is no question about the ability of the plant to thrive, particularly within the coastal belt on the free-working alluvial types of soils from the Burnett to the Tweed; also on similar classes of country on the Downs close to the Range, where a good rainfall is to be expected. Experiments at State farms and the Agricultural College have proved that flax finds a congenial home here. At present no machinery is available in Queensland to treat the plant for its highly valuable fibre, but present and prospective prices indicate that the growing of the crop in the meantime, for its seed alone, will be a sufficient inducement for farmers to take the matter up.

The cultivation and successful raising of the crop present no difficulties; seeding, harvesting, and threshing can be effected with labour-saving machinery.

The principal firm of linseed oil and cake manufacturers, Messrs. Meggitts, Limited, of Parramatta, New South Wales, advise that: "As far as an assurance to Queensland farmers that a satisfactory market would be obtained locally is concerned, we would say that no fear need be felt, at all events for some years. This year we consumed over 9,000 tons, and we estimate our requirements for next year at well over

12,000." . . . "Referring to the probable market price, this is somewhat difficult to forecast. Calcutta seed ranges from £11 per ton to as high as £18 per ton, c.i.f. and e. Sydney, and we should base the price we would pay Australian growers on the price ruling for Calcutta seed at the time of purchasing, taking into consideration the difference, if any, between the yield of oil in the Calcutta seed and in the Australian. We should think it probable that Australian seed would be worth, approximately, judged by its oil contents, £1 per ton less than Calcutta seed."

The present shipping charges, Brisbane to Sydney, aggregate £1 8s. per ton, or 8 2/5d. per bushel; rail freight, cartage, &c., at this end would need to be added.

The Department of Agriculture has made arrangements to secure a supply of seed to meet the anticipated demand.

Persons requiring seed should register their names as early as possible with the Under Secretary for Agriculture, Brisbane. Prior to the despatch of the seed, notification will be sent to applicants in order that the necessary remittance (with exchange) may be forwarded.

Price of seed, 6s. 6d. per bushel, f.o.b. Brisbane.

SOME NOTES ON GROWING FLAX (LINSEED).

SOIL.

Flax can be successfully raised in a fairly wide range of soils; those of a free-working, loamy nature, alluvial in character, are very suitable. Well-prepared new land is also to be preferred on account of its freedom from weeds, flax being a poor weed-fighter.

The soil should be prepared well in advance of the planting season, and kept in good tilth until ready to plant. Thorough cultivation ensures a plentiful supply of plant food and moisture, and better prospects of higher yields.

TIME TO PLANT.

Sowings can be made during May and June; the latter date will in all probability be found the most suitable for localities below the range.

METHOD OF PLANTING.

The crop can either be drilled in or broadcasted. For the former method, the grass-seeding attachment on the wheat-drill can be used. In the event of the drill not being fitted with such, the seed can be mixed with about twice its bulk of sifted sawdust and sown similarly to wheat. The depth to be covered will depend somewhat upon the type of soil and the amount of moisture present. A depth of over 2 in. is not recommended.

SEED REQUIRED PER ACRE.

This plant does not stool. When sown for fibre, a long, straight stalk is required, which is induced by thick seeding. In growing the crop for grain, a thinner seeding must be made, so as to encourage branching and seed-production.

In drilling, 40 to 50 lb. of seed is sufficient to plant an acre. In broadcasting, 60 to 70 lb. would be necessary.

Plump, well-developed seed should only be sown; thin, scaly seed should be avoided.

HARVESTING.

This can be carried out in several ways, but most expeditiously with the reaper and binder.

Great care must be taken not to allow the crop to fully mature before cutting, otherwise shelling would result, and a large percentage of the seed would be lost.

It will generally be found necessary to stook the sheaves for about a fortnight before threshing out the grain or placing it in a stack. Threshing out of "stock" is to be preferred. To save loss of seed when handling, spread tarpaulin or bag-sheeting over dray or wagon.

THRESHING OUT.

A special machine is required when threshing the crop for its fibre. When only the seed is to be secured, the ordinary type of wheat-thresher will answer the purpose, sieves being fitted to suit the size of the seed. A small peg-drum thresher can also be used, or a simple power-driven device consisting of two wooden rollers about 2 ft. in diameter. The top roller—resting upon the bottom—should be fitted with slotted bearings to allow a perpendicular play of about 2 in. The weight of the roller is sufficient to crush the husk, allowing the seed to fall out.

The sheaves can also be left intact by supporting the top roller at one end on a long bearer, thus permitting the sheaves fed from the end of the rollers to pass through sideways. Only the "seed end" of the sheaf need pass through.

The seed when cleaned should be placed in sound bags of close texture.

Under favourable conditions a yield of from 14 to 20 bushels per acre may be expected.

ENCOURAGEMENT TO COTTON-GROWING IN INDIA.

It is stated in an article in the "Indian Trade Journal," on Cotton-growing in India, that the short-staple cotton yielding a heavier out-turn per acre than the indigenous long staple was first introduced in various places with the idea of mixing the short and long staple together. After watering, the mixture is practically indistinguishable from long-staple cotton until it is actually brought into use in the spinning mills. For a time the mixture fetched the same prices as long staple; but once the practice became generally known, prices were noticeably reduced. In districts where long staple was grown, short staple was actually imported by rail to be mixed and watered with the local cotton. If no steps had been taken to check this tendency, every district would have lost its reputation as a cotton-producer. The deterioration of Hyderabad cotton resulted in a loss to the ryot (peasant farmer) of 5 rupees per acre, with the probability of a heavier loss in the near future. To remedy this state of affairs, farms were opened for the cultivation of pure long-staple and for provision of seed, but this was not enough. At first the ryots refused to use the seed from the farms until the Agricultural Department agreed to buy their kapas (seed cotton) grown from seed distributed by the farms and to hand over the profits to the ryots. This was done for one year, with the result that the demand for seed increased from 2,000 acres to 20,000 in the second year. The mill agents, now assured of long staple, are offering Rs. 10 more per kandi of 240 seers. There are thus very good grounds for hoping that the restoration of the indigenous long staple will be successful. Taking the average area under cotton in Mahratwara, it is believed that the ryots will be benefited to the extent of at least one crore of rupees. If these hopes are realised, the benefits which the Agricultural Department will have conferred on the State in the short period of its existence are exteremely remarkable.

EXTENDING THE CULTIVATION OF COTTON IN EASTERN BRAZIL.

Two important influences are operative in Brazil to bring about as large and as speedy an extension of cotton cultivation in that country as possible. The first is peculiar to Brazil itself, being the embarrassment caused to the domestic textile industry by the failure of the Brazilian cotton crop a year ago and the consequent very high prices attained by the staple. The second influence is the enormous increase in the market value of all kinds of cotton all over the world. Brazil is naturally a cotton-growing and cotton-exporting country; and those concerned with the economic welfare of the nation see in the very large returns obtainable from producing cotton at existing prices the strongest of inducements to push cotton-growing in every possible way. Various statements of Brazilian projects to this end have appeared in recent months in the pages of this paper. To these may be added a report lately made to Washington by United States Consul-General Alfred L. M. Gottschalk, Rio de Janeiro, as published in "Commerce Reports." Mr. Gottschalk says—

"By a decree dated 5th August, 1916 (Law No. 1161, State of Bahia), the local government of the State of Bahia offers the gratuitous use for the space of five years of certain State lands to individual cotton-growers, either native or foreign, or to persons who, not being agriculturists themselves, are desirous of founding colonies of agriculturists who would raise cotton. *At the end of this period the full title to the lands would revert to the individual planter in the first case, or, in the* *second case, to the person who had formed the colony.* In the event, however, that the lands be not under proper culture at the end of the prescribed five years, the lands would revert to the State of Bahia. The State Government of Bahia also offers facilities in the way of distributing seeds, and promises to engage one or more specialists to instruct cotton-growers as to planting methods and the quarantine of blights and other diseases."—" Cotton and Cotton Oil News."

[The Queensland Department of Agriculture offers to supply pure seed to farmers willing to grow cotton, give them all necessary instruction, and purchase their crops when harvested. Yet the response is poor, and a more payable industry than wheat, sugar, or maize hangs fire.—Ed. " Q.A.J."]

THE OUTLOOK FOR COTTON.

A report on the present position of the American cotton market, and the prospects for the future, appeared in the " Cotton and Cotton Oil News," of 27th November. The report emanates from a cotton-broking firm at New Orleans, Louisiana, and reads as follows:—

" From every State comprising the cotton belt have come reports of the largest spot merchants competing for offerings, and with the demand emanating from such sources all doubt has been dispelled as to the underlying strength of the raw material.

" The fact of the matter is that as the season grows older and the cotton gradually disappears from the points of concentration, those short of their requirements are having it forcibly brought home to them that the year's growth is much below what the world actually needs. And while in peaceful times it would be relatively easy to square demand and supply through the agency of a sharp advance in prices, the great wastage of raw cotton and cotton goods occasioned by the war automatically creates such a demand for these commodities that they must be had, no matter what their cost, while any supply is available. Viewed from any standpoint, we can see no chance of a permanent decline in the price of raw cotton; on the contrary, we believe it will continue to advance until either a surplus crop is produced or the war terminates."

COTTON PLANTS AS A MANURE FOR BANANAS.

An interesting experiment has been conducted in Fiji which consists in growing cotton before bananas as organic manure. Cotton-seed was sown at the rate of 6,720 lb. per acre, and when the young plants had reached an average height of 9 to 10 in. they were ploughed under. The total weight of the bananas produced in the plot manured in this way was 454 lb. compared with 282 lb. in the case of the control. The cotton-seed, therefore, seems to have had some effect.—"Agricultural News of Barbados."

Pastoral.

PRICKLY-PEAR STOCK-FEEDING EXPERIMENTS AT WALLUMBILLA.

The undermentioned report has been presented to the Hon. Wm. Lennon, Minister for Agriculture, by the Prickly-pear Board appointed to control the experiments.

The information represents a summary only of deductions drawn from initial "maintenance" tests, and has been compiled from progress reports furnished by the chemist in charge of the station, Mr. Frank Smith, B.Sc., F.I.C., who has been deputed to present full data of the experiments for publication.

Two animals were slaughtered in the interests of the experiment. Particulars as to the effect of a pear diet, gained by *post mortem* examination, have been furnished by Mr. Adam McGown, M.R.C.V.S., and are attached as an addendum to the present report.

Experiments in feeding sheep commence in January.

The knowledge already gained from the "maintenance" trials with steers will be adapted for dairying operations, which will be initiated early this year.

MEMBERS OF PRICKLY-PEAR BOARD.

A. H. Cory, M.R.C.V.S., Chief Inspector of Stock.
J. C. Brünnich, F.I.C., Agricultural Chemist.
A. E. Graham, Chief Dairy Expert.
H. C. Quodling, Director of Agriculture.

PRICKLY-PEAR STOCK-FEEDING AT WALLUMBILLA.
OBJECT: PEAR UTILISATION.

1. As a drought stand-by for cattle and the preservation of herds.
2. To determine the exact requirements of animals when fed with pear. How to feed pear and what minimum of added food is necessary in conjunction to enable animals *to live, also to thrive.*
3. Water requirements: Whether water is necessary or harmful.
4. Physiological effect of pear diet.

Maintenance tests were carried on for six months with eighteen young bullocks.

Certain deductions were made which have an intimate bearing on the question.

Animals had to be quietened and taught to feed, and it is estimated that several beasts lost up to 80 lb. weight each in condition before settling down to pear-feeding.

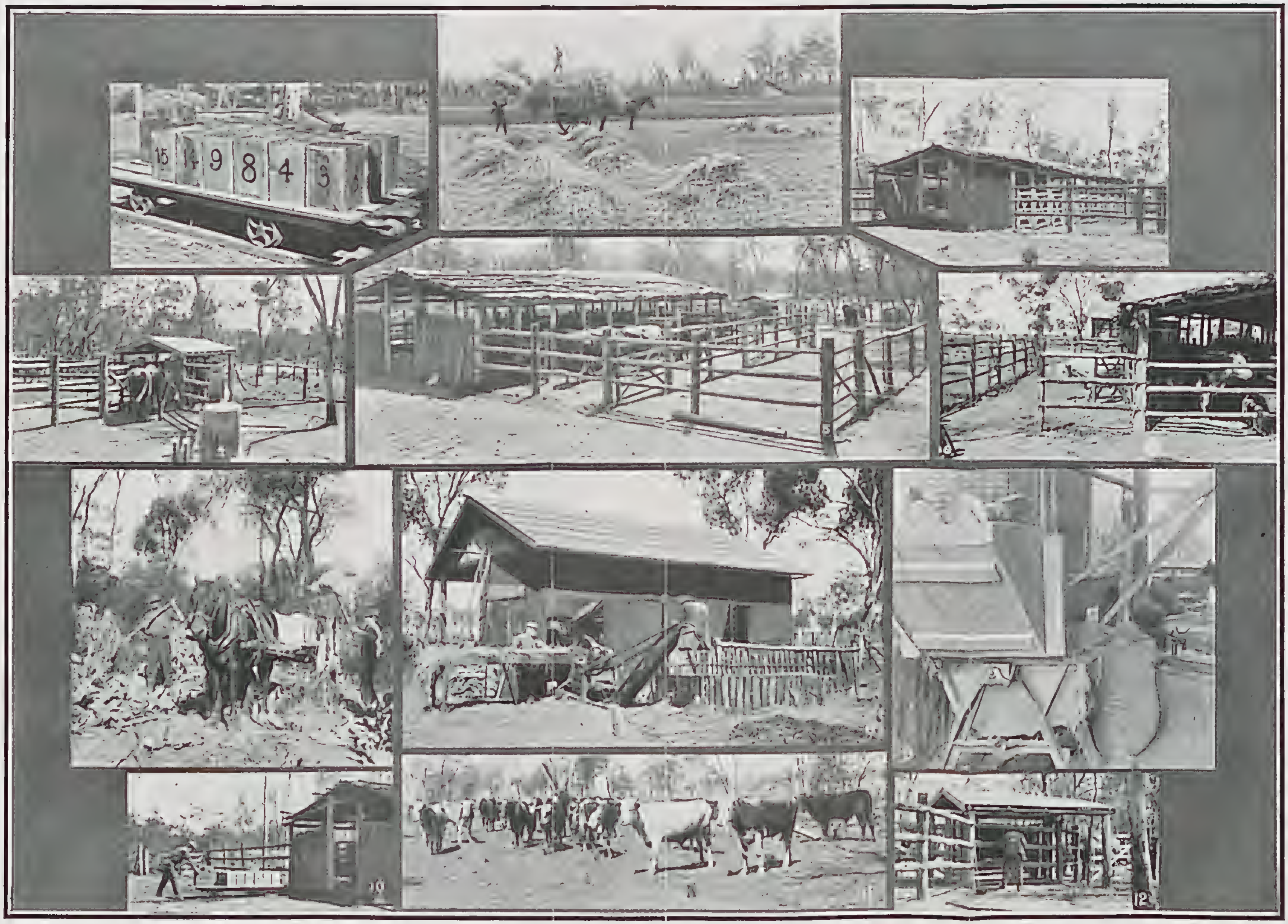

Plate 4.—Views at Prickly-pear Stock-feeding Experiment Station, Wallumbilla.

Those fed exclusively on pear up to their maximum consumption, 62 lb. per day, gradually wasted, as there was insufficient nutriment in this amount to maintain life for more than strictly limited periods; the practice of feeding on pear alone had to be discontinued to save the animals' lives. However, when fed with small amounts of other food, lucerne chaff or oilcake, they promptly improved.

Machine-sliced pear proved as acceptable to stock as boiled pear.

It was found unnecessary to singe either the spines or prickles prior to slicing and feeding. The only preparation found necessary was to pass the pear through a power-driven slicer.

FOOD VALUE OF PEAR.

This has been proved, as a food, to be equal to many root crops—mangolds, &c.—commonly used elsewhere. It is obvious that pear can be handled and fed to stock at a cost much below that of cultivated crops.

The animals under experiment failed to consume, even in the case of the heaviest pear-eaters, more than 90 lb. per day. The average daily consumption of pear per capita was less than this amount; and naturally the animals suffered a deficiency in nourishment and rendered it imperative to add nutrients to compensate for the shortage of protein in the ration.

In the cases under review it was proved that by the addition of a few pounds (3 to 3½) of lucerne chaff or a lesser poundage of linseed oil cake (2 to 2½ lb.), procured at the present cost of slightly over 2d. per head per day, the thriftiness of the animals was restored, and they gained body weight at the rate of one-third of a pound per head per day, and this applies to the coldest period of the year. With the advent of warmer weather and when fed rations similarly constituted, as far as the value of concentrates is concerned (2d. per head per day), certain animals, the more lavish pear-consumers, improved sufficiently in condition to be fit for beef purposes, and individuals gained in flesh to the extent of ½ lb. per day.

Two beasts used in the feeding tests were sold to a local butcher and slaughtered under veterinary supervision to determine the effect of an almost exclusive pear diet, and these proved to be quite satisfactory for beef purposes, and carried a light though even distribution of fat, the carcass weights being 664 and 652 lb. respectively. The veterinary surgeon's (Mr. A. McGown) attached report shows that with the exception of a minor ulceration of tongue, palate, and stomach, the animals were otherwise remarkably healthy and free from any general inconvenience attributable to a pear ration. There was, however, distinct evidence throughout to show that the mucous membranes of the various digestive organs had become thickened, the result of irritation, but no lesions of a serious nature were found. No fibre had accumulated in the stomachs of the animals, and its absence may be accounted for in a measure by the fact that the pear was sliced before being fed.

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Results demonstrate the feasibility of promoting advancement in condition of animals with pear as a sole roughage, and feeding trials proved in the case of those beasts which consumed pear freely (70 lb. and over per day) that no useful purpose would be served by supplementing what may be termed pear roughage with ordinary hay.

WATER REQUIREMENTS.

Ordinarily in the cool months of the year, stock do not require water, as the moisture in the pear provides sufficient.

The animals at the Pear Station did not receive any water for 150 days, but as soon as warm weather set in they exhibited a desire for water, which was provided in unlimited but measured quantities without any injurious result.

FUTURE WORK AT THE PEAR STATION.

It is purposed to follow up the work at the Station by introducing feeding trials with five groups of sheep (ten each), to determine the effect of a pear diet on this class of stock whilst woolgrowing and when rearing lambs.

With the data at their command, as a result of the initial experiment work, it is now opportune for the Prickly-pear Board to determine the possibilities of dairying—

(*a*) Whether it is possible to profitably engage in this occupation in country thickly infested with pear.

(*b*) To ascertain whether pear country can be satisfactorily used for maintaining dairy stock in time of drought.

(*c*) To decide the most satisfactory means of doing so.

Further, the Board recognises the importance of showing whether, in times of food scarcity or drought, live stock (sheep and cattle), may be railed to pear country contiguous to the railway line and be satisfactorily maintained by feeding them with such a cheap and abundant food as pear merely by the addition of small quantities of nitrogenous food.

REPORT BY ADAM McGOWN, M.R.C.V.S.

6th November, 1916.

SIR,—I have the honour to report that I visited Wallumbilla on the 3rd instant for the purpose of making a *post mortem* examination on two young bullocks from the Prickly-pear Stock-feeding Experiment Station which had been maintained on a pear diet supplemented by small quantities of protein-yielding food for a period of some six months.

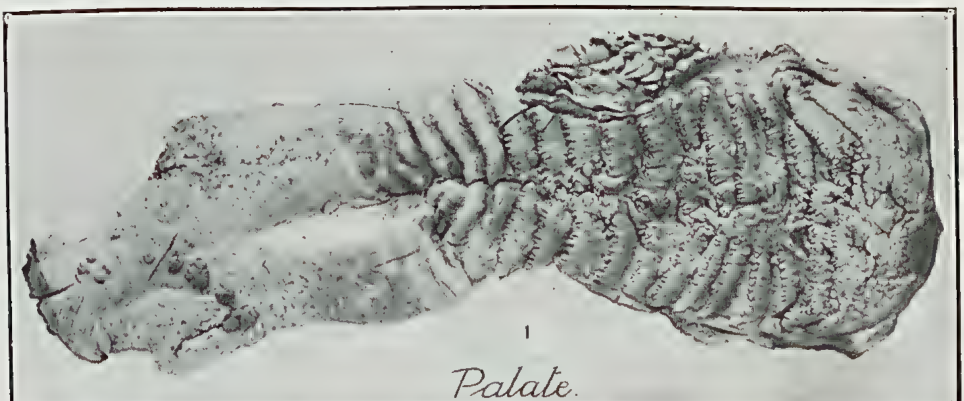
Both animals were grades between three and four years old and apparently raised from dairy stock. They appeared to be evenly though lightly fleshed, and were thrifty in appearance. A *post mortem* revealed certain features attributable to regular and constant employment of a pear diet. Its effect on various organs of the body was confirmed by a similarity of results found in each animal examined, leading to the conclusion that whenever cattle are placed in the position of having to obtain the major part of their sustenance from pear, similar changes to those enumerated are to be expected.

From inquiries made, it has been shown that the daily pear consumption of animals at the Station was not always regular, and this fact seemed to indicate that pear was unpalatable, however—an opinion borne out by *post mortem* results, shows fairly conclusively that at times the soreness due to ulceration of tongue would act as a check to mastication.

Post Mortem: General Appearance.—Carcass in both cases well nourished and entirely healthy. Flesh: Good colour, nicely grained, and of good quality. The fat, though not plentiful, was evenly distributed and of a good clear white colour and quality.

Alimentary Tract.—The changes from normal proved to be as follows:—Tongue: Mucous membrane disturbed by five ulcers in one case, and six ulcers in the other, the size of which approximated ¾ in. in diameter throughout. The sides of tongues in both instances showed the presence of several small nodules, caused by spines penetrating the membrane of the tongue, which in the ordinary course of events would have a tendency to burst, leaving a raw sore. The tongues carried a number of fine spines and prickles.

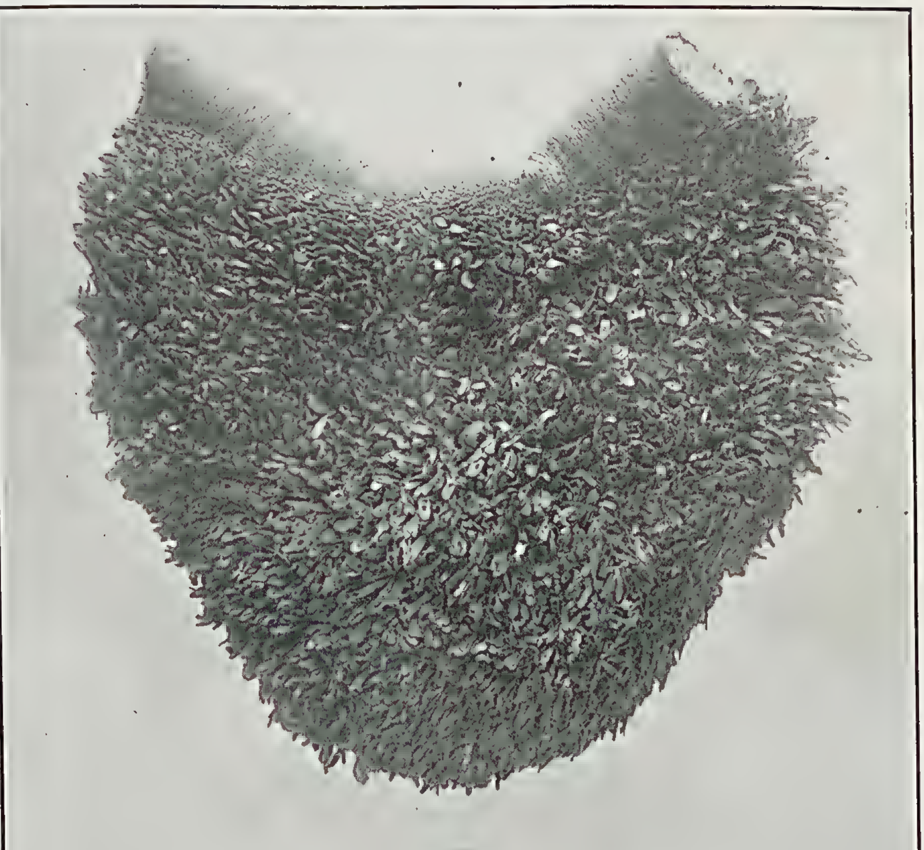
Oesophagus.—The mucous membrane of this organ showed no marked change, and in both instances proved to be free from prickles.



Specimen 1: *Palate.*—Thickened and roughened, with a few small abrasions and several small excrescences; no prickles present.

Specimen 2: *Cheek.*—The papillæ show an increase in size. The anterior portion of the gum of one animal was ulcerated (ulcer 1½ by ½ in. approximately), and contained a group of fine prickles.

Specimen 3: *Rumen.*—Mucous membrane exhibited differences, one portion being normal, whilst adjoining it the papillæ were increased in size and in length and thickness.



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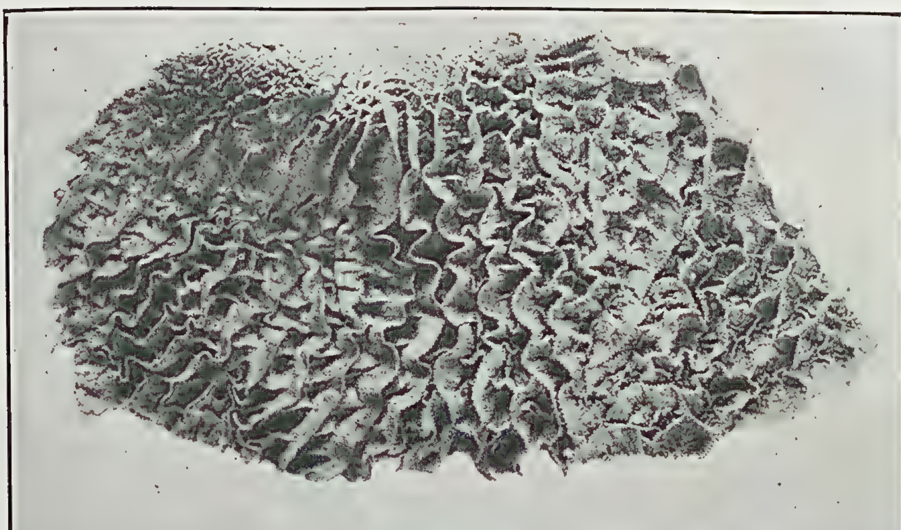
Rumen.



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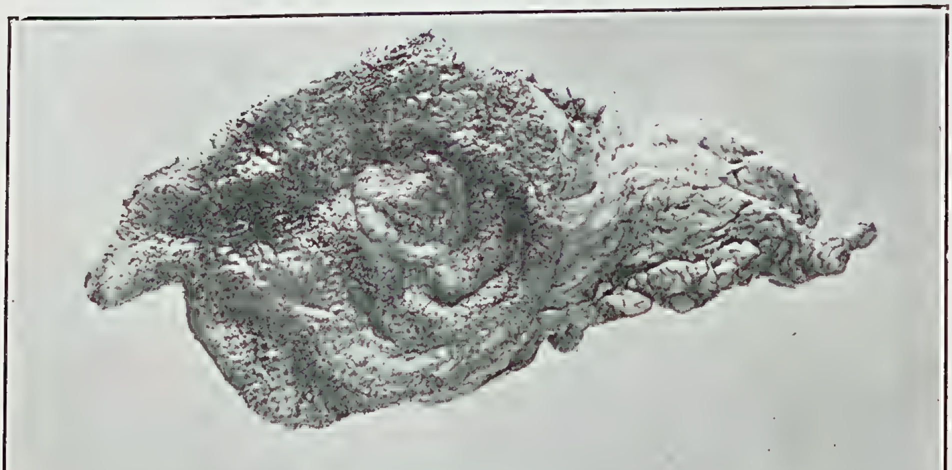
Reticulum.

Specimen 4: *Rumen.*—All the mucous membrane showed a regularity in condition—viz., the papillæ covering the membrane were also increased in size and gave evidence, in a few instances, of small perforations apparently from pear spines.

Specimen 5: *The Reticulum.*—Mucous membrane much thickened and toughened in both animals, and showed at one portion a tendency to ulceration.

Omasum.—In both cases showed no marked change from normal.



6. Abomasum.

Specimen 6: *Abomasum.*—In both animals the mucous membrane was greatly thickened throughout; a portion of the membrane in each instance was covered with colonies of fine prickles embodied in the membrane. These (prickles) were apparently unaffected by the digestive fluids.

Contents of Stomach.—Quite fluid, due to the large percentage of moisture in the pear fed to the animals. No fibre present.

Summary.—The *post mortem* appearances indicate that animals can assimilate a pear diet and thrive, provided it is presented to them after passing the pear through some form of slicing or pulping machine to break down the spines or prickles present.

It is evident also that the animals examined received a sufficiency of supplementary flesh-forming (nitrogenous) food to properly nourish their systems and build up their tissues satisfactorily.

The Chief Inspector of Stock, Brisbane.

SHEEP ON COASTAL AREAS.

The various articles which have been written for this Journal, on the advisability of raising sheep of certain breeds on our coast lands by the help of artificial grasses, have been the means of establishing many thriving flocks on lands where, in years gone by, sheep proved a failure. We have received the following letter addressed to the Under Secretary for Agriculture by a gentleman at Nebo, under the pen name of "Malabar":—

"I have been much interested in the articles on 'Coastal Sheep,' and I think Mr. W. G. Brown and the department are to be congratulated on their enterprise in drawing the attention of coastal farmers generally to the possibility of establishing such a suitable and profitable industry as sheep, and particularly fat lamb raising on small areas near the market, and adapted to small purses. If, as advised, farmers who know nothing of sheep, buy small lots for a start, or even confine themselves to fattening little lots of store wethers (even merino wethers on artificial grasses will pay for fattening), they can make a handsome and interesting addition to their work and incomes. About twenty-five years ago I spent six months on new country just outside Napier, Hawke's Bay, New Zealand, and assisted in the opening and development of an area of about 5,000 acres for a Napier firm. This country is hilly, and was covered with 'bush' (or heavy vine scrub, as we call it), and was felled and burnt off in the same manner as we do in Queensland. A mixture of grasses—principally English grasses—was then sown, and within six weeks of sowing we had ewes and lambs on it. The fencing was all barbed wire stapled to posts and strained very tight. The sheep run were Leicester sheep, and the rainfall about 40 in. Around our place there were a number of small farmers, on areas of from 50 to 100 acres of land, and all ran sheep and a few cows, and all were prosperous. I cannot see why our North Coast lands should not be equally suitable for either English or crossbred sheep, and coastal farmers would certainly have an immense advantage over inland farmers in both regular rainfall and accessibility to markets.

"In one direction, I think, further experimenting and inquiry would be advisable and interesting, in view of opening coastal areas and improving same for grazing purposes. As this is practically intense farming applied to grazing, a study of mixtures of grasses suitable to local conditions, in place of confining attention to one or two separate varieties, would be advisable; also cultivation of crops such as turnips for fattening. In New Zealand turnips are grazed in the field, the sheep themselves doing their own foraging. Large areas each year are cultivated for sheep alone. In any case, the subject is an interesting one, and so much attention has been drawn to 'Farmers' Sheep on the Coast' that I am sure articles in your Journal bearing on fodder crops suitable for coastal lands—turnip, mangold wurzel, &c.—which could be obtained from New Zealand sources (North Island preferably), would be much appreciated by farmers who have an idea of engaging in this industry.

"One very attractive feature about lamb-raising is that it is a business that all members of a family can take an interest in. Children are especially good with lambs, and it is wonderful how fond they get of them and what useful and timely work they can do. Personally, although I am now engaged in cattle-raising, I have had many years of experience in sheep, on dry areas and on natural grasses, and I keep a little flock of about 100 running about the homestead. My children look after them almost entirely, and owing to the care they take of the ewes and young lambs they thrive well and the lambing is phenomenal.

"No matter how small a farm is, I am convinced a few sheep will pay, and pay handsomely, if it is only for home consumption of the mutton and a few to sell to neighbours, &c.; and with the small, cheap machines for shearing now obtainable, and which can be geared to any oil engine, the trouble of shearing presents no very great difficulty.

"To conclude, I am sure that any man running a little flock of suitable sheep (crossbreds for preference), using reasonable care, and in any difficulty seeking the advice of Mr. W. G. Brown, the sheep expert of the department, cannot help making a success of it, if he follows the sensible plan of a small flock first and build up as he gains experience."

PAPER QUILLS FOR CUTWORMS.

A DEADLY ENEMY FRUSTRATED.

An amateur gardener of the good old sort and a reader and subscriber of your interesting paper from its inception sends you the following "dodge" for the benefit of those who may not be aware of it. We all know how the *cutworm* (Dutch *misworm*) attacks and destroys plants put in by us in our garden, notwithstanding the liberal application of, for instance, vapourite and other remedies. In one night these pests have been known to eat off whole rows of such plants as tomatoes, cabbages, cauliflowers, &c.

Try the following simple and inexpensive remedy and "sure cure":—Before putting your plant in the ground wrap around the stem just above the roots some stout brown paper (or for that matter paper of any sort), say about 3 in. wide; then put in your plant with the paper round it covered about half-way in the ground. This will effectually prevent the worm from eating off the plant, as he can't eat through the paper, and we know he does his mischief *only just on the surface* and cannot climb. The paper has the additional advantage of holding up the plant after being put in the ground, and by the time the plant is strong enough the paper has rotted away.—"South African Gardening and Home Life."

The Orchard.

THE NAVEL ORANGE.

CINCTURING.

BY R. G. BARTLETT, Head Teacher, Buderim State School.

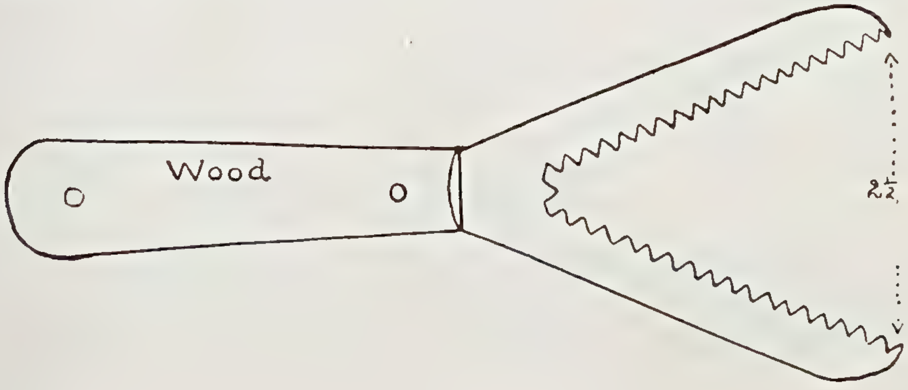
Quoting from Mr. Benson's book on "Citrus Culture"—"The tree is a strong and vigorous grower, with large dark-coloured leaves and a few small thorns. . . . The fruit is of a large size—in young trees over-large—having a fine, thin, smooth skin, which thickens considerably towards the stem end, and is usually of a pale-orange colour. The pulp is juicy, sweet, of fine flavour, contains very little rag, and is usually seedless. It is one of the first oranges to ripen, and has good keeping qualities, hence is a good shipper and valuable for export."

From this description the navel orange should be the ideal variety for a citrus man to grow; but, unfortunately, the experience of most growers is that, though the navel blooms profusely, it seldom sets a good crop of fruit—number as well as quality being required to make any variety a commercial success.

Numerous experiments have been and are still being carried out in order to assist nature in the setting of the fruit.

In irrigation areas, all that is needed is to flood the ground with water during the flowering season. But in Queensland irrigation is practically *non est,* and so something has to be found to take its place. One grower has tried removing a ring of bark from the trunk of the tree during the flowering, with splendid crops as a result. This, however, is too drastic for most orchardists, as they consider the life of the tree would inevitably be shortened by this practice. A more common and fairly successful method is to hammer a piece of No. 12 fencing-wire its own depth into the bark all round the trunk. This, however, tends to damage the young, soft wood, and cause unsightly excrescences.

After studying the methods and results of cincturing grape vines, the writer had a special tool made by the blacksmith as per the rough sketch.



The teeth of saws were set so that both cut at the one time, while the shape permits of the tool being used on any limb up to 2½ in. in diameter.

With the tool the bark of the limbs was cut through when the blossoms were well out. It has been found that in the case of deeply cut limbs, the crop set has been very heavy, while superficial cuts apparently did not cause any more fruit to set than was set on adjacent uncinctured trees. In one orchard, four out of six trees were cinctured, and the cuts tied round with raffia fibre to promote more rapid healing, but the result has been a failure, as not much difference can be seen between the crop on uncinctured trees and that of the cinctured trees, though the grower admits that beetles or bugs have been very busy eating the young fruit. However, in this one case only, failure has resulted, owing either to tying cuts with fibre or to the depredations of insects. Next year extended experiments should give more definite results.

Similar experiments in cincturing navel orange trees are being carried out on the Blackall Range—namely, at Montville and at Mapleton. A comparison of methods and results would greatly assist in perfecting the work and in removing cincturing beyond the experimental stage, thereby benefiting the citrus-growers of the State.

Buderim Mountain, 20th November, 1916.

ARSENIC SPRAYING FOR THE BLACKBERRY PEST.

Mr. Allen M. Williams, of Te Aute Station, Pukehou, Hawke's Bay, New Zealand, describes, in the 'Journal of Agriculture' of New Zealand, 20th December, an effective and comparatively inexpensive weapon for the destruction of the blackberry pest. He says:—

"In reference to our treatment of blackberries, we first cleared the stock out of the paddock, and then sprayed the blackberries with 2 oz. arsenic to the gallon of water. When the bushes had quite dried off—say, in a month—we burned them. The man in charge of the work would then go to each bush twice a week to spray the young shoots as they appeared. In our soil (limestone subsoil), after the first week or two, it would only require looking at once a week, and gradually ease off until no more shoots appeared. The point is, not to let the young shoots get into leaf. The best time to spray is when the blackberries are in flower and the sap well up. If one is careful not to let the young shoots get into leaf, the stock can be put back into the paddock after the blackberries have been burnt, including any grass which may have been affected by the poison. We have always done this, and never lost a hoof. All our blackberries were absolutely destroyed in a very short time, but in lighter soils I can quite understand that it might take much longer. Do not cut the bushes down, but spray them as they stand."

THE AVOCADO PEAR.

This fruit has nothing in common with the European pear. It merely resembles the pear of our orchards in shape. It is of the size of a large Jargonelle pear, has a tough coat, and contains a large, rugged seed. The fleshy part of the fruit is of a bright-yellow colour, with a rich, delicate, creamy texture of about the consistency of firm butter, and with the fine flavour of a fresh walnut. In the West Indies, of which it is originally a native, it is called "subaltern's butter," and sometimes "vegetable marrow." The richness of the pulp necessitates the addition, when eating it, of something pungent, such as pepper and salt, wine, or limejuice and sugar; but the favourite condiment is pepper and salt. It is propagated from seed, but may be struck from cuttings of half-ripened wood without mutiliating the leaves. The tree attains the size of our apple-trees, and it grows well and fruits freely on our coast lands. It is being grown by Mr. Bliss, of "Glen Retreat," Enoggera; also at the Penal Establishment at St. Helena, and the Botanic Gardens, Rockhampton. A few seeds might be obtained from these sources. The Department of Agriculture has none for distribution. Rooted plants in pots can be obtained from S. Eaves, nurseryman, Adelaide street, Brisbane.

THE CAROB TREE.

We are indebted to Mr. W. S. Campbell, Cooregab, Vaucluse road, Rose Bay, Sydney, for the following useful information concerning the Carob Tree:—

"When the Pera artesian bore, near Bourke, New South Wales, was taken over by the Agricultural Department of that State, I caused to be planted several small carob trees, as an experiment, to test their suitability for the climate when irrigated with artesian water. Three thrived admirably, and grew into most beautiful shady trees, one of which produced fine crops of pods. I saw these trees not long before I retired from the department, and they were then splendid specimens, and are probably still thriving. This little experiment shows clearly that the carob is well suited for the Western districts—500 miles from the coast, at any rate—and that the artesian water of the Pera bore suited them well. I may mention that the south Australian 'Sugar Gum' also thrived splendidly there, as well as the Olive, which produced really wonderful crops of excellent fruit, and the trees are absolutely free from the Black Olive Scale."

THE MACGREGOR PINEAPPLE.

In February last year we gave a description of the MacGregor pineapple, grown at Campsie Fruit Farm by Mr. E. Smallman. This was accompanied by an illustration of the crop on a field planted in September, 1914, which the plants bore in 1916. This year the yield has been far greater than that of the first crop, as will be seen by the photograph taken in January last. The first crop averaged 10,000 pines per acre, and the average weight of the single fruit was 4½ lb. Mr. Smallman has already gathered several hundred cases for shipment South, and at the time of writing there were enough pines on the plants to fill a couple of hundred more cases. This goes to show that pineapples pay well if a good variety is grown and proper cultivation is given. The MacGregor pine brings the highest price in the Sydney market.

PLATE 5.—THE MACGREGOR PINEAPPLE CROP OF 1917 AT MR. E. SMALLMAN'S FARM, "CAMPSIE," ORMISTON.

Viticulture.

WINE INDUSTRY.

THE CELLAR.

BY G. A. GATTINO.

A cellar, to be really good, must satisfy three conditions—

(1.) Has to be built so that the internal atmosphere marks the required temperature for maturing the wine.

(2.) Shall not be disturbed by winds or other causes affecting the quietness.

(3.) Must be kept sufficiently clean.

As I have previously stated, the tumultuous fermentation requires a temperature from 30 to 70 degrees F.; but the insensible fermentations (which complete the maturing of the wine) should have a temperature varying from 30 to 40 degrees F. A cellar should also be built in order to participate, in a progressive way, to the atmospherical changing of the seasons and shall not reciprocate the rough changes of them.

A cellar where the atmospherical disturbances could not be controlled is not adapted to improve and keep the wine. The latter at each rapid elevation of temperature would bring about precipitous fermentation, and at each sudden fall of same would cease to ferment before the correct time. These sudden changes of temperature, which damage the wine very much, are experienced in buildings situated above the ground level, and such cellars should be totally abolished, as well as all cellars too much under ground, as in the case of many old cellars of the old country, which were once built on this wrong idea. In this latter class of cellars, the atmosphere keeps a uniform temperature during all the year, therefore the wine, not being able to get the insensible fermentations required for improving and completing, cannot mature properly. The wine will become clear and drinkable, but, as it could not divest itself of the substances which precipitate only by the succession of insensible fermentations, when this wine is brought from the cellar it is liable to re-ferment and become cloudy and undrinkable.

A good cellar, therefore, should have the floor about 10 or 12 ft. under the ground level, and be provided with thick walls. The door of the cellar should open to the south, and, if possible, not leading direct to the open air. Several small windows with blinds are required, and should be highly situated. As a matter of fact, the sun must not penetrate into the cellar at all.

As the quietness of a cellar should not be disturbed, it is necessary that the latter be sheltered from the direct force of the winds and be situated far from streets with continuous traffic. The wine, for refining and maturing well, requires a more or less long calmness, thus enabling it to slowly become free of all the small particles of dregs which precipate very slowly.

The French enologist, Vergnette Lamotte, was right in saying: "Les caves des grandes villes sont mauvaises" (the cellars of the big cities are bad).

The floor of the cellar must be well paved, not allowing the water to become stagnant. It is advisable that this floor have a slight descent to the centre of the building, falling towards a small cemented sub-well. Such small well would serve also the purpose of receiving any wine that would eventually spill from the casks if a breakage or leakage occurred in the absence of the cellarmen. To prevent the formation of humidity or mouldiness, the walls of the cellar should be plastered with hydraulic lime.

Besides the abovementioned conditions, the cellar must be kept thoroughly clean, not allowing the deposit of anything unconnected with the manufacture of the wine, especially things of a fermentable nature.

The cellar must be carefully and frequently washed, swept, and cleaned, preventing all formation of cobwebs, mouldiness, &c..

All these precautions have to be adopted by the winemaker who wishes to produce good wine. I will give the reasons why they are indispensable later on, when I write on the theories of the fermentations.

To complete the descriptions of the buildings required for making wine, I will only add a few words referring to the store or cellar for bottled wine. Generally the coolest part of the cellar is destined for the bottle department, but it would be better if a separate place could be built for this purpose. The bottled wine cellar, having to be used for the conservation of matured wine—whether in bottles, jars, or small casks—should be situated underground and have the floor at a lower level than the general cellar.

The wine to be placed in the bottle department has no need of further fermentation, but wants, instead, to be kept unalterable. This can be obtained by having the cellar for bottled wine very deep underground and with little light.

If any further description or plan of the abovementioned buildings are required, I am only too willing to give the necessary illustrations thereof.

Tropical Industries.

THE ACTION OF COPPER ARSENATE AND ARSENIOUS ACID ON SUGAR-CANE ROOTS.

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

It is satisfactory to be able to state that experiments started at Gordonvale Laboratory last November, with the object of determining the action of copper arsenate and arsenious acid on growing roots of sugar-cane, have yielded results of a most encouraging nature, and are now far enough advanced to admit of publication of a few details regarding this research work.

In the first test, with arsenate of copper, short "sets" of "Badila" cane having three buds were planted in common 8-in. earthenware flower pots filled with coarsely sifted, red volcanic soil. Pots Nos. 1 to 4 were infected at the rate of 113 lb. of Paris Green per acre; the poison being mixed uniformly with the soil in pots Nos. 1 and 2, but buried in a horizontal layer a couple of inches below " sets" in Nos. 3 and 4.

No. 5 was treated at the rate of 226 lb. of the arsenical preparation per acre, thoroughly mixed with the soil; while Nos. 6 and 7 were untreated controls. These "sets," which were planted on 3rd October, sprouted together, all producing healthy-looking shoots. Six weeks later, when the resultant plants were photographed, the mean height of foliage in Nos. 1 and 2 was found to be 15 in; in Nos. 3 and 4, 18 in.; No. 5, 27 in.; and in Nos. 6 and 7, 15 in.

Nos. 1 to 5 had produced collectively eight shoots, and Nos. 6 and 7 five shoots; the average height of foliage for the five treated pots being 10 in., as against 7.50 in. for the two controls.

This seems to indicate that cane plants may perhaps derive benefit from absorption by their roots of minute quantities of copper salts; since it is a well-known fact that, in many cases, we are able to artificially stimulate plant growth by an application to the soil of weak solutions of copper sulphate. In the above experiment, all seven pots received the same measured quantity of water, sufficient to nicely moisten but be wholly absorbed by the earth, thus precluding drainage and possible loss of fine particles of the soil or arsenic. Artificial manure, consisting of a little nitrogen and potash, was given at intervals in the water, each pot receiving exactly the same amount.

The result conveyed by the foregoing figures merely confirms previous opinions with reference to Paris Green stated in last month's report.

The quantity per acre advocated in Bulletin No. 4 of this Bureau—in connection with cane grub control by means of poison baits—was only 8 lb., whereas it appears probable that at least 226 lb. per acre can, if desired, be administered to the soil in this way without causing injury to the cane.

Other experiments with Paris Green yielded results practically identical with that given above, so need not be referred to in detail. I may mention, however, that the cane growing in a number of 7-in. pots is higher at present in those treated with copper arsenate than in the controls, and finest of all in one containing cowpea leaves that had been dusted with the arsenical mixture at the rate of 113 lb. per acre.

This experiment was started on the 1st November, and five weeks later (5th December) foliage in these ten pots averaged about 18 in. in height.

As regards the action of commercial white arsenic, cane "sets" were planted, on 4th October, in half a dozen 10-in. flower pots, and when photographed, after a lapse of six weeks, the average height of cane leaves in those containing soil infected at rates of from 100 to 200 lb. of arsenious acid to the acre was found to be 27.80 in., while in a single pot, used as a control, the height was 26 in. All plants appeared equally healthy throughout the course of this experiment. Outdoor tests were limited to an application of copper arsenate to the roots of two months old plant cane growing near the laboratory, the poison being simply dusted over damp cowpea leaves, which were then buried about 6 in. deep on each side of the stools and 8 in. from the centre of the row. Plants treated in this way continued healthy, and developed in a normal manner. Five weeks later, when the soil was examined, the treated cowpea foliage was easily located owing to its conspicuous green hue, but had, of course, partially decayed. The rainfall experienced during the course of the above test was only 112 points, all of which fell on the 7th instant, about a week after burial of the poisoned leaves.

The primary emergence of our grey-back cockchafer was noted by Mr. J. Clarke, of Highleigh, on the 7th instant, and at Meringa a week later. Several experiments were initiated this month in order to determine approximately the duration of the egg stage of albohirta under both normal and adverse climatic conditions.

On the 27th a collection of these beetles was procured from the former locality (Highleigh), and twenty female specimens confined separately in cages of damp soil.

When examined after an interval of four days (twenty-three days after emergence), fourteen out of the twenty beetles had, between them, laid 318 eggs, and the remaining six were constructing earthen chambers in which to oviposit.

Half a dozen females derived from the abovementioned collection, but placed on the same date in cages containing dry soil, did not lay; and ultimately, upon dying, four of them were found by dissection to contain eighty-four full-sized eggs fit for exclusion, and varying in individuals from ten to thirty in number. The ovaries of the other two were small and apparently unfertile.

We may, I think, reasonably assume from the foregoing evidence that the simultaneous desire to oviposit manifested by the former batch of twenty beetles was induced by the ideal conditions of soil-moisture artificially provided for them; and, moreover, that the ovary in these insects had in most cases attained full development prior to the date of capture, but oviposition had been purposely postponed owing to abnormal dryness of the soil.

It is hoped to deal more fully with this matter in a later report, but I may state that, apart from any scientific interest it may possess, these investigations have, up to the present, resulted in discoveries of more or less economic value in connection with the control of the egg stage of *Lepidiota albohirta.*

PEARLS IN COCOANUTS.

In 1911, the then Governor of Queensland (Sir William MacGregor) obtained from Mr. T. A. Williams, of Sabai Island, Torres Strait, valuable information on the subject of the diameter of space to which root cords spread out from the base of cocoanut trees, and courteously handed the report to us for publication. This appeared in the October issue of the Journal, 1911.

Whilst discussing the root question, His Excellency informed us that in Hawaii (or Fiji?) he had been handed a cocoanut for his refreshment, and that he found inside it a valuable pearl. He saw the cocoanut opened, and was quite sure the pearl was not dropped into it. He gave the pearl to a lady present, who afterwards wore it at some Court function in London. Singularly enough, to-day we find in a book on "Tropical Agriculture," by H. A. Alford Nicholls, M.D., F.L.S., C., M.Z.S., &c., the following remarkable confirmation of the existence of pearls in cocoanuts. The author says, when describing the various parts of the nut: "Finally, a very singular and highly-prized pearl is found, under very rare circumstances, in cocoanuts, and a specimen has lately been added to the Museum of the Royal Gardens at Kew (1892)."

Forestry.

FORESTRY IN HAWAII.

The Forestry Department in Hawaii announces that the Division of Forestry would have ready for distribution, about December last, several thousand young trees of the Australian red cedar, *Cedrela australia,* which it desires to have planted out in as many different situations as possible in order to test its adaptability to the Hawaiian Islands. In connection with this, the "Hawaiian Forester and Agriculturist," of October, 1916, writes:—

"This is a timber tree which promises to be of great value to the Territory. Its distribution has been made possible by the gift of a quantity of seed which Mr. A. W. van Valkenburg and Mr. C. E. Smith kindly turned over to this Division and which Mr. Smith personally selected and gathered recently in Australia.

"The timber of the Australian red cedar is considered the most valuable produced in New South Wales, and it is in universal use there. The tree is found growing naturally in Queensland and New South Wales, especially in the warmest and moistest districts between the latitudes of 35 degrees and 20 degrees south. It grows best in protected places where there is a little shade. The tree is easily transplanted, is a rapid grower, and in Australia attains a height up to 200 ft., with a diameter up to 10 ft. The size of the average tree now being cut in Australia is about half of the above.

"The wood of the Australian red cedar is equal to mahogany but lighter in weight. It is used for many of the same purposes—for tables, cabinets, furniture, doors, and interior finish, and it is excellent for carriage-building, because it is light and easily worked. It seasons well with very little splitting, and is very durable when kept dry.

"The Division of Forestry will be glad to place a number of these trees in the hands of tree planters who will be willing to set them out in suitable situations, care for them, and report on their growth in after years. Orders for these trees will be gladly received from those who are willing to do this and who have not already received special notification that these trees will be available for distribution."

SOME USES OF HONEY.

Honey for Cleansing the Hands.—Honey is an excellent cleanser of the skin, though few are aware of the fact. Try this: Rub a little honey on the dry skin; moisten a little, and rub again; use more water, and rub. Wash thoroughly, when it will be found that the hands are as clean as the most powerful soap can make them.

Honey for Freckles.—Half a pound of honey, 2 oz. glycerine, 2 oz. alcohol, 6 drams citric acid, 15 drops ambergris. Apply night and morning.

Entomology.

THE CANE BEETLE.

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

With further reference to experimentation relating to the egg stage of our principal cane-beetle—alluded to in last month's report—it will be of interest to record the following data just obtained at Gordonvale Laboratory.

Dealing firstly with the method of oviposition as practised by the grey-back beetle (*Lepidiota albohirta*, Water.), I may state that the depth at which its eggs are deposited depends naturally to a great extent upon the amount of moisture contained in the soil at the time, which, however, needs to be sufficient to keep the ova thoroughly damp during a period of at least two weeks.

Under normal weather conditions this species most likely oviposits in the field at a depth of about 6 in.

Practically all of the seventy-three female specimens confined in moist soil at the laboratory this month oviposited at the bottom of their cages, where the earth had been made wetter and firmer than elsewhere. Those laying large batches of eggs usually constructed a chamber of irregular shape, about an inch in diameter, the sides of which were firmly compacted—in order, no doubt, to prevent the interior from becoming filled with soil, that if coming into close contact with the comparatively soft ova would interfere with their proper expansion. This cavity, however, generally contained a good deal of loose earth, introduced most likely owing to disturbance of the outer soil by the insect as it crawled from the spot after having laid its eggs.

These are placed in a flattened mass on the floor of the chamber, and may be deposited either separately or attached to each other in short strings of two or more, or connected groups consisting of as many as seventeen (so far as observed), but are usually laid singly and nearly always intermixed with small particles of soil.

At the time of deposition, the egg is about 4.25 mm. long—twelve this size placed end to end in a straight line measuring exactly 2 in.—but during development gradually swells, until just prior to hatching it is fully a quarter of an inch in length (6.30 mm.).

Being of a creamy-white colour, these large oval-shaped eggs are necessarily conspicuous when occurring in dark soils.

With regard to the number that may be produced by a single specimen of albohirta, it is interesting to be able to state that results just obtained verify the correctness of previous opinions in this connection recorded last January ("Australian Sugar Journal," Vol. VII., p. 902).

Judging by numerous dissections made at that time, I concluded, from the structure of the ovarian tubes, that an individual beetle, although often laying from twenty-four to thirty eggs, was capable of producing as many as three dozen—a number, by the way, much in excess of that given by other entomologists, who have stated the maximum to be twenty-four or twenty-five.

During the present season, however, a female of this species caged at the laboratory actually deposited, on the 8th instant, a batch of thirty-six eggs, and from the ovary of another specimen a similar number was taken, fully grown, and almost fit for exclusion. In addition to the above high record it may be mentioned that two beetles laid thirty-four eggs each; while other lots—obtained from chambers formed in cages of damp earth—comprised eight batches of thirty eggs; three of twenty-nine; one of twenty-eight; one of twenty-seven; seven of twenty-six; three of twenty-five; and eight of twenty-four.

The seventy-three females used in the above experiments produced altogether 1,537 eggs (21·5 per insect), and as all specimens laying less than fifteen were examined after death and the ovaries found empty, we may assume this average to be fairly correct. When laying twenty or less, the individual eggs in such lots are generally a little larger at the time of deposition than those taken from chambers containing twenty-five to thirty-six. Among batches of thirty to thirty-six, it is not unusual to find two or three much smaller than the rest.

Regarding the duration of the period preceding oviposition, recent experiments incline me to believe that *Lepidiota albohirta* deposits only one large batch, which—in the event of emergence being followed by continuous dry weather—most likely includes every egg it is able to lay. On the other hand, should this interval prove more or less showery, oviposition may, and no doubt frequently does, take place as soon as each of the twelve ovarian tubes forming the ovary contain two fully grown eggs. Under the latter climatic conditions, maternal instincts would naturally prompt the female to take advantage of the presence of abundant moisture in the soil; thus we may reasonably assume that the batch of twenty-four so often met with, consisting of eggs that usually mature simultaneously, would, under such circumstances, be laid first; while the remaining supplementary twelve, which apparently constitute a sort of reserve supply and do not attain full development until some days later, would be deposited at random either singly or in small numbers as opportunity might offer. For example: The seventy-three beetles abovementioned chanced to experience a dry spell after emerging from the ground, and, egg-laying being delayed in consequence, deposited the whole contents of the ovary in one large batch; while in no instance did a specimen subsequently yield additional ova, although living for several days longer subjected to the same congenial environment.

With reference to the influence of parasites in this connection, it was noticed that a grey-back beetle, harbouring a single maggot of one of the smaller parasitic flies, managed, notwithstanding, to mature and deposit fourteen eggs about twenty days after emergence, and did not succumb until six days later.

Another containing a large dexiid grub and a third specimen infested with nine dipterous maggots lived for nearly three weeks, but were unable to oviposit.

THE MAGGOT-FLY.

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

On a recent trip to the South I found pastoralists, and even the authorities on the above matter, in despair as to finding a method of destroying maggots or preventing the infestation of sheep by the fly. It is the same thing here in Queensland. It has seemed to me for years that the problem has been tackled at the wrong end. It seems obvious that if the fly can be destroyed then no palliatives will be required; yet it is safe to say that nine hundred and ninety-nine people in a thousand who are interested in the matter, and who have fly-stricken sheep, are looking for something which will either destroy the maggots or minimise their effects.

Until this year, in the very great majority of cases, it was known that the fly did not blow sheep with less than two months' wool. In the middle of November last year, on the Downs, I saw newly shorn sheep blown on the neck, in the ears, and in wrinkles; in fact, all over the body. At the same time, on walking through the paddocks, it was to be seen that almost every blade of grass and the stems of the various shrubs or weeds were literally swarming with flies, many of which were the red-headed blue fly or the common green fly, both of which are reputed as being addicted to striking the sheep.

What chance has any sheep of escaping if the paddocks be full of flies? The cost of palliatives by this time (from 1902) must have run into hundreds of thousands of pounds, and the losses of sheep and wool quite incalculable. Therefore, if we are to do anything to lessen the losses, it seems that the fly itself must be tackled; and, while that is being done, we can use the palliatives, such as they are, in the hope that something may be discovered which will deal with the fly in a wholesale manner.

Here is a suggestion which comes from a well-known pastoralist, and it seems so reasonable that I thought it well to put it on paper. We have the prickly-pear pest, and many methods have been used to kill it wholesale. Amongst the methods is the use of a gas heavier than air, and which is poisonous. This seems to kill pear wherever I have seen it tried.

Our soldiers at the front, too, are liable to be killed with a gas heavier than air. Now, if pear or human beings can be killed by such a gas in a wholesale manner, it seems quite reasonable that all these flies may be killed also, and our chemists should be able to find such a gas.

To apply it, the animals could be removed from a paddock, placed in high country, or at the back of the gas-holders, and then a stream of poisonous fumes allowed to flow over the country.

Even if the sheep should have to be removed from the district for a time, it is no more than happens if water or feed fail in bad seasons. Details, of course, would have to be left to the chemists; but surely if human beings and prickly-pear can be destroyed in such a manner, flies are not immune.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH DECEMBER, 1916, TO 26TH JANUARY, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Violette's Peer's Girl	Jersey	13 Dec., 1916	629	6·4	47·73	
Iron Plate ...	,, ...	9 Dec. ,,	737	4·6	39·94	
Miss Edition	,, ...	25 Dec. ,,	777	4·1	37·42	
Sweet Meadows	,, ...	18 Aug. ,,	490	6·0	34·82	
Nina ...	Shorthorn... ...	23 June ,,	729	3·9	33·36	
Jeannie ...	Ayrshire	27 Oct. ,,	651	4·3	32·94	
Comedienne	Jersey	24 Nov. ,,	557	5·0	32·88	
Miss Bell ...	,, ...	1 Aug. ,,	496	5 3	32·06	
Lady Margaret	Ayrshire	8 Jan., 1917	580	4·5	30·74	
Queen Kate	,, ...	15 June, 1916	683	3·8	30·42	
Twylish's Maid	Jersey	2 Nov. ,,	536	4·8	30·34	
Bluebelle ...	,, ...	22 June ,,	580	4·4	30 04	
Lady Dorset	Ayrshire	14 Sept. ,,	668	3·8	29·75	
Lilia ...	,, ...	4 Sept. ,,	543	4·4	28·11	
Princess Kate	,, ...	20 June ,,	508	4·6	27·53	
Charity ...	Jersey	28 May ,,	393	5·8	26·98	
Constancy ...	Ayrshire	27 Dec. ,,	673	3·4	26·73	
Lady Annette	,, ...	11 Nov. ,,	708	3·2	26·42	
Rosine ...	,, ...	6 July ,,	570	3·9	26·09	
La Hurette Hope	Jersey	6 Oct. ,,	498	4·3	25·19	
Thornton's Fairetta	,, ...	26 May ,,	498	4·0	23·38	
Skylark ...	Ayrshire	21 March ,,	440	4·4	22·79	
Netherton Belle	,, ...	11 March ,,	372	4·9	21·49	
Lady Loch II.	,, ...	17 March ,,	391	4·6	21·18	
Glen ...	Shorthorn... ...	8 Jan., 1917	415	4·2	20·48	

The above cows were fed on natural pasture only.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
AYRSHIRES.				
Queensland Agricultural College	Gatton	14	45	Ayrshire Herd Book of Queensland
State Farm	Warren, Rockhampton	9	88	ditto
H. M. Hart	Glen Heath, Yalangur	6	15	ditto
L. H. Paten	Jeyandel, Calvert ..	8	20	ditto
J. H. Paten	Yandina	8	23	ditto
J. H. Fairfax	Marinya, Cambooya	9	55	ditto
State Farm	Kairi	4	8	ditto
F. A. Stimpson ..	Ayrshire Stud Farm, Fairfield, South Brisbane	17	68	ditto
J. W. Paten	Wanora, Ipswich ..	10	42	ditto (Includes 29 cows in advanced register.)
JERSEYS.				
W. Siemon & Sons Ld.	Roma st., Brisbane ..	6	60	Queensland Jersey Herd Book
Queensland Agricultural College	Gatton	13	30	ditto
W. J. Barnes	Cedar Grove ..	10	27	ditto
W. J. Affleck	Grasmere, N. Pine ..	6	31	ditto
M. W. Doyle	Moggill	4	12	ditto
State Farm	Kairi	6	40	ditto
James T. Turner ..	The Holmwood, Neurum	1	5	ditto
Robert Conochie ..	Brookland Jersey Stud Farm, Brooklands, Tingoora	9	21	ditto
G. A. Buss	Bundaberg	5	14	ditto
T. V. Nicholson ..	Windsor	2	8	ditto
Geo. H. Crowther ..	Montrose, Oakey ..	7	43	ditto
E. F. Fitzgibbon ..	Listowel, Oakey ..	7	30	ditto
GUERNSEYS.				
Queensland Agricultural College	Gatton	2	2	Eligible but no Herd Book in Queensland
HOLSTEINS.				
Queensland Agricultural College	Gatton	3	10	Holstein-Friesian Herd Book of Australia
George Newman ..	Wyreema	9	37	ditto
F. C. G. Gratton ..	Towlerton, Kingsthorpe	2	11	Eligible for entry in Holstein-Friesian Herd Book of Australia
State Farm	Kairi	1	2	ditto
R. S. Alexander ..	Glenlomond Farm, Columboola	3	1	Holstein Friesian Herd Book of Australia
S. H. Hosking ..	Racing Plains, Toogoolawah	2	23	ditto
C. Behrendorff ..	Inavale Stud Farm, Bunjurgen, *via* Boonah	5	10	ditto

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Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
ILLAWARRA.				
John Hardcastle ..	Dugandan	5	17	Illawarra Herd Book of Queensland
Hunt Bros.	Maleny	3	62	ditto
W. F. Savage ..	Ramsay	2	29	ditto
G. E. J. Chaseling ..	Brundah, Coolabunia	1	45	ditto
P. Biddles	Home Park, Netherby	3	14	ditto
A. N Webster ..	Yaralla, Maleny ..	5	65	ditto
A. Pickels	Blacklands, Wondai	4	82	ditto
MILKING SHORTHORNS.				
A. Rodgers	Torrans Vale, Lanefield	3	18	Milking Shorthorn Herd Book of Queensland
Wm. Rudd	Airedale, Christmas Creek, Beaudesert	6	30	ditto
W. Middleton	Devon Court, Crow's Nest	3	27	ditto
P. Young	Talgai West, Ellinthorp	11	60	ditto
BEEF SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	..	17	Queensland Shorthorn Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	20	Australian Herd Book
HEREFORD.				
H. F. Elwyn	Gunyan, Inglewood	250	750	Australian Hereford Herd Book
Mrs. Lumley Hill ..	Bellevue	45	127	Entered or eligible for entry A.H.H.B.
James T. Turner ..	The Holmwood, Neurum	25	50	Australian Hereford Herd Book
A. J. McConnel ..	Dugandan, Boonah	43	60	ditto
ABERDEEN ANGUS.				
G. C. Clark	East Talgai, Ellinthorp	4	10	Entered or eligible for N.Z.H.B.
SHORTHORN.				
C. E. McDougall ..	Lyndhurst, Warwick	25	50	Entered or eligible Q.H.B.
W. B. Slade	East Glengallan, Warwick	77	283	Queensland Shorthorn Herd Book
W. T. Scrymgeour ..	"Tara," Arthur st., Toowoomba	79	300	ditto
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book

PEPSIN V. RENNET.

The following particulars concerning the investigation in connection with the manufacture of pepsin for cheesemaking in view of the shortage of rennet, the export of which has been prohibited by war regulations in Europe, have been supplied by the hon. secretary of the Queensland Committee of the Commonwealth Advisory Council of Science and Industry, and they go to show that the results of the use of pepsin are more than equal to those obtained by rennet. It appears that pepsin costing 1¾d. will go as far as rennet costing, to-day, 1s. :—

"The average annual production of cheese in the Commonwealth from 1910 to 1915 was 18,097,424 lb. Assuming 1 lb. of pepsin is required for 9,000 lb. of cheese, 2,019 lb. of pepsin would be required to supply the whole Commonwealth if pepsin entirely displaced rennet in cheesemaking. The normal price of pepsin is usually £1 1s. per lb. This would mean that the maximum value of the industry would be worth, say, £2,200. It seems probable that at least another ton of pepsin would be utilised for the manufacture of peptonised foods, &c.

"There is no doubt that pepsin can be made here, and that it would have been produced locally if sufficient inducement were forthcoming. Mr. F. E. Trollope, formerly chemist to the Bovril Company, London, and to Angliss and Co., Melbourne, states that he has extracted high-grade pepsin from stomachs of both hogs and sheep, and that there are no technical difficulties in the extraction. According to Mr. Trollope, 1 ton of sheep's stomachs will give 2 per cent., or 45 lb., of pepsin; consequently, approximately, 50 tons of stomachs would be required to produce 1 ton of pepsin. The pepsin is at least twenty times as strong as rennet extract, and 5 grams of pepsin will coagulate as much milk as 3½ to 4 oz. of rennet extract. If rennet in normal times is worth 10s. per gallon, pepsin is worth £1 per lb. Rennet recently was sold at £4 15s. per gallon, and is unobtainable even at that price.

"The sheep's stomachs utilised for making the pepsin are at present made into fertiliser, and for that purpose are worth about £4 per ton. As 50 tons would be required for the manufacture of 1 ton of pepsin, the raw material for a year's supply of pepsin would be worth £200. The material could still be utilised for fertiliser purposes after the rennet is extracted, so that the actual cost of raw material would be at the outside £40. The labour required would be an experienced chemist and an assistant registered as boiler attendant. The plant (irrespective of building) would be a boiler for steam and connections, vacuum pan and pump, wooden vats, drying oven, dialysers, laboratory apparatus for testing and standardising pepsin, and a grinding mill, making a total cost of about £750."

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, DECEMBER 28, 1916, TO JANUARY 27, 1917.

Eight thousand nine hundred and ninety-four eggs were laid during the month, an average of 123·2 per pen. The heat wave from the 10th to the 12th, inclusive, was one of the worst we have experienced here. The temperature (106 degrees) was not so high as we have had it on previous occasions, but the accompanying humid atmosphere made it very oppressive. Every attention was given to throwing about water in the houses, with the result that we lost one bird only, a Black Orpington owned by Mr. Fanning. The laying, however, was considerably checked; many birds have stopped altogether and are going into moult. Geo. Tomlinson wins the monthly prize with 154 eggs. The following are the individual records:—

Competitors.	Breed.	Dec.	Total.
*J. Zahl	White Leghorns	118	1,301
*Miss M. Hinze	Do.	121	1,282
*T. Fanning	Do.	115	1,277
*A. T. Coomber	Do.	128	1,270
*J. M. Manson	Do.	121	1,266
W. Meneely	Do.	143	1,260
G. H. Turner	Do.	126	1,250
Geo. Tomlinson	Do.	154	1,247
J. R. Wilson	Do.	134	1,245
A. Howe, N.S.W.	Do.	105	1,214
Dr. E. C. Jennings	Do.	124	1,204
*E. A. Smith	Do.	139	1,199
*A. E. Walters	Do.	138	1,194
*E. F. Dennis	Do.	132	1,187
J. M. Manson	Black Orpingtons	116	1,175
Mrs. Munro	White Leghorns	136	1,174
Mrs. W. D. Bradburne, N.S.W.	Do.	132	1,166
*Dixie Egg Plant	Do.	123	1,160
A. W. Bailey	Do.	136	1,158
Geo. Prince	Do.	128	1,151
*J. H. Gill, Victoria	Do.	140	1,147
T. Taylor	Do.	127	1,146
W. Lyell	Do.	133	1,145
H. W. Broad	Do.	134	1,138
*W. H. Knowles	Do.	137	1,135
Kelvin Poultry Farm	Do.	116	1,130
A. H. Padman, S.A.	Do.	152	1,130
T. E. Jarman, N.S.W.	Do.	127	1,129
E. Pocock	Do.	143	1,128
*J. F. Dalrymple, N.S.W.	Rhode Island Reds	124	1,128
*Mrs. J. H. Jobling, N.S.W.	Black Orpingtons	87	1,127
T. B. Hawkins	White Leghorns	112	1,121
F. Clayton, N.S.W.	Do.	139	1,118
W. Purvis, S.A.	Do.	128	1,114
P. Brodie	Do.	128	1,113
Cowan Bros., N.S.W.	Do.	145	1,108
Mars Poultry Farm	Do.	135	1,104
*C. Knoblauch	Do.	126	1,104
A. F. Camkin, N.S.W.	Do.	137	1,100
R. Burns	S. L. Wyandottes	124	1,098
J. Anderson, Victoria	White Leghorns	138	1,094
*E. West	Do.	116	1,090

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Dec.	Total.
E. F. Dennis	Black Orpingtons ...	134	1,088
H. Jobling, N.S.W.	Do.	115	1,081
T. Fanning	Do.	130	1,080
King and Watson, N.S.W.	White Leghorns ...	130	1,076
Mrs. C. Davis	Do.	113	1,075
Cowan Bros., N.S.W.	Black Orpingtons ...	117	1,068
W. Becker...	White Leghorns ...	135	1,061
G. W. Holland	Do.	150	1,058
A. Hirst, N.S.W.	Do.	126	1,047
*W. L. Forrest, N.S.W....	White Leghorns ...	106	1,044
*Kelvin Poultry Farm	Do.	90	1,043
J. G. Richter	Do.	121	1,031
Mars Poultry Farm	Black Orpingtons ...	128	1,026
C. P. Buchanan	White Leghorns ...	105	1,023
S. B. Tutin	Do.	92	1,009
F. Clayton, N.S.W.	Rhode Island Reds ...	109	1,002
R. Burns	Black Orpingtons .	119	996
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	100	983
*J. W. Macrae	Black Orpingtons ...	100	977
Moritz Bros., S.A.	White Leghorns ...	131	968
H. Hammill, N.S.W.	Do.	143	967
Harveston Poultry Farm	Do.	129	960
J. Gosley	Do.	97	951
F. W. Leney	Do.	118	937
W. Lindus, N.S.W.	Do.	124	936
*J. Anderson, Victoria	Red Sussex	80	924
L. K. Pettit, N.S.W.	White Leghorns ...	113	906
W. H. Forsyth, N.S.W.	Black Orpingtons ...	84	879
A. T. Coomber	Sicilian Buttercups ...	107	861
F. W Leney	Rhode Island Reds ...	110	829
E. F. Dennis	White Wyandottes ...	115	770
Totals	...	8,994	79,683

* Indicates that pen is taking part in single hen test.

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
J. Zahl	211	227	216	216	222	209	1,301
Miss M. Hinze	220	195	241	196	223	207	1,282
T. Fanning	227	225	226	219	195	185	1,277
A. T. Coomber	218	226	221	189	192	224	1,270
J. M. Manson	192	244	201	204	228	197	1,266
E. A. Smith	222	217	195	222	171	172	1,199
A. E. Walters	207	232	194	180	208	173	1,194
E. F. Dennis	186	221	170	227	202	181	1,187
Dixie Egg Plant	246	229	237	225	...	223	1,160
J. H. Gill	168	195	189	222	190	183	1,147
W. H. Knowles, junr.	179	181	195	168	213	199	1,135
J. F. Dalrymple	178	187	202	156	220	185	1,128
Mrs. J. H. Jobling	179	239	171	182	169	187	1,127
C. Knoblauch	166	199	180	172	192	195	1,104
E. West	220	199	166	170	152	183	1,090
W. L. Forrest	209	208	52	173	210	192	1,044
Kelvin Poultry Farm	169	167	159	161	221	166	1,043
J. H. Madrers	128	193	192	185	145	140	983
J. W. Macrae	136	202	178	177	138	146	977
J. Anderson	171	144	197	91	183	138	924

RANGEVILLE STATE SCHOOL, TOOWOOMBA.

Mr. Thos. Henderson, head teacher of the Rangeville State School, Toowoomba, sends in the following interesting account of rural studies and practical utility work in which his pupils are instructed. It is worthy of note that many of the State school teachers—as, for instance, Mr. R. G. Bartlett, head teacher of the State school, Buderim Mountain and others—are doing excellent work in instructing the pupils in various branches of rural industries, which work cannot fail to be of much benefit to the latter and incidentally to the State.

"In conjunction with the practical nature study work carried on by the boys and girls of Rangeville School, it was decided to add poultry-keeping from a utility point of view. Several well-known breeders—Messrs. Parker and Smith, of Brisbane, and Becker, of Toowoomba—presented the school with a pen of six White Leghorn pullets. These three breeders each have a pen competing in the Gatton College laying competition. Mr. F. A. Robinson, of Toowoomba, also presented two roosters—one of pure Padman blood and one by a Yangarella cockerel from Padman hens. The manager of Yangarella Yards also presented a pure Padman bird. Mr. Becker's pen is housed in a Philo summer coop, and the pens of Messrs. Parker and Smith are each in a pen 6 ft. square and about 6 ft. high on a semi-Gordon system.

"Horse manure is used for scratching material. The ammonia in the manure keeps the birds free from vermin. The fowls are attended to entirely by the children, whose ages range from nine to thirteen years. The monitors are changed weekly, two boys looking after each pen, and two girls attend the chickens, which are housed in a Philo chicken-coop, and sleep in a fireless brooder. This system of changing the monitors gives every child an opportunity of personally attending to the fowls. The birds are fed on dry mash, which is always in hoppers before them. Grain is given in the evening and dug into the scratching material to make the birds work for their food. Dried blood is used as a substitute for animal food. Green feed is given daily, and is suspended in the air by a wire from the roof. Salts are given once a week in the drinking water. The houses are cleaned daily.

"As well as being educational to the children, the object is also patriotic. There is a hospital ('Finchley') at Toowoomba for wounded soldiers, and many who are incapacitated for hard labour could make a living from poultry-raising, and a visit to the school shows them two systems of running the birds. Settings also, free of charge, will be supplied to those wounded soldiers who intend to go in for poultry-raising.

"The scholars are keenly interested in this new branch of nature knowledge, and are all anxious for their turns to act as monitors.

"The following are the numbers of eggs laid by the respective pens for the month of October:—Mr. Smith's birds got a bad start off, but now seem to have settled down to business; Mr. Parker's pen (Mars Poultry Farm), laid 138 eggs; Mr. Becker's pen, 122 eggs; Mr. Smith's pen, 112 eggs."

A TOWERS POULTRY FARM.

We are indebted to Mr. J. W. Ward, Charters Towers, for the following description of a thriving poultry farm near the Weir at that town, owned and conducted by Mrs. Rose, and her young son and daughter. The success which has been achieved by her should surely be an incentive to others to go and do likewise:—

" In travelling to the Weir at Charters Towers one would not think for a moment that they passed within a quarter of a mile, at most, of one of the most up-to-date poultry farms in Queensland. This writer has certainly not seen anything like it this side of Petuluma, near San Francisco, California. Some two or more years ago I called on the then owner, Mr. Pass, of the Defiance Poultry Farm, and in looking around I complimented him upon his up-to-date stock and method. I said, ' Man, you must do well. I am sure nobody in this district knows what a fine little concern you have here.' Mr. Pass replied, in his short curt way, ' No; and neither do I want them to know until I have my plant and stock complete.' He requested me at that time never to mention his farm in the Press, or to outsiders, until he gave me permission. That request has been kept sacred until recently. Since then the farm has changed hands, and is now owned by Mrs. Rose, and, with her permission, I now write you of this well-kept, up-to-date model hen farm.

" Mrs. Rose, with the help of her boy and girl (when not at school), looks after and feeds anything from 700 to 1,000 fowls, besides some 900 to 1,200 young chickens of all ages, from four days to several weeks old. Could anyone imagine a woman looking after three incubators, hatching anything from 75 to 100 chickens at a time and taking care of these young chicks in their different foster-mother homes. Why, it is quite a sight to see 80 to 120 little toddlers running around in their little foster-mother coops, when feeding time comes, and when the feeding is over to watch these little chicks running into an adjoining coop where a kerosene lamp is burning in a kerosene tin, giving off heat to keep them warm at nights; and then as they grow older they are passed out into the larger enclosure, later to be separated, the males from the females—the one (male) to go out on to the table, and the female to keep up the process of egg supplies.

" It is indeed an interesting subject, and to visit this farm is quite an eye-opener to those who have not been there before. It has been my lot within recent months to take visitors to see the farm, and they have come away surprised at what was seen.

" Quite recently Mrs. Rose has sold over 300 of her hens, at prices varying from 5s. to 7s. 6d. each. They are the White Leghorn variety, and prize fowls, coming from a 245-egg strain. Just imagine a well-looked-after hen giving from 200 to 300 eggs per annum, and one can safely say the product will average at least 1s. 6d. per dozen all the year through. There is no doubt these fowls are well looked after, and the corn and wheat is ground or crushed so that everything is made easy for them.

"Herein is an object lesson of what can be done in this district. Here we have two 40-acre homesteads, two horses, two carts and harness, five incubators, two decent cottages, windmill, pumps, and plant. The fenced-off hen-runs have their little coops in each enclosure. Mr. Rose and Mr. Pass have taken up an island named Phantom Island, near Palm Island, where they are now planting fruit trees as well as getting ready to go into fowl-rearing in a much bigger way than locally. In addition to the plant mentioned above, 700 laying hens, giving at the very least 200 dozen per week worth at least 1s. 6d. per dozen, besides the fowls to be disposed of, and anything from 800 to 1,200 young chicks varying from a few days to a few weeks old.

"This is but one more self-evident and concrete case, showing what can be done with application and ambition to push on and make a success of things. The little farm under consideration, a few years ago, was commenced with just a few fowls, and has grown to quite decent dimensions, and there is no earthly reason why we should not have more of these places around us. There is any amount of room for development. Only within the last month a representative of a Townsville firm was here quite ready to buy out all the eggs and all the fowls at the Defiance Fowl Farm.

"Western Queensland takes quite a large number of eggs. Townsville imports from South, and there is quite a good opening for the egg and hen industry here. This industry in the United States is the very biggest industry they have, running into hundreds of millions annually, and even in the Southern portion of Queensland it is getting quite a big business. Eggs can be bought South at about 8½d. to 10d. per dozen at the present time, and yet there is a plentiful market here at 1s. 3d. per dozen, and then supplies are short.

"Here we have a calling or industry quite suitable for women, and yet so little of it is done. Even we are so far away from the centre of government that the heads of the departments never care whether the people at great distances from the seat of government learn anything or not. Neither the fowl experts nor any other experts call here, except for a passing visit; they are here to-day and gone to-morrow—not as in Southern Queensland, when they are sent out during the week and come home for week ends.

"One fact stands out boldly—that there are other means of getting a decent livelihood rather than running around looking for a boss at so much per week. All that is needed is men and women with a bit of pluck and ambition to strike out for themselves. Our community would be the better for such, and much real progress from a wealth-producing point of view would soon be seen if men and women could be induced to try and make a success of getting wealth from the surface of the land."

General Notes.

FEEDING PIGS: A STARTLING STATEMENT.

A somewhat startling statement appeared in one of our exchanges (says the "London Live Stock Journal"). It is as follows:—"Lewes and Gilbert, at Rothamsted, in a ten weeks' feeding trial with pigs weighing 135 lb. each and feeding to a weight of 275 lb., found at the start 386 lb. of food provided 100 lb. of live weight. At the end of four weeks 502 lb. were necessary, and in the ninth and tenth weeks 610 lb."

This is an extraordinary result, if it be correct, as it shows that more than twice as much meal was required to produce 1 lb. of meat by a pig weighing about 250 lb. than could be manufactured by the same pig when it weighed about half the weight some nine weeks previously. Should this be proved in general practice to be true, how great an advantage has a young pig in the manufacture of meat over one of more mature age after a period of good living!

The question arises, have our specialists given sufficient attention to the more profitable system of fattening our pigs to light weights when they are young?

A USE FOR SURPLUS PLUMS.

PLUM WINE.

The "Farmer and Settler," Sydney, writes: "Plum wine is easy to make on the farm," and gives the following simple recipes:—

Now that plums are in season, and some farm folk have more than they can use as jam or bottled fruit, they may like to experiment with plum wine, using the following recipes recommended by the New Zealand Department of Agriculture:—

DRY PLUM WINE.

Place plums in a copper or enamel jam-making bowl and cover with water. Boil, and when boiling simmer for half an hour; strain into wooden vessels (casks for preference). Add ½ lb. to ¾ lb. of good sugar to each gallon of liquid and allow to ferment until dry—*i.e.*, until all the sugar has disappeared. Then allow to stand for seven days, after which rack the clear liquid off into another vessel, and allow it to stand for another fortnight. Then rack again and bung the cask up airtight. The wine will be ready for use in three to six months.

SWEET PLUM WINE.

Proceed as in the making of dry plum wine; but when adding sugar add ½ lb. per day per gallon of juice until 5 lb. per gallon has been added; then allow to ferment. When fermentation is completed, if not sweet enough, add more sugar until the wine is sufficiently sweet to be palatable. Then add 4 oz. of potassium bisulphide per 100 gallons, and 7 gallons of grape spirit—7 gallons grape spirit from 40 o.p. (overproof) to 65 o.p. to be used to every 100 gallons of liquid. This should be ready for use in six to nine months.

These are alcoholic wines, and are therefore too strong for consumption by young people.

DEHAIRING MARSUPIAL SKINS.

Mr. M. J. Gallagher, Kedron Tannery, gives the following recipe to the "Farm Bulletin," 1st December, 1916:—

"Take an empty hogshead and cut in halves. You have now got two pits which will contain about 18 to 20 gallons water each. Half fill one with water, then in the other half slack some lime and pour into the half containing the water. Place the skins in this solution as flat as possible and lift out for a few minutes every day. It will take from six to ten days before the hair is sufficiently loose to scrape off with a blunt knife. Before putting the skins into the lime they will have to be thoroughly soaked and scraped on the flesh several times.

"Use ½ lb. to 1 lb. of lime for each skin according to size; dissolve the lime in half a gallon of water."

COTTON IN THE LIVERPOOL MARKET.

The following are the official "Spot" prices in Liverpool at the end of November, 1916, and on the corresponding dates in 1915, 1914, and 1913:—

—	1916.	1915.	1914.	1913.
"Middling" American	11·42	6·88	4·66	7·42
"Fair" Pernam	12·20N	7·52N	5·12	7·61
"Fully Good Fair" Egyptian ..	20·20N	9·50N	7·20	10·20
"Fine" Broach	10·90N	6.50	4·25	$6\frac{15}{16}$N
"Fine" No. 1 Oomra	8·95N	5·55N	4·25N	$6\frac{7}{16}$N
"Fine" Bengal	8·35N	5·05	3·26	$5\frac{7}{8}$N

Answers to Correspondents.

CATERPILLARS ATTACKING CEDAR TREES.

"B.M.B.," Jundah Station, Cairns—

The caterpillars attacking your cedar trees are, most likely, the larval or caterpillar state of one of the many small moths which attack our forest and other trees. We should be glad to receive specimens of this caterpillar at an early date, to enable us to identify the species. All insects that devour their food can be occasionally combated with any one of the many arsenical prepartions. Paris Green is perhaps the cheapest. In mixing same, place the Paris Green in a cup or billy, add a little water, and mix in the same way as mustard is mixed for table use. Add more water slowly, stirring well all the time. Paris Green should not be used much stronger than 2 oz. to 20 gallons of water (five kerosene tins full). Arsenate of lead is also a good and reliable insecticide, and can be purchased from all seedsmen in tins, on which are full directions for mixing and application. The Paris Green should be sprayed on to the tree in as fine a spray as possible, stirring the mixture to prevent sediment settling to the bottom of the vessel. It is an active poison, and great care should be taken to keep all vessels used in the mixing for that purpose alone, and it should be kept out of the way of children and domestic animals.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JANUARY, 1917.

Article.		January.
		Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	4s. 3d.
Bran	ton	£5 15s.
Broom Millet	"	£22 to £24
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£4
Chaff, Oaten	"	£4 10s. to £5 10s.
Chaff, Lucerne	"	£3 to £3 10s.
Chaff, Wheaten	"	£4
Cheese	lb.	8d. to $8\frac{1}{2}$d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£4 10s.
Hay, Lucerne	"	£1 10s.
Honey	lb.	4d. to 5d.
Maize	bush.	2s. 11d. to 4s.
Oats	"	2s. 6d. to 3s.
Onions	ton	£9
Peanuts	lb.	3d. to 4d.
Pollard	ton	£5 5s.
Potatoes	"	£5 to £5 10s.
Potatoes (Sweet)	cwt.	3s. 6d. to 4s.
Pumpkins (Cattle)	ton	£1 10s. to £2 10s.
Eggs	doz.	9d. to 1s. 4d.
Fowls	pair	4s. to 6s.
Ducks, English	"	4s. to 4s. 6d.
Ducks, Muscovy	"	7s. to 8s.
Geese	"	10s. to 11s.
Turkeys (Hens)	"	12s. to 13s.
Turkeys (Gobblers)	"	18s. to 24s.
Wheat	bush.	2s. 3d. to 3s. 4d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	...
Cabbages, per dozen	2s. to 6s. 6d.
Cauliflowers, per dozen	...
Celery, per bundle	...
Cucumbers, per dozen	...
Beans, per sugar bag	2s. to 3s. 6d.
Peas, per sugar bag	4s. to 6s.
Carrots, per dozen bunches	4d. to 9d.
Chocos, per quarter-case	1s. 6d. to 2s.
Beetroot, per dozen bunches	8d. to 9d.
Marrows, per dozen	1s. to 2s.
Lettuce, per dozen	2d. to 6d.
Parsnips, per dozen bunches	6d. to 9d.
Sweet Potatoes, per sugar bag	1s. 6d. to 1s. 9d.
Table Pumpkins, per dozen	1s. 6d. to 2s. 6d.
Tomatoes, per quarter-case	4s. to 6s.
Vegetable Marrows, per dozen	...
Turnips, per dozen bunches	...
Rhubarb, per dozen bundles	..

SOUTHERN FRUIT MARKETS.

Article.	JANUARY. Prices.
Bananas (Queensland), per case	10s. to 12s.
Bananas (Fiji), per case	17s. 6d. to 19s.
Bananas (G.M.), per case	19s. to 21s.
Custard Apples, per tray	...
Lemons (Local), per bushel-case	6s. to 10s.
Mandarins, per case	...
Mangoes, per bushel-case	6s. to 8s.
Oranges (Navel), per case	...
Oranges (other), per case	...
Pears, per case	...
Papaw Apples, per half-bushel-case	3s. to 7s.
Passion Fruit, per half-case	...
Persimmons, per half-case	...
Pineapples (Queens), per double-case	8s. to 12s.
Pineapples (Ripleys), per double-case	5s. to 7s.
Pineapples (Common), per double-case	5s. to 7s.
Strawberries (Local), per dozen punnets*	5s. to 12s.
Tomatoes (Queensland), per half-bushel-case	2s. to 5s.

* 1 punnet = 1 quart.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JANUARY. Prices.
Apples, Eating, per case	8s. to 12s.
Apples, Cooking, per case	5s. to 8s.
Apricots, per quarter-case	1s. 6d. to 4s. 6d.
Bananas (Cavendish), per dozen	1½d. to 4d.
Bananas (Sugar), per dozen	1½d. to 2¾d.
Cape Gooseberries, per case	...
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	...
Granadillas, per quarter-case	...
Lemons, per case	6s. to 12s.
Limes, per quarter-case	
Mandarins, per case	12s. to 13s.
Mangoes, per case	5s. to 8s.
Nectarines, per cwt.	1s. to 3s.
Oranges, (Navel), per case	9s. to 10s.
Oranges (other), per case	4s. to 8s.
Papaw Apples, per case	9d. to 1s.
Passion Fruit, per quarter-case	1s. to 1s. 9d.
Peaches, per quarter-case	1s. to 3s. 6d.
Pears, (local), per quarter-case	2s. 6d. to 4s.
Peanuts, per pound	3d. to 4d.
Persimmons, per quarter-case	...
Plums, per quarter-case	2s., 3s. 6d.
Pineapples (Ripleys), per dozen	1s. to 3s.
Pineapples (Rough), per dozen	9d. to 1s. 6d.
Pineapples (Smooth), per dozen	1s. 6d. to 3s.
Quinces, per case	...
Rockmelons, per dozen	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	4s. to 6s.
Watermelons, per dozen	2s. 6d. to 7s.

TOP PRICES, ENOGGERA YARDS, DECEMBER, 1916.

Animal.	DECEMBER. Prices.
Bullocks	£18 15s. to £20 7s. 6d.
Cows	£12 17s. 6d. to £15 2s. 6d.
Merino Wethers	32s. 3d.
Crossbred Wethers	38s. 9d.
Merino Ewes	26s. 9d.
Crossbred Ewes	30s.
Lambs	30s.
Pigs (Porkers)	66s.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

1917.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·46	5·21	6·41	5·41	6·19	5·58	5·46
2	4·58	6·46	5·22	6·41	5·41	6·18	5·59	5·45
3	4 59	6·46	5·23	6·40	5·42	6·17	5·59	5·44
4	4·59	6·46	5·24	6·40	5·43	6·16	6·0	5·43
5	5 0	6·46	5·25	6·39	5·44	6·15	6·0	5·42
6	5·1	6·47	5·25	6·39	5·45	6·14	6·1	5·41
7	5·2	6·47	5·26	6·38	5·45	6·13	6·1	5·39
8	5·3	6·47	5·27	6·37	5·46	6·12	6·2	5·38
9	5 3	6·47	5·28	6·36	5·46	6·11	6·2	5 37
10	5·4	6·48	5·29	6·35	5·47	6·10	6·3	5·36
11	5·5	6·48	5·29	6·35	5·47	6·9	6·3	5·35
12	5·6	6·47	5·30	6·34	5·48	6·8	6·4	5·34
13	5·6	6·47	5·31	6·33	5·48	6·7	6·4	5·33
14	5·7	6·47	5·32	6·32	5·49	6·6	6·5	5·32
15	5·8	6·47	5·32	6·32	5·49	6·5	6·5	5·31
16	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·30
17	5·9	6·47	5·34	6·30	5·50	6·2	6·6	5·29
18	5·10	6·47	5·35	6·29	5·51	6·1	6·7	5·28
19	5·11	6·47	5·35	6·28	5·51	6·0	6·7	5·27
20	5·12	6·46	5·36	6·28	5·52	5·59	6·8	5·26
21	5·13	6·46	5·37	6·27	5·52	5·58	6·8	5·25
22	5·13	6·46	5·37	6·26	5·53	5·57	6·8	5·24
23	5·14	6·45	5·38	6·25	5·53	5·56	6·9	5·23
24	5·15	6·45	5·38	6·24	5·54	5·55	6·9	5·23
25	5·16	6·45	5·39	6·23	5·54	5·54	6·10	5·22
26	5·16	6·44	5·39	6·22	5·55	5·52	6·10	5·21
27	5·17	6·44	5·40	6·21	5·55	5·51	6·11	5·20
28	5·18	6·43	5·40	6·20	5·56	5·50	6·11	5·19
29	5·19	6·43	...	...	5·57	5·49	6·12	5·18
30	5·19	6·42	...	...	5·57	5·48	6·12	5·18
31	5·20	6·42	...	..	5·58	5·47	...	...

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

			H. M.
8 Jan.,	○	Full Moon	5 42 p.m.
16 ,,	☽	Last Quarter	9 42 ,,
23 ,,	●	New Moon	5 40 ,,
30 ,,	☾	First Quarter	11 1 a.m.

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

7 Feb.,	○	Full Moon	1 28 p.m.
15 ,,	☽	Last Quarter	11 53 a.m.
22 ,,	●	New Moon	4 9 ,,

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

1 Mar.	☾	First Quarter	2 43 a.m.
9 ,,	○	Full Moon	7 58 ,,
16 ,,	☽	Last Quarter	10 33 p.m.
23 ,,	●	New Moon	2 5 ,,
30 ,,	☾	First Quarter	8 36 ,,

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m.

7 Apr.	○	Full Moon	11 49 p.m.
15 ,,	☽	Last Quarter	6 12 a.m.
22 ,,	●	New Moon	12 1 ,,
29 ,,	☾	First Quarter	3 22 p.m.

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

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

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

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 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.

The approximate times of sunrise and sunset at Rockhampton can be obtained by adding one hour till 26th March, and the following numbers of minutes to the times given for Brisbane:—

On 1st February for sunrise add 16 m., reducing gradually to 13 m. on 28th.

On 1st February for sunset add 4 m., increasing gradually to 6 m. on 28th.

On 1st March for sunrise add 13 m., reducing gradually to 9 m. on 31st.

On 1st March for sunset add 7 m., increasing gradually to 10 m. on 31st.

On 1st April for sunrise add 9 m., reducing gradually to 5 m. on 30th.

On 1st April for sunset add 9 m., increasing gradually to 14 m. on 30th.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec	No. of Years' Records.	Dec., 1916.	Dec., 1915.
North Coast.	In.		In.	In.
Atherton	7·10	15	17·74	9·15
Cairns	8·99	34	25·13	16·64
Cardwell	8·14	44	24·15	8·64
Cooktown	6·67	40	16·63	8·71
Herberton	5·35	29	13·81	8·56
Ingham	6·28	24	24·98	9·07
Innisfail	11·91	35	29·99	18·81
Mossman	16·41	4	26·43	13·89
Townsville	5·44	45	17·99	3·22
Central Coast.				
Ayr	3·56	29	8·31	1·88
Bowen	4·13	45	11·04	1·23
Charters Towers ...	3·50	34	10·69	5·06
Mackay	6·76	45	17·56	7·40
Proserpine	7·79	13	24·54	7·89
St. Lawrence ...	4·28	45	8·45	4·18
South Coast.				
Biggenden	4·74	17	*	2·39
Bundaberg	4·45	33	6·63	3·12
Brisbane	5·02	65	5·10	1·33
Childers	5·23	21	6·29	3·72
Crohamhurst ...	7·26	25	12·33	2·52
Esk	4·35	29	2·93	1·85
Gayndah	3·86	45	3·38	2·77
Gympie	5·89	46	5·31	7·37
Glasshouse M'tains	6·64	8	14·24	1·39
Kilkivan	4·28	37	3·98	3·58
Maryborough ...	4·49	45	5·59	2·37

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec.	No. of Years' Records.	Dec., 1916.	Dec., 1915.
South Coast—continued:	In.		In.	In.
Nambour	6·03	20	13·80	2·35
Nanango	3·64	34	3·39	4·05
Rockhampton ...	4·33	29	9·44	2·03
Woodford	5·25	29	11·02	1·33
Darling Downs.				
Dalby	3·14	46	1·64	2·18
Emu Vale	3·49	20	2·51	4·22
Jimbour	3·22	28	1·04	2·26
Miles	2·57	31	2·07	1·46
Stanthorpe ...	3·45	43	2·59	3·13
Toowoomba ...	4·19	44	3·72	4·55
Warwick	3·46	29	2·26	3·92
Maranoa.				
Roma	2·32	42	3·38	1·30
State Farms, &c.				
Bungeworgorai ...	2·76	4	5·69	0·91
Gatton College ...	3·32	17	2·63	1·37
Gindie	2·58	17	9·82	1·15
Hermitage ...	2·64	10	2·82	3·57
Kairi	9·60	4	18·89	8·06
Kamerunga ...	6·90	27	23·58	7·85
Sugar Experiment Station, Mackay	7·99	19	24·44	8·47
Warren	4·61	4	7·93	1·72

* Incomplete.

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

GEORGE G. BOND,
Divisional Officer.

Farm and Garden Notes for March.

FIELD.—Take every opportunity of turning up the ground in readiness for sowing and planting winter crops. The main crop of potatoes should at once be planted. As the growth of weeds will now be slackening off, lucerne may be sown on deeply cultivated soil. The latter should be rich and friable, with a porous subsoil. The land should be thoroughly pulverised. Do not waste time and money in trying to grow lucerne on land with a stiff clay subsoil. Prepare the land a couple of months before sowing, care being taken to cross plough and harrow before the weeds have gone to seed. This ensures a clean field. Sow either broadcast or in drills. In the former case, 20 lb. of seed will be required; in the latter, 10 lb. A good stand of lucerne has been obtained with less quantities. Should weeds make their appearance before the plants have sent down their tap roots, mow the field. Before they can again make headway enough to do any damage, the lucerne will be strong enough to hold its own against them. Harrow and roll the land after mowing. Gather all ripe corn. It is now too late to sow maize, even 90-Day, with any certainty of harvesting a crop of grain. Rye grass, prairie grass, oats, barley (in some districts, wheat), sorghum, vetches, carrots, mangolds, and Swede turnips may be sown. In Northern Queensland, sow tobacco seed, cowpea, carob beans, sweet potatoes, opium poppy, &c. Sow anatto, jack fruit, and plant kola-nut cuttings. Some temperate-zone vegetables may be planted, such as egg plants, potatoes, &c. Coffee-planting may be continued. Harvest kafir corn and paddy.

FLOWER GARDEN.—Now is the time to plant out bulbs. A complete garden could be furnished with these charming plants, which are to be had in every colour and variety. Amongst the many are—Amaryllis, anemone, arum, babiana, crinum, crocus, freesia, ranunculus, jonquils, iris, ixias, gladiolus, narcissus, Jacobean lilies, tigridia, tritonia.

All bulbs like well-drained, somewhat sandy soil, with a plentiful admixture of leaf mould. Herbaceous plants and annuals which it is intended to raise from seed should be sown this month. Such are antirrhinums (snapdragon), asters, cornflowers, dianthus, larkspurs, daises, cosmea, candytuft, lupins, gaillardias, godetia, mignonette, poppies, pansies, phlox, sweet peas. Cannas now planted will require plenty of food in the shape of liquid manure. Put in cuttings of carnations. Chrysanthemums require attention in the way of disbudding, staking, watering with liquid manure, &c. Growers for exhibition will thin out to a few buds and protect the flowers from rain and sun. Dahlias should be looking well. To secure fine blooms, disbudding should be done.

Now, as to climbers which may now be planted. These are—*Allamanda Schotii* (beautiful yellow), *Antigonon leptopus*, a charming cerise-coloured climber; *Aristolochia elegans,* handsome as an orchid and easily grown; *Aristolochia ornithocephala* (Dutchman's Pipe), very curious, large, always attracts attention; *Asparagus plumosa* grows in any shady place; *Beaumontia grandiflora,* splendid white flower, grand for a fence, will grow 50 ft. high; Bignonias of several kinds; Bougainvilleas, with their splendid leafy pink and purple flowers, rapidly clothe a fence or unsightly shed with a blaze of blossom; *Quisqualis indica,* a fine creeper, flower pink, changing to white; Wistaria, purple and white. Most beautiful is the *Bauhinia scandens,* rarely seen about Brisbane. We grew a plant of this climber at Nundah, and it soon closed in the front of the veranda for a distance of over 80 ft. The leaves are very small, and in the flowering season it presents almost a solid mass of beautiful round bunches of blossoms, something like the hawthorn bloom —pink and white. It seeds freely, but the seeds are difficult to germinate, and when they have produced a plant it is still more difficult to rear it. A rooted sucker from the main stem will in all probability grow.

KITCHEN GARDEN.—During this month a very large variety of vegetable seeds may be sown in readiness for planting out where necessary in the autumn, which begins on the 20th of March. All unoccupied land should be roughly dug, and, where required, add well-decomposed manure. Transplant cabbage, cauliflower, celery, &c. Sow French beans, beet, carrot, turnips, radish, cabbage, cauliflower, cress, peas, mustard, &c. Former sowings should be thinned out and kept clear of weeds. Mulch round melon and cucumber beds with a good dressing of long stable manure, as it assists in keeping the fruit clean and free from damp. Cucumbers, melons, French beans, and tomatoes should be looked for every day and gathered, whether required or not, for, if left on the vines to perfect their seeds, the plants will soon cease to be productive, or will form inferior, ill-shaped, and hence unsaleable fruit.

Orchard Notes for March.

THE SOUTHERN COAST DISTRICTS.

The marketing of the main crop of pineapples will continue to occupy the attention of growers; and as it is probable that the plantations have been allowed to get somewhat dirty during the previous month, they should be cleaned up as soon as ever the crop has been got off. The fruit of the new crop of citrus fruit will be showing signs of ripening towards the end of the month; and as the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and as they always select the first fruit that shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on the barn floor, and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths, but also the fruit-flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit-fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit-flies may also be caught in large numbers by means of such artificially ripening fruits. The fruits are smeared with tanglefoot, and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house-flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit-flies.

The yellow peach-moth that does such damage to peaches in spring, and that attacks corn, sorghum, cotton bolls, custard apples, and many other plants and fruits, often does a lot of damage to citrus fruits. It acts in a very similar manner to the second and later generations of the Codling moth of pomaceous fruits, in that it lays its eggs where two fruits touch, under the shelter of a leaf on the fruit, (at the stem end of the fruit, and, in the case of navel oranges, in the navel itself; in fact, anywhere that there is a likelihood of the egg not being disturbed. The egg hatches out into a small spotted caterpillar, which eats its way into the fruit, causing it to ripen prematurely, and fall off. Where two fruits touch, it often eats into and destroys both, and it frequently leaves one fruit to go and destroy a second. It is a very difficult insect to deal with, owing to the number of fruits and plants on which it lives; but, as far as citrus fruits are concerned, the best remedy is undoubtedly to spray the fruit with a remedy that will destroy the young insect when it starts to eat the skin of the fruit. Bordeaux mixture has been found efficacious, but I am of opinion that spraying with Paris green and lime, Kedzie's mixture, or arsenite of lead, will also have good results. The latter poison is, in my opinion, well worth giving a thorough test, as it sticks to the fruit and leaves for a long time. Bordeaux mixture, either alone or in conjunction with Paris green or Kedzie's mixture, is, however, a good remedy, as not only will it destroy the larvæ or prevent the moth from attacking the tree, but it is also the best remedy for black brand or melanose, as well as tending to keep all other fungus pests in check. Fight fruit-fly systematically—both by means of the sticky fruit already recommended and by gathering all fly-infested fruit, such as guavas, late mangoes, kumquats, &c., as well as any oranges or mandarins that may have been infested, as if kept in check now there will be little loss throughout the season. A little fruit will be marketed towards the end of the month. See that it is gathered and sweated for seven days before marketing, and don't gather it too immature. Beauty of Glen Retreat mandarins are often gathered and marketed as soon as they show signs of colouring. They are then as sour as a lemon, and anyone who is unlucky enough to buy them will steer off mandarins for some time to come. This variety should not be gathered till thoroughly ripe, as when marketed in an immature state it spoils the market, as it puts people off eating citrus fruit.

Clean up the orchard after the summer rains, and have everything ready for the marketing of the crop. See that there is a good supply of clean, dry case timber on hand, as one of the greatest sources of loss in shipment is packing fruit in green cases.

Strawberry planting can be done throughout the month. Plant such berries as Federation on the lowest ground, and Aurie, Anetta, Trollop's Victoria, and Glenfield Beauty on warm, well-drained soils. Prepare the land thoroughly, so that it is in perfect tilth, and in a fit state to retain moisture well; as on this, as much as anything, the success of the crop depends. Where new orchards are to be planted, get the land ready—not the clearing, which should have been done months ago, but the working of the land, as it is advisable to get it thoroughly sweetened before putting the trees in.

THE TROPICAL COAST DISTRICTS.

The Notes for February apply equally to March. See that bananas are netted—keep down weed growth, and market any sound citrus fruits. Clean up the orchards as well as possible, and keep pines clean. Get land ready where new orchards are to be set out, as tree-planting can be done during April and May. Pines and bananas can still be planted, as they will become well established before winter.

THE SOUTHERN AND CENTRAL TABLELANDS.

Finish the gathering of the later varieties of deciduous fruits, as well as grapes. Clean up the orchard, and get ready for winter. Get new land ready for planting; and where there are old, dead, or useless trees to be removed, dig them out and leave the ground to sweeten, so that when a new tree is planted to replace them the ground will be in good order.

In the drier parts, where citrus trees are grown, keep the land well worked, and water where necessary.

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Agriculture.

WINTER CEREALS.

EXPERIMENTS AT ROMA STATE FARM. SEASON 1916.

Before giving the results of the different experiments a brief resumé of the meteorological conditions experienced immediately preceding the sowing and during the growing period of the crops will be given.

At the time of sowing (May) the prospects were very little, if any, brighter than at the same time in 1915, there being practically a complete absence of moisture in the soil and subsoil. The reason why this was so can be readily understood when it is learned that the rainfall for the twelve months ended 31st May was 863 points, representing forty-seven falls, of which quantity only 567 points fell after the removal of the previous crop. Had the latter amount been experienced in one or two falls it would have been of some value, but it represents the total of thirty-seven, the heaviest of which yielded 49 points, so very little benefit accrued therefrom, more especially as it was recorded during a period when the evaporation was at its greatest pitch. With the advent of June, relief came, as a welcome change took place during the first week, 65 points of rain being recorded, which in itself was sufficient to promote the germination of all the grain sown. The weather continued showery, and by the end of the month the total precipitation reached 307. July saw a continuance of the congenial conditions, 275 points being registered. August also may be considered favourable, $1\frac{1}{2}$ in. of rain falling. Such conditions resulted in exceptionally heavy growth being made. September saw a curtailment in the precipitation, with the result that the heavy call on the moisture contents of the soil, made by the exceptionally heavy growth, had such an effect as to reduce it so that it was insufficient to meet the full requirements of the crops, which resulted in a reduction of the ultimate yield by a pinching of the grain. Possibly the injury occasioned by the reduction in the moisture supply was much less than the benefit it conferred in checking the visitation of rust, which first made its appearance about the middle of August, and which gave every indication of being very virulent. The cold snap experienced in the latter part of that month was also very serviceable in checking its career, although it resulted in the frosting of wheat in some localities. The middle of October, when most of the early varieties were beyond benefiting from rain, showery weather set in, continuing throughout the balance of that month and the next, with the result that harvesting operations were delayed, quality of grain depreciated, and a goodly portion of the crops rendered worthless.

The following is a tabulated list of the rainfall for the thirteen months ended November, 1916:—

Month.	Wet Days.	Points.
November (1915)	4	55
December (1915)	6	91
January (1916)	6	55
February ,,	6	140
March ,,	3	161
April ,,	7	65
May ,,	0	0
June ,,	9	307
July ,,	7	275
August ,,	6	151
September ,,	3	77
October ,,	6	190
November ,,	8	684

MANURIAL EXPERIMENTS.

On these blocks, each of which contains one-quarter of an acre, the experiments have been carried out continuously. In 1915 the crops were practically a failure; nevertheless the returns are included in the averages given.

It will be seen that superphosphate at 1 cwt. per acre is the only manure which gave a slightly better financial return than the unmanured blocks.

The preparation of the seed-bed necessitated two cultivations with disc cultivator and two harrowings prior to seeding. Ploughing was not necessary, as practically no consolidation of the soil had taken place since the last was done.

Sown, May; variety, Bunge No. 1; quantity seed, 2½ pecks (1914 grain), treated with 2 per cent. solution bluestone as a smut preventative; germinated, 6th to 8th June; earing, first week September; ripe, third week October; harvested, last week October.

Block.	Manure Applied.	Cost.			Yield.	Average. Seven Years.	Remarks.
		£	s.	d.			
1	Shirley's No. 1 Cereal Manure, 1 cwt. ..	0	11	0	29·5	20·4	Crop thin; stout straw; free from rust; ears well filled. Through the proximity of obstacles it was necessary to turn over on this block with harrows, which resulted in the destruction of a goodly portion, thereby interfering with results.
2	Shirley's No. 1 Cereal Manure, 1 cwt. per acre; ½ cwt. nitrate lime	0	17	9	29·2	21·6	Crop medium; thin straw; fairly tall; heads large and well filled; traces rust; grain slightly pinched.
3	Shirley's No. 1 Cereal Manure, ½ cwt. per acre; ½ cwt. nitrate lime	0	12	3	29·8	22·6	Remarks as applied to No. 2.
4	Control (unmanured)	..			30·1	18·7	Crop medium; thin, even straw; medium length; fine heads, well filled, and slight traces rust; very little flag; grain slightly pinched.
5	1 cwt. superphosphate	0	7	0	31·2	21·0	Crop even, medium length; very little flag; straw fairly fine; slight traces rust.
6	Thomas's Phosphate	0	5	6	30·4	19·4	Crop slightly uneven; unequal ripening; more flag than Nos. 4 and 5; traces rust; grain slightly pinched.
7	Stable manure; superphosphate, ½ cwt. ..	0	3	6	24·9	19·6	No manure (stable) applied. Crop grew too flaggy; stooled very well; straw short; crop on the whole badly affected by dry weather and rust. As in the previous season the ears were badly tipped and failed to emerge from the shot blade.
8	Superphosphate, 1 cwt.; nitrate of lime, ½ cwt.	0	13	9	28·4	19·2	Earing uneven; crop on the whole uneven, due to inequalities in the soil. Patches where crop grew flaggy produced pinched grain, possibly due to dry weather and effects of rust.
9	Nitrate of lime, ½ cwt.; superphosphate, 1 cwt.; sulphate of potash	1	1	9	29 ·5	17·9	Remarks as applied to No. 8.
10	Superphosphate, 1 cwt.; sulphate of potash, ½ cwt.	0	15	0	30·6	19·7	This experiment should have included dried blood, but it was unprocurable. Crop uneven, but more even than in any previous season. Where crop was flaggy it suffered from dry spell and produced pinched grain; traces rust.
11	Unmanured	..			28·9	18·4	Crop uneven, but inequalities not so marked as usual. Straw medium length; medium stout; traces rust.
12	Thomas's Phosphate, 1 cwt.; sulphate of potash, ½ cwt. ..	0	14	6	29·8	20·4	Crop uneven, ranging in height from 3 ft. to 5 ft.; fairly flaggy; inclined to be rusty; grain slightly pinched. Blood should have been included in this experiment.
13	Sulphate of potash, ½ cwt.; superphosphate, 1 cwt.; nitrate of lime, ½ cwt.	1	1	9	30·6	20·6	Remarks as applied to No. 12.

MAIZE CROP PROSPECTS IN THE BOONAH DISTRICT.

In a report dated 5th February, submitted by Mr. W. H. Bechtel, Field Assistant, in reference to his recent visit to the Boonah district, attention is drawn to the fact that the August, September, and October sown maize crops made very satisfactory progress, and give excellent promise of bountiful returns of grain; a number have been harvested, but a spell of bright, sunny weather, to admit of handling the main crops, is now required. It is noteworthy that late-sown crops are not doing at all well, and fully 75 per cent. of these are backward and stunted owing to the presence of what is locally termed "blight." Speciments of affected plants have been submitted to the Government Pathologist (Mr. Henry Tryon). From present appearances many of these late-sown crops will be a complete failure. Others may possibly set a small proportion of grain, but the position at this stage is not at all satisfactory. Mr. Henry Tryon's remarks on the subject of the affected crops are as follows:—

"Maize.—Disease affecting late-sown (December-January) crops in the Boonah district: This malady is one that does not appear to have come under the notice of previous workers. It is termed by me—in earlier reports—'Maize Hyperplasia.' It is a disease affecting particular cells of the leaf-tissue; these becoming exceedingly enlarged, without any great numerical increase, the energy of growth being diverted for their formation instead of being utilised for increase in size, &c.; hence the linear series of little swellings (intumescences) in the foliage. This trouble, I have been led to conclude, is physiological and non-parasitic. Therefore I have found it to occur in a particular period in the plant's growth when abundant rainfall is experienced, water-logging the soil; and in such a way as to suggest that it has a meteorological origin. Its prevention, therefore, is a matter involving proper agricultural method."

THE IMPORTANCE OF SOIL VENTILATION.

A very instructive article on this subject appeared in the "Agricultural News," Barbados, of 2nd December, 1916. The writer points out that when considering the composition and structure of a fertile soil, we are apt to overlook the fact that air is a constituent part just as essential as water or plant nutrients. Air supply has never taken definite shape in soil science to the extent water supply or plant-food has, and consequently an important field of investigation appears to lie practically untouched. It is true that drainage in relation to soil ventilation is appreciated, as well as methods of cultivation that go to produce a good tilth, but that does not teach us anything; it gives us no definite clue as to what the roots of different crops require, or whether air supply might not be more scientifically adjusted to suit the roots of different crops, and the beneficial bacteria that function under similar conditions in the soil. If, under certain circumstances, it were found desirable, it should be quite practicable to supply the soil with air by more direct means than by cultivation and drainage, just as we know it is practicable to supply the soil with plant-food in the form of chemicals instead of relying upon weathering and the decay of organic matter.

Then considerations suggest a new aspect of land culture, namely, constructive soil ventilation—a definite branch of agricultural engineering associated with drainage.

[In 1908 a Bundaberg sugar-planter spent a great deal of money in draining a large sugar-cane field, and after the work was done, no rain came, and neighbouring planters laughed, for no water came through these drains, and they said he had wasted his money. But, as the cane grew, it was noticed that during all the dry weather that season, when everybody's cane was drooping, and scarcely growing at all, the cane on this drained land kept on growing, and the canes held up their light-green heads, above all other canes in the district, and the crop was nearly double that on the other plantations, although there had been no rain and not a drop of water ran through the drains. The reason was that the moisture from below rose through the warm, well-aired loose soil, and the cane roots went down to meet it, and so they stood the dry weather and grew quickly.—Editor, "Q.A.J."]

Before proceeding to enlarge upon this idea, it will be well to consider what evidence exists to justify it.

The importance of soil ventilation has been brought out prominently by the observations of Howard in India. He has pointed out that crops undoubtedly differ greatly in the amount of air their roots require. In India, for example, Gram requires a great deal of air, and only a moderate amount of water. In some parts of the country, the conditions, both natural and artificial, are such that the roots get plenty of air. Here this particular crop thrives, but in other places, where, for instance, irrigation conditions obtain, Gram will not grow successfully. Howard maintains that the proper provision of air to the soil is all that is necessary for extending the cultivation of this useful crop. The facts are the same in regard to the cultivation of Indigo. This crop is largely cultivated on the higher levels in rice-growing districts. The occasional flooding of these higher levels due to the rise of the rivers is the cause of the low yields obtained in India compared with those obtained under drier conditions in Java.

The two crops just referred to are of course leguminous, and the detrimental effect of insufficient air is partly due to the limited supply of nitrogen available for fixation by the nodules on the roots. But that is only partly the reason; bad aeration has a general retarding influence upon root development. Howard has noticed this even in the case of wheat, which is a crop that can be successfully grown on very heavy land. Experiments conducted at Pusa show that the best-grown wheat can be raised only on soil that is well aerated. Lastly, rice which grows in swamps is unable to thrive without a supply of oxygen for root development. This is obtained through the surface film of algae and other green organisms on these soils. Certain cultural operations after harvest also help to conserve a store of oxygen in the soil subsequent to the arrival of the rains.

Other crops in other parts of the world are equally susceptible to anaerobic conditions in the soil. In regard to cotton, we know that this plant thrives best on soils of open texture, and that the principal cause of boll-shedding is root asphyxiation, proved by Balls, in Egypt, and fully supported by observations in the West Indies. Cacao is extremely sensitive to clay. That may be because cacao is naturally a deep-rooting plant and the clay offers mechanical resistence to the extension of the roots; but it is also likely to be due to the fact that a clay soil contains less air than a light soil. It is not merely a clay subsoil, but a clayey surface soil that has an adverse effect on the growth of cacao.

Coconut trees are very sensitive to inadequate aeration. They will thrive only on land that is well drained either naturally or artificially. No harmful effect is produced on the roots by the presence of water; coconuts will thrive in saturated soil provided the water is continually moving. This is a very significant fact concerning the physiological importance of soil aeration.

In view of all these facts, which come within the range of observation of the planter himself, it will be admitted that soil aeration demands greater attention than it has received. The significant fact is, that air is the limiting factor to the efficiency of water supply. Beyond a certain point, water is wasted in the soil if it is not aerated.

Turning more particularly to the physiology of roots, it is very desirable to know more concerning their respiration. Respiration has been studied almost exclusively in regard to the parts of the plant above ground, and the generalisations have been extended to apply to the roots. But it does not seem justifiable to assume that the manner in which roots breathe under the complex conditions, both chemical and physical, of soil environment is the same, and follows the same laws as those parts of the plants exposed to the comparatively simple environment of the atmosphere. There is probably a difference in the rate of respiration of the roots of certain plants, and, as already suggested in this article, the growth of certain crops might be stimulated by the artifical introduction of air into the soil.

Constructive soil ventilation as an established branch of agricultural engineering presupposes successful researches into the air requirements of roots and soil organisms. The desirable conditions in different cases having been determined, it should then be possible to establish them.

The methods of effecting soil aeration artificially would come within the province of the engineer. Possibly one method would be to lay down porous ventilation-pipes through which air could be introduced, if necessary, under pressure. In orchard cultivation vertical tubes might be introduced near the trees and air pumped down them periodically. In the light of soil aeration better use might be made of soil explosions with dynamite, to aerate clayey subsoils especially.

Investigation might show that an alteration in the percentage composition of the soil atmosphere would prove advantageous in some circumstances; for example, a high proportion of oxygen might prove beneficial, or in some cases the removal of an excess of carbon dioxide. There is also the question of the possible value of introducing gases other than those that normally constitute the air of the soil. A matter for speculation is whether liquid air could be usefully employed as a soil fertiliser.

Finally, more might be done to bring about a better state of aeration in certain circumstances by means of methods of cultivation. The forking of orchard soils is still a matter of some controversy, and the true value of this operation requires investigation. The ploughing of the soil in coconut plantations gives good results, but its relation to soil aeration is not generally recognised.

"WOOL COTTON."

"Cotton and Cotton Oil News," U.S.A., says:—"A. G. Spiller, a farmer living near Barnesville, Georgia, has grown about 150 lb. of seed cotton this year of what he calls 'Wool Cotton.' He has been displaying the cotton, and it has attracted considerable attention. It has a remarkable similarity to wool. The locks are 4 or 5 in. long, and the yield is said to be heavy on the stalk and in lint. Mr. Spiller asserts that it is boll-weevil proof on account of the toughness of the hull or burr of the boll. All who have examined the cotton agree that it is very unusual, and its development will be watched with interest."

Mr. D. Jones informs us that some Northern and Central Queensland varieties of Mascot types have locks exceeding in length that described, and in all probability a superior class of fibre, and are virtually immune from insect pests. Cotton similar to that described grows "volunteer" all over the North.—Ed., "Q.A.J."

NEW METHOD OF POTATO CULTURE.

In the latest issue to hand of the "International Review of the Science and Practice of Agriculture" (Rome), there is given a summary of an article by a well-known French authority, in which a new method of economic cultivation of the potato is described. This consists in planting budding stalks instead of tubers, and has been tried for several years with good results. The tubers are sorted out and spread in a dry cellar at a temperature above 63 degrees Fahr. if possible. In a few days, before the tubers wrinkle, rooting sprouts are obtained, which must be cut before they reach a length of 8 in. After cutting, they must be planted as quick as possible. The sprouts are planted in twos on ridge sides at distances of 8 by 20 in. at a depth of 2¾ to 3½ in., according to the soil. In a few days the outside part becomes green and puts out one or two stalks, the roots taking hold at the same time. Each planted shoot gives one or two tubers which are seldom very large, but never small; a crop of nearly 8½ tons per acre of marketable potatoes may be reckoned on. The method is applicable to all loose, light, and relatively dry soils. Its advantage is that it leaves for consumption those potatoes which, on the ordinary method, would have been used for planting. The shoots given off by the potatoes on germinating, keep for several days, and can be planted direct, or even forwarded some distance for planting.—"Farmers' Advocate," South Africa.

MARKET GARDENING.

SUGGESTIONS FOR SEED PRESERVATION.

In a Bulletin (No. 20) of the Porto Rico Agricultural Experiment Station, U.S.A., on experiments on the supposed deterioration of varieties of vegetables in Porto Rico, by Messrs. C. F. Kinman, Horticulturist, and T. B. McClelland, Assistant Horticulturist, the following remarks on preserving the vitality of vegetable seed are worthy of notice by both vegetable and flower gardeners:—

"The humidity of the air in Porto Rico is very high, and causes vegetable seed exposed to the open air to lose their viability much sooner than would be the case in a drier atmosphere. The inability to keep seed in good condition is a serious hindrance to vegetable growing. When the experiments herein reported were undertaken, the following method for preserving seed was employed and was very satisfactory. The seed in cotton sacks was placed in airtight glass jars in the bottom of which a few ounces of calcium chloride had been placed. A small piece of wire screening separated the seed from the calcium chloride below. This method is simple and costs little, and is recommended for general use. While glass jars were used in experiments, metal or non-porous earthen vessels will serve as well if made airtight. It must be remembered that the calcium chloride placed in the bottom of the jar is used as a drying agent and not as a preservative in any other sense. Seed such as coffee and citrus, which lose their viability on drying, can not be kept viable in this way. If seed with a fairly high water content is to be stored, it may be necessary to renew the calcium chlorid, since, unless a sufficient quantity of calcium chloride is used to take up the surplus water, the seed may not be kept sufficiently dry. Before the calcium chloride becomes entirely moist, it should be replaced by a fresh supply. In handling it should be exposed as short a time as possible to the open air, since it takes up moisture from the air readily and so loses its drying power. In removing seed from the container this should be remembered.

"In the last germination test of bean seed which had been kept in the open the seed was put in the tester on the 29th October, 1910, germinating 4 per cent. On this date, 100 per cent. of the seed kept in the drier germinated. This seed from the drier still showed a 100 per cent. germination nearly two years later, 13th August, 1912, when the tests had to be discontinued on account of a scarcity of seed.

"By the end of 1911 all of the imported seed kept in the open air had lost its viability. In 1915, 94 per cent. of the radish seed and 84 per cent. of the beet and tomato seed kept in the drier still germinated.

"The native tomato seed, after more than five years in the drier, showed a germination of 93 per cent., whereas seed kept in the open lost all viability in less than half that time.

[The loss of viability of imported seed of a number of different vegetables is graphically shown in illustrations which are not here reproduced.—Ed., "Q.A.J."]

"The very rapid loss of viability of lettuce seed kept in the open air stands in marked contrast with the results of tests of seed of the same lot which had been kept in the drier and which showed a germination of 90 per cent. in 1915.

"That Northern vegetables degenerate quickly when taken to the Tropics is a common belief in Porto Rico, resulting from the fact that seed loses its viability quickly when exposed to moist air and from a lack of knowledge regarding seasonal effect on vegetable production.

"To retain the viability of seed of the crops used in the experiments here reported, the seed was stored in airtight jars in the bottom of which was placed a small quantity of calcium chloride. This method was so satisfactory that it is recommended for general use."

TOMATO-GROWING.

By WM. McLEAN, Boggabri, New South Wales.

A large number of people from Queensland keep writing to me *re* growing tomatoes. As I know that many of them are readers of your paper, I give them a little information as to the methods adopted by me in growing of same. One thing I notice in articles on tomato-growing is, that all vines are recommended for the same treatment in cultivation. This, I find in many cases, is a mistake. I wish to point out that some varieties make very little vine and can be allowed to trail on the ground with satisfactory results, while others that are strong growers and require to be let grow tall so as to bear heavy crops of fruit, must be trained up or staked to get good results. I always stake the following, and let them run 6 ft. to 8 ft. high, and often more:—Ferris Wheel, Giant Tree, Yellow Ponderosa, and Colossal. These kinds must be trained up or staked to get good results, as the fruit is so large that the limbs will get broken, and most of the largest fruit will be on the ground, on half broken limbs, the large fruit making it impossible for the limbs to bear them up, and, unless trained up, staked, or given support, good results cannot be expected.

The Ferris Wheel, Giant Tree, Colossal, and Yellow Ponderosa are the largest I have ever imported, while the Yellow Ponderosa is the smallest of the four, but a very strong grower and a heavy cropper, and a splendid shipper. The fruits will keep in good condition on this variety longer than any other variety I have ever grown, and run very even in size. I have about sixty different kinds on trial this season, collected from India, South Africa, New Zealand, and different States of America, while I am trying also a number of our leading varieties to see how they correspond with the new imported ones. By keeping the vines of all large kinds staked or tied up, the yield is much better. It keeps away grubs, and prevents rot, if very wet, and in a hot climate, like where I live, prevents sunscald. I have had a few very hot days this summer, with the thermometer from 100 to 110 degrees in the shade. Many tomatoes on the vines that were allowed to trail on the ground got sunscald, while not a single one was touched on the staked vines. I don't care for the single-stem system in my climate, as it is too hot. I let my vines throw out a number of shoots, so that they may grow into a large bush, as it keeps the fruit well shaded in the hot weather. I also draw the earth well up to them, when the plants are about 8 in. high, or a little less, and then do the same again when the plants are starting to shoot out suckers. I have about 3,000 vines growing this season.

The following do better if staked or trained up if convenient:—Burpee's Improved, Matchless, Snowball, Golden Sunrise, Wood's Imperial Beauty, Five Million Dollar, John Bair, and Bonnie Best (South African strain). I wish to mention that the Snowball is a white tomato, but may vary, in different soils and under different climatic conditions, towards yellow or straw colour, but all the same, if it does, it is large and a beautiful tomato. This tomato makes very little vine with me, but bears very large fruits, and unless the vines are staked or trained up a great number of the main limbs will get broken off, and half the fruit are destroyed.

SOME FINE TOMATOES.

During the past two or three months, the fruits and vegetables in various parts of Queensland have excelled in size and weight anything which has, except in rare instances, been in evidence in former seasons. Within the last three months we have seen peaches weighing 1 lb. each, onions 2 lb., bananas 9 in. long and 5 in. in circumference, and in the

PLATE 6.—SOME FINE TOMATOES.

middle of February, a banana-grower is reported to have produced bananas, each fruit weighing 1 lb. Now we have a specimen of tomatoes grown by Messrs. C. Tutton and Sons at Cloncurry, photographed by Mrs. Chas. Tutton. The photograph shows five tomatoes, the combined weight of which was 11 lb. 4 oz. It would be of interest to know if any particular methods of manuring, pruning, &c., were employed in producing this magnificent fruit, which, from the photograph, might easily be mistaken for table pumpkins.

NEGLECTED INDUSTRIES.

PEANUTS.

Notwithstanding all that has been written in this and hundreds of other agricultural journals throughout the civilised world on the great value of peanuts both as a food for stock and for the production of oil, few farmers have, in this State, devoted any attention to it as a farm crop. In Hawaii, the United States, Japan, Russia, China, and other countries, peanuts are grown largely as a staple crop. They are consumed in large quantities by the inhabitants of those countries both in a raw and roasted state. In the Southern States of the Commonwealth the crop is produced in fairly large quantities with considerable profit to the growers. A farmer in Victoria, Mr. Bunbury, of Ballendella, known as the "Peanut King," estimates that as much as £350 per acre profit may be earned by growing peanuts. The wholesale price of these nuts, he said, was 6½d.* per lb., and, despite importations from Japan, the demands of the Australian markets are not properly filled. He stated that when he marketed his first crop in 1914, he disposed of a large portion of it at 1s. per lb., and it was his opinion that, even if nuts were to fall to 1d. per lb., a grower could make a profit of £27 per acre.

The total area of land under cultivation in Queensland amounted in 1915-1916 to 1,059,401 acres besides 329,813 acres in fallow, or lying idle. Out of that area only 102 acres are returned as being under peanuts. which yielded 85,864 lb. of nuts—12,980 lb. in the Moreton district, 27,219 lb. in the York Peninsula, and 41,700 lb. in the Port Curtis district. The money value of these crops at 6d. per lb. would be about £2,146. An

* The price of peanuts at present, in Queensland, is about 3d. per lb., and although 6½d. per lb. was obtained by the Victorian farmer, the Queensland farmer would have to pay freight and other charges to Sydney or Melbourne, which would reduce the net return to the grower. At the same time, where he now sells 1 cwt. he would dispose of tons in the Southern markets, provided he can produce an even, bright-coloured, clean sample, such as can always be turned out from a light, sandy loam.—Ed., "Q.A.J."

acre of peanuts will yield from 1,500 to 2,000 lb. of nuts. At one of the Queensland State Farms, the return per acre in 1914 was 2,420 lb.—£60 worth at 6d. per lb.

Six years ago there were in the United States of America, as in Queensland to-day, only a few experimental plots in one county. The estimated area in that county in 1914 was 15,000 acres and other counties have followed suit. The major portion of the crop is devoted to pig-feeding and oil-making. For the former purpose the peanut is far preferable to corn, when fed in conjunction with other foods, in promoting rapid growth and considerably increased weight as compared with results from other food. Professor Cottrell (a pig-raiser in Texas, U.S.A.) has shown that it requires less than 3 lb. of peanuts for each 1 lb. of gain on pigs that weighed from 40 to 50 lb. at the start. At Arkansas Experiment Station, an acre of ripe peanuts pastured by hogs made 1,252 lb. of gain, while an adjoining cornfield, yielding 30 bushels to the acre, only made 436 lb. of gain per acre on hogs. Now we have been asked, "Where is there a market for large quantities of peanuts?"

We have just received a letter from Messrs. A. H. Burnet and Co., Limited, merchants and wholesale grocers, Australia House, Sydney, N.S.W., which answers the question. This firm writes: "There is a very fair market in this State for peanuts, and large quantities are bought, especially by the Chinese merchants who import them from the East. We would give the whole of our trade to the Australian producers if they will market them in a satisfactory way." The firm also states that if any growers are willing to grow with the idea of marketing in New South Wales, they will see other members of the Merchants' Association there with a view of giving the growers an idea of the quantity the association would be prepared to take. Prospective growers would naturally ask what price the New South Wales merchants would be prepared to pay for nuts, but the firm did not name any price. In any case, the question of freight from Queensland to New South Wales would have to be considered.

NEW USE FOR COCONUT WATER.

Coconut water or, as some call it, "milk," which hitherto has been a waste product in copra-making countries, has been found to be an excellent rubber coagulent. The discovery has been lately made in Ceylon. Millions of gallons of coconut water allowed to run to waste on coconut plantations can now be made use of at a good profit. The coconut water is allowed to ferment for four or five days, after which it can be used without further delay as coagulating latex. This is said to produce a fine rubber, superior to that procured with the use of crude acetic acid. The colour of the rubber with acetic acid fermentation is decidedly inferior to the coconut water fermentation. Coconut water is now made up in bulk and shipped in large quantities from coconut plantations to the various rubber estates.—"Town and Country."

Pastoral.

THE BLOW-FLY PEST.

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

About one of the best suggestions which has come before me lately in regard to the tratment of sheep as against the blow-fly, is made by Mr. P. O'Sullivan, of Charleville.

In the "Courier" of the 16th February, that gentleman states (*inter alia*)—

" . . . . There is an old saying that 'Cleanliness is next to godliness.' The proverb might apply in this case. If the sheep on all stations were washed, say, in the beginning of the summer months—as was the case some forty years ago—it might relieve the trouble. The process was as follows:—First, the sheep were put through a hot water soak tank for about twenty minutes, then they were run through a race, and placed under cold water spouts, being afterwards allowed to swim through another square tank to a drying trellis pen, thus cleansing the dirt and grease out of the wool. The fly was never known to attack the sheep treated in this way. With the advantages of bore water the wool could be made very clean and bright. On Tarong Station, in the Burnett district, in olden times, when that magnificent property carried a good flock of sheep, a woolwash was in existence there, and was erected on the principle I refer to. Some eight horses were driven in a circular 'merry-go-round' whim, which worked machinery that operated eight to ten spouts, from which the water would gush in a goodly stream at a terrific pace. Men would stand up to their waist in the water, holding each animal sufficiently long to scour the fleece, then let the sheep go, and it would swim to the drying pen, wearing a beautifully clean, white appearance. This, I think, would be almost a sure safeguard against the invasion and vicious attack of the fly. Of course, the plan I state could be worked now on a more modern, up-to-date, and scientific system; for instance, it might not be necessary for the men who would be operating to stand in the water. Some appliance could surely be devised to do that work."

Now, there is more than a grain of common sense in Mr. O'Sullivan's suggestion. It is well known that, generally speaking, light, dry-woolled sheep and crossbreds are not nearly so subject to the attention of the fly as the dense-woolled, greasy wools of the latter-day merino. In the departmental experiments of 1914-15 the sheep dipped showed a greater relative immunity than the undipped, the non-poisonous dips themselves showing out fairly well in the analysis. I am of opinion that the cleansing effects of the dipping itself had more than a little to do with the results at the end of the twelve months' trial. Not only was there a big difference (53·17 struck of the undipped, and 18·72 of the dipped), but the wool, when sold by Messrs. Fenwick and Co., in the open market, and classed only as dipped and undipped wool, showed a balance in favour of dipped wool of 3d. per lb. (*vide* "Queensland Agricultural Journal" of January, 1915). The dipping was done by means of a Tandawanna shower, which is established at Gindie State Farm. It is calculated that the amount of dip solution falling from a height of about 7 ft. for the six or seven minutes the sheep were under the shower, was equal to a fall of 10 in. of rain over the area of the pen holding the animals. Thus the sheep received a great washing—not as cleansing a washing as hot water and soap would give, but still fairly effective. For the ten months after the dipping, the undipped sheep could be distinguished without handling, merely by the difference in the tips of the fleece, one being much cleaner and brighter than the other. With bore water the process of washing the sheep by means of the shower would be comparatively cheap and easy. The sheep would not be knocked about; and, if soap and water were desired, there would be little waste, as the liquor could be used almost *ad lib.* in regard to time during which it was flowing. As is well known to scourers, the greater the number of fleeces washed in the first liquor, the better the liquor becomes for cleansing purposes.

The matter will certainly be tried out in the experiments about to be conducted at Gindie, and I have to thank Mr. O'Sullivan for the suggestion which, I confess, should have been obvious to everybody concerned. The gain, besides, would be enormous in a dozen ways which are known to wool and sheep men.

LIVE STOCK IN THE UNITED STATES OF AMERICA.

Official figures state that there are, in the United States of America, 21,262,000 milch cows, 37,067,000 beef cattle, 49,956,000 sheep, 64,618,000 pigs, and 21,195,000 horses.

A NEW METHOD OF BRANDING.

An original and admirable idea in branding has been placed upon the market by Mr. James Robinson, the well-known maker of ear-tags and ear-punchers. The object is to brand on the inside of the ear, thereby obviating the destruction of the hide which accompanies the usual system of branding. Branding on the horn has been tried as a means of obviating the drawback of the usual system, but this has been found to come out in a year or two. Tags have been introduced from the United States, but these, too, often tear out, while tattooing grows indistinct. Several pedigree cattle breeders who have tried Mr. Robinson's system are thoroughly satisfied with it. It certainly meets a long-felt want.—"New Zealand Farmer."

The Horse.

TREATMENT OF SMALL WORMS IN HORSES.

The Chief Inspector of Stock and Chief Government Veterinary Surgeon, Department of Agriculture and Stock, Mr. A. H. Cory, M.R.C.V.S., advises —

Sclerostoma tetracanthum.—This is a small thread-like worm about ½ in. long, found chiefly in the large bowel in great numbers. The embryos encyst themselves beneath the mucous membrane. The countless wounds which the worms make in the bowel and the irritation caused by the encysted larvæ give rise to enteritis, &c. There is usually associated with this worm another known as the *Sclerostoma equinum.* This worm is about 1¼ in. to 1½ in. long, grey or reddish-grey in colour, with a round knobbish head, and tapering to the tail end. The embryos wander into the blood-vessels, causing obstructions, giving rise to grave complications.

Treatment.—All suspected animals should be purged by administering a dose of physic such as 5 to 6 drachms of powdered Barbados aloes, with 1 drachm of powdered ginger given as a drench in a pint of thin gruel, or made into a ball with a little soft soap. After the action of the purgative has ceased, they should be given every day, about one hour before their morning feed, the following powder mixed in a couple of handfuls of damped food:—Antimony tartrate, 2 drachms; powdered sulphate of iron, 1 drachm; powdered gentian, 2 drachms; powdered aniseed, 3 drachms.

After six doses they should be given a second active purgative; for the smaller horses and ponies not more than 5 drachms of aloes, and 1 drachm antimony tartrate should be given. During the treatment the animals should be kept yarded to prevent the contamination of pastures by excreta, which should be gathered up and burnt and the ground dressed with common salt or quicklime. As infested animals cannot by one course of vermifuges be divested of the larvæ in the cysts and blood-vessels, they should be treated at intervals of two or three months. More important than medication is the exclusion of embryos from food and water.

Wherever the *Sclerostoma* have secured a local habitat the land should be put under a rotation of crops to be laid down in grass again after four or five years; the *Sclerostoma* ova will by this time have hatched out and died a natural death. Where this is impracticable change the horses to other pastures and depasture the infested land for several years by cattle or sheep which do not harbour the *Sclerostoma*; in all cases it must be provided that no drainage can come from infested pastures to the clean pastures. Rock salt left in the paddocks for the horses to lick will greatly minimise the chances of infestation.

[NOTE.—A correspondent informs us that he tried feeding some horses infected with worms on sunflower leaves, with the result that in three weeks the animals were entirely free of worms.—Ed., "Q.A.J."]

The Orchard.

THE CINCTURING OR RINGING AND GIRDLING OF FRUIT TREES.

BY CHARLES ROSS, F.R.H.S., Instructor in Fruit Culture.

Some considerable attention has been given to this subject, which has been favourably commented upon from time to time, and a few remarks from myself in reply to many inquiries may not be inopportune.

The method has long been practised in all grapegrowing countries. The cincture consists of removing a narrow ring of the outer bark without injuring the inner fibrous tissue or cambium layer along which the sap rises to the superstructure of the tree. The return sap is thereby checked at the ring, and, instead of proceeding to the roots and causing more wood growth, it is elaborated in the blossoms, leaves, and fruit. The effect is to produce a more regular and better bearing habit, the fruit being earlier, larger, and richer in flavour and colour; and, what is also important, the fruit is not so liable to drop off after setting. The best time to ring or girdle is when the sap is in full flow, or when the petals are beginning to fall; if done later, the operation is useless for increasing the setting, but will ensure an earlier crop of better quality. I have advocated this system for many years, but until recently it has not been much followed. Where I have recommended it, and induced growers in the North Coast, Central, and Southern districts to try it, the result of the operation has proved all that has been claimed for it. A sharp knife may be used for removing the ring, but it can be done more quickly by the instruments figured in the illustrations (Figs. 19 and 21). Unfortunately this tool is now difficult to obtain, as it is of French manufacture.

In England, during my more youthful days, cincturing and girdling were performed on grape-vines grown under glass, and upon pears and other deciduous fruit-trees grown in the open, known to be shy croppers and late in maturing. Girdling with fine wire was even performed on hard-wooded, flower-bearing shrubs, such as roses and camelias, with more or less success for exhibition purposes; also to ensure a better setting of the seed heads after the flowers had been hybridised. In our own State there are many erratic and shy-bearing fruit-trees that will give a satisfactory response to the treatment, which has already been proved on mangoes, Washington Navel oranges, walnuts, peaches, pears, apples, grapes, &c. The method is well worth trying upon other fruits which have not yet been experimented with, more especially those varieties that are shy or erratic bearers; also

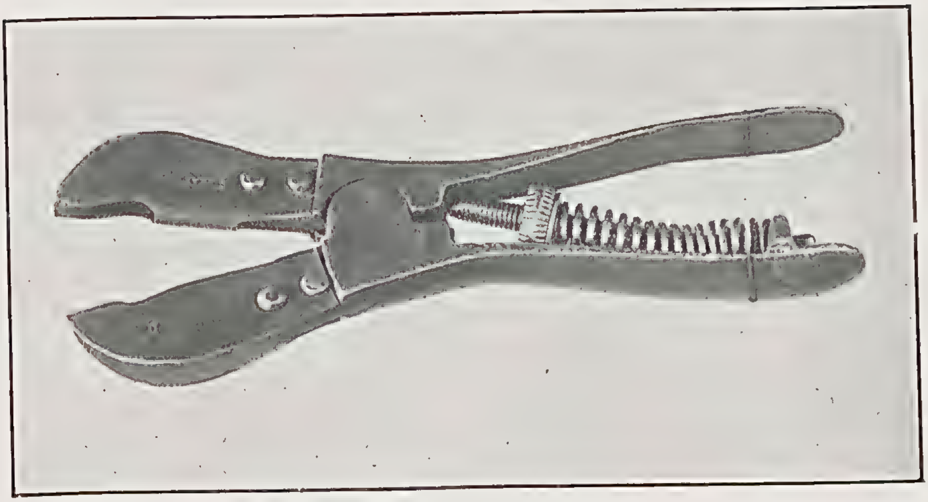


Plate 7.—Cincturing Tool.

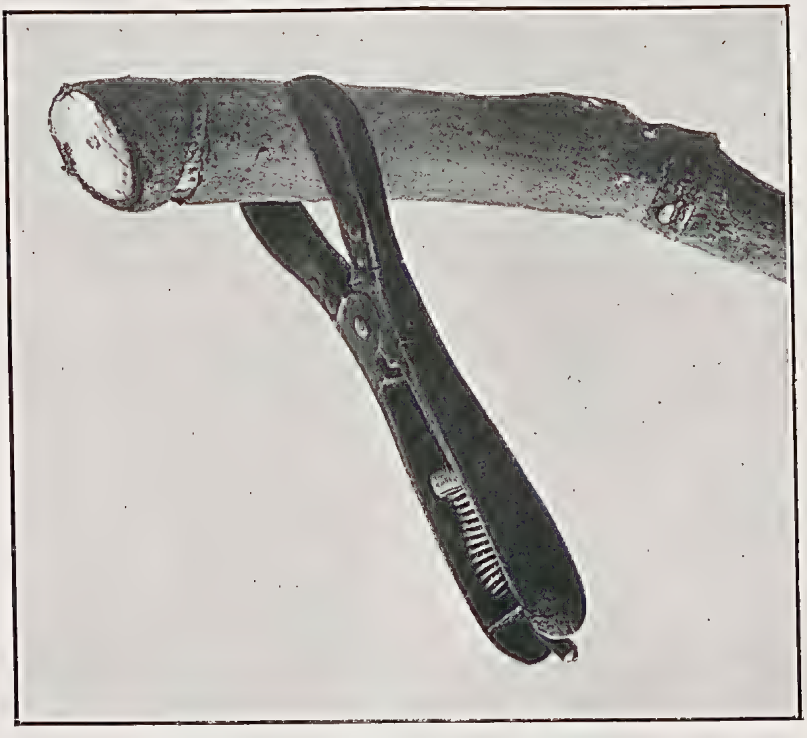


Plate 8.—How to Use the Instrument.

such as, under ordinary conditions, require age before assuming a free cropping habit: for instance, the Ahuacate (Avocado or Alligator Pear), Pecan Nut, Cherimoya, &c.

Girdling is performed by twitching a piece of No. 8 or No. 10 wire very tightly round the trunk, or, say, half the main limbs or smaller branches; but if the stems are not perfectly cylindrical, the wire must be hammered in all round, otherwise the cavities would be bridged over by the wire, under which the sap would continue to circulate freely, and therefore would not answer the purpose. There must be a complete check of return sap all round the circle. The girdle is never so complete a check as the cincture. My European experience long ago was to select a number of limbs or branches (not all) on each tree or vine for the purpose, rather than ring the main stem, but the latter has been operated on here with the utmost satisfaction.

In this connection I desire to draw the attention of fruitgrowers to the following, which appeared in "The Fruit World" of last month (February) :—

"RINGING FRUIT TREES.

"The practice of removing a complete ring of bark from fruit-trees has been followed by Mr. W. H. Hughes, of Longwood, writes Mr. Geo. Quinn, Horticultural Instructor, South Australia. Mr. Hughes practised the system on some trees of the Nickajack variety some ten years ago. He put two cuts, ⅛ in. apart, through the bark of the trees, and removed the strip between the cuts. The operation was performed when the blossom began to fall. It was important, Mr. Hughes considered, that the cuts should not be deeper than through the bark, and, if the weather were warm, he advised tying a strip of bagging over the wound to protect it from the rays of the sun. At the time the first test was made, one tree of a lot of eight was chosen for treatment. The treated tree yielded more fruit the season directly after treatment than was gathered from the remaining seven untreated. Needless to say, these were subjected to ringing the next year. All the treated trees are still bearing well. However, Dunn's Seedlings were also treated, but not successfully.

"Mr. J. Roebuck, also of Longwood, ringbarked a Gravenstein Apple in the limbs ten years ago. Prior to treatment it had not averaged a return of one case per year, but immediately succeeding the ringing it yielded thirteen cases, and since then has returned an average of nine cases annually.

"A vigorous growing Northern Spy Apple was ringbarked by Mr. W. Nicholls, and the result was very satisfactory."

The operation as performed in the present day may not have been known, but the principle of checking the flow of sap by bruising or beating the bark of trees must have been crudely understood hundreds of years ago (*vide* the following very ancient couplet) :—

"A woman, a dog, and a walnut tree,
The better you beat them the better they be."

PICKLING GREEN AND RIPE OLIVES.

Although olives have been grown for some years in different parts of Queensland, there has never been a systematic production of the pickled olive. At St. Helena Penal Establishment, in former years, very excellent olive oil was made, but owing, we believe, to the fruit-fly pest, oilmaking was given up. Some time ago we published in this Journal a very excellent paper on pickling olives, by W. Calton Grasby, and as olives are now ripening, we republish the directions for pickling both the green and ripe fruit, as possibly some owners of olive trees in bearing may like to make a trial of the process.

The directions for green olives are taken, with a few slight modifications, from a bulletin prepared by Frederick T. Bioletti, at the College of Agriculture, University of California, in 1901. They are the result of a series of experiments conducted at the Agricultural Experiment Station to determine the best method of preserving the green colour of the fruit, and at the same time give a good-quality pickled green olive.

TO PICKLE GREEN OLIVES.

Choice of Fruit.—Only large-fruited varieties should be chosen, as the small green pickles bring a very inferior price. The olives should be gathered as soon as they have reached full size, and before they have coloured notably. A slight pink colour on one side does no harm, as it disappears during the process, but olives which have reached the stage of ripeness indicated by this first change of colour will probably have less of the bright green than if gathered earlier. No two varieties should be pickled together, and the olives should be graded into three or four sizes. The reason for this is that different varieties and different sizes are almost sure to require different strengths of lye solution, and it is therefore impossible to attain the best results unless this selection is made. The proper strength of lye solution to use in each case is best determined by a preliminary trial, as follows:—

Preliminary Trial.—Take a series, say four, of pint preserving jars, and fill them with the olives to be tested. Pour into them respectively a 1 per cent., 1½ per cent., 2 per cent., and 2½ per cent. lye solution, sufficient to cover the fruit. At the end of forty-eight hours examine them. (It has been found that a sufficiently strong lye solution will extract the acid and bitter principles of even very bitter olives in forty-eight hours.) At the end of this time some of the weaker lye solutions will be found to have neutralised—that is to say, all the lye will have been used in acting upon the acids of the fruit. This will be made evident by the lack of the slimy feeling which the fingers have when dipped into a lye solution and rubbed together. Suppose that the 1 per cent. and 1½ per cent. solutions are neutralised, and that the 2 per cent. still has a slight slimy feel, this will show that a 2 per cent. solution is a little stronger than is necessary to neutralise all the bitter or acrid matter in the sample tested. If, now, we use a 2 per cent. solution in curing the bulk of the olives from which the sample was taken, we are able to preserve the green colour perfectly. If we use a somewhat stronger solution—say, a 2½ per cent.—the colour will bleach out a little; while, if we use a much weaker solution—say, a 1 per cent.—the green will change to that disagreeable grey or brown which we wish to avoid.

Process.—The appropriate strength of lye solution having been determined, the olives are placed in convenient receptacles, where they can be treated with a minimum exposure to light and air. For this purpose, 50-gallon barrels with very large bung-holes (4 or 5 in. in diameter) and spigots are useful. After filling the barrels with olives, the lye of the strength determined in the preliminary trial is poured in. Each barrel should be quite full of olives, and sufficient lye solution be put in to come flush with the bung-hole. At the end of forty-eight hours, the lye should be drawn off, the olives quickly washed in two changes of water, and the barrels filled immediately with a 2 per cent. salt solution. This brine should be replaced successively with a 4 per cent., 8 per cent., and, finally, a 12 per cent. solution, in the last of which the pickles remain permanently. The successive brines should be allowed to act for from forty-eight to seventy-two hours each, according to the size of the olives, the larger size requiring more time for the brine to penetrate and to displace the excess of lye which remains. The whole process will thus take from ten to fourteen days.

Absence of Air.—The essential part of the process is to avoid exposing the olives to the air during pickling, until all the bitterness and acid are completely neutralised by the lye. After this, the green colour seems to be fixed, and exposure to the air does not change it much, though it is well, all through the process, to avoid leaving the olives uncovered by liquid any longer than necessary.

As different varieties of olives, and even the same variety in different seasons and from different localities, differ very much in bitterness, the importance of treating each variety separately is evident, as each will require lye solutions of different strength to neutralise them. Very bitter olives—such as Mission, Sevillans, Manzanillo, and True Picholine—require solutions containing from 1½ to 2½ per cent. of pure potash lye, while olives containing little bitterness, such as Ascalan and Columbella, require only from ½ to 1 per cent. solutions.

To facilitate the preparation of lye solutions, it is convenient to remember that an English standard gallon of water weighs, approximately, 10 lb., so that to make a 1 per cent. solution of Greenbank's concentrated lye, use—1 lb. lye in 10 gallons water; ½ lb. lye in 5 gallons water; or ¼ lb. lye in 2½ gallons water. To make a 2 per cent. solution—1 lb. lye in 5 gallons water; ½ lb. lye in 2½ gallons water; or ¼ lb. lye in 5 quarts water.

Those who do not care to go to the trouble of the preliminary tests are advised to use a 2 per cent. solution of lye, and watch and taste the olives to see when the bitterness is removed. They may or may not get the best colour, but they will be able to make a pickled olive of excellent quality.

TO PICKLE RIPE OLIVES.

The olives are best when fully ripe, but yet firm, and they should be picked carefully and not bruised. Olives of any degree of ripeness may be used, but all treated in one operation should be of the same degree of ripeness, of the one variety, and of uniform size.

Put the olives in 2 per cent. lye, and allow to stand twenty-four hours. Wash well for twenty-four hours, changing the water three or four times. If the bitterness has not gone, add 1 per cent. lye solution, and let stand for twenty-four hours; then draw off the lye, and replace with a 2 per cent. salt brine and again allow to stand twenty-four hours. Draw off this brine and replace it with another of the same strength. After forty-eight hours again change for fresh brine, and test for bitterness. If this has gone, use a 4 per cent. brine and allow it to remain four days, and then change the brine for fresh, of the same strength, for seven days. Then change for a 10 or 12 per cent. brine, and the olives will keep indefinitely, but may mould on top. To prevent this, either cover the contents of the vessels with a layer of olive oil, or, better still, pasteurise the vessels and the olives by treating them up to 180 degrees Fahr. for twenty minutes, sealing with pasteurised corks or stoppers.

ANOTHER METHOD.

Place ripe olives in a jar or cask, and cover with a 1½ per cent. lye solution and 2 per cent. salt solution. Allow to stand for forty-eight hours. Draw off the lye and add 2 per cent. brine for forty-eight hours. Change the brine, still using 2 per cent., and allow to stand for three or four days; then repeat the operation, allowing to stand four days. Draw off the brine and cover with a 4 per cent. brine for a week; then change, and use an 8 per cent. brine for another week; then draw off the brine once more, and place the olives in jars or bottles with a 10 to 12 per cent. brine, and pasteurise.

PRACTICAL HINTS.

For a small quantity of olives, procure a barrel-shaped earthenware jar, holding 5 gallons. Insert a spigot into the hole on the bottom side, and on the top let there be a circular hole about 3 in. in diameter. The spigot, of course, is for withdrawing the lye, water, and brine. A small 3 or 5 gallon keg will answer the same purpose. Nearly fill the jar or keg with olives. Then pour in the lye and cover the hole with a piece of board to keep out the light. At the proper time, as given previously, run out the lye and pour in water to rinse the olives, and repeat the operation as already described. By keeping the top carefully covered, there need be no haste in finally bottling the olives, for they will keep for months in the keg. Brine should be boiled, and that added last should be almost boiling hot, and should well cover the fruit, a film of oil being poured on top. Any mould should be removed at once and the olives treated with fresh hot brine and pasteurised. If the olives are too salt when opened, a soaking in fresh water for a day or two will remove the excess of salt without detriment to the olive.

Viticulture.

THE WINE INDUSTRY.

By G. A. GATTINO.

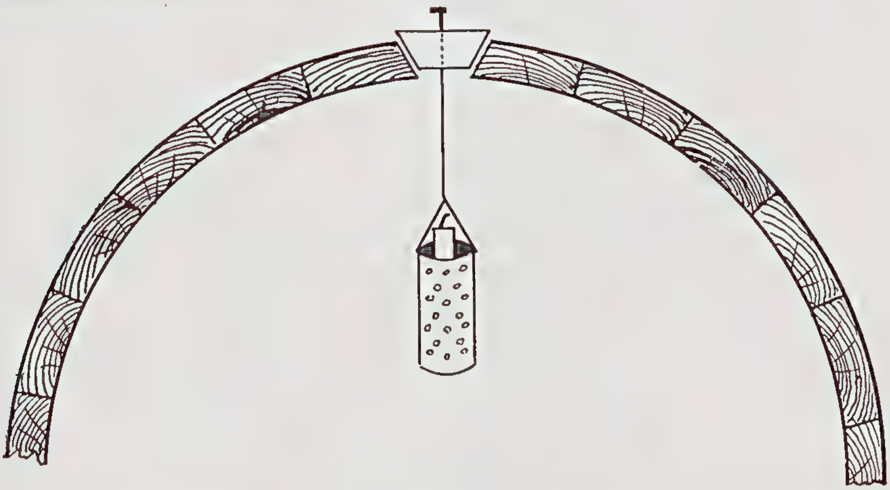
CONSERVATION OF THE WINE IN THE CASKS DURING THE FIRST YEAR.

The tumultuous fermentation brings to the must such alterations as will totally change its nature and cause it to assume the qualities of the wine. At this point, however, the must has not yet acquired all the wholesome tonic and resistant characters that are required in the wine, nor has the fermentation ceased. When, after the tumultuous fermentation, the must is taken away from the dregs and transferred into other casks, continuous successive transformations will occur until the must becomes matured wine. That the wine will always go through continuous changes is proved by the fact that after each transfusion or decantation, you will always find that more or less sediment is left in the vessel from which the wine has been transferred. This deposit demonstrates that chemical reactions occurred in the wine in succession, causing the precipitation of insoluble matters. When the wine is bottled, these reactions still occur, and small sediment will always be found in the bottles. The fact being established that the wine, after the tumultuous fermentation, is still subject to transformation, it is necessary to regulate and complete these transformations with care and diligence, and so bring the wine to perfection. The must being transferred, will, after a while, work again, arriving at the phase of the insensible or slow fermentation. If the conditions are propitious, these slow fermentations will last from twenty-five to thirty days. During this phase the wine will improve effectively, and on account of its transformations will be now of defined appearance and apt to be tested.

One of the most essential conditions required to bring the wine to perfection is that the insensible fermentation occur under a moderate and constant temperature, which condition can conveniently be obtained by building a cellar in accordance with my hints appearing in the December (1916) and February (1917) issues of the Journal.

After twenty-five or thirty days, the slow fermentation being completed, the wine becomes cold, and almost all the refuse will be deposited at the bottom of the cask. As soon as the wine becomes clear it is necessary to separate it from the dregs. The racking off must be executed on a dry, calm day, preferably a cool one.

The casks into which the wine will have to be racked off should not be too large, as the duration, efficacy, and degree of the reawakening of the insensible fermentation will be in proportion to the volume of the mass. Vessels of decreasing capacity are therefore required in graduation as the wine approaches the maturity stage, the wine becoming by this process finer and finer until ready for bottling. It may be mentioned that the vessels into which the wine has to be racked off should be sulphurated. The sulphurous acid gas will free the vessel of the presence of air and destroy any germs whose presence may bring alterations to the liquid. This sulphurating of the casks keeps the wine unalterable owing to the strong anti-fermentative action which the sulphurous fumes strongly possess, and this action renders the germs inert and without efficacy to act on the wine. The sulphurating of the casks can be executed with sulphurated matches burnt in a small iron cage of cylindrical form, as shown in the accompanying sketch.



This cage should have the sides perforated and be of a diameter not greater than that of the bung-hole of the cask, and be suspended by a wire.

The preparation of the sulphurated matches is simple, as is also the sulphurating of the casks with the above illustrated cage. Melt the sulphur in an earthenware dish, and, as soon as it is liquid, plunge into it strips of calico in width about 2 in. and in length as long as they are needed. Let them be uniformly covered with the liquid—sulphur. After a few seconds the sulphur will adhere to the cloth, and the matches are ready for use when cold.

For sulphurating the casks, suspend in the cage one of these specially prepared matches, light it, and insert the cage, with match, half-way down in the cask. To enable the cage to stop in this position, fix the suspending wire through a wooden or cork bung, of diameter greater than that of the usual bung-holes. Sometimes the match becomes extinguished as soon as it is introduced in the cask, owing to the presence of carbonic acid gas in the vessel. To remedy this, open all holes existing in the cask, so as to allow the external air to enter first. The casks after being so prepared and sulphurated are ready to receive the wine to be transferred. In racking off avoid as much as possible allowing the wine to come in contact with the air, whose constituents, excepting the oxygen, are dangerous to the wine.

[TO BE CONTINUED.]

RAISIN DRYING AND CURING.

(Extracted from "The Raisin Industry," by Gustav Eisen, published by H. S. Crocker and Co., of San Francisco, U.S.A.)

In describing the processes of drying, curing, packing, and assorting, the only methods which should be used by every conscientious raisin-grower and packer have been followed. These methods are now actually in use, not by every packer and grower, but by the best of them, by those who strive to produce a very superior article which will compare favourably with and compete successfully with the best products of Malaga or other foreign growing districts. Raisins may be produced by cheaper methods than those advocated, but only great care, judgment, and study will produce the best results. In the raisin industry it pays to produce the best, and to attain this very little extra care is required.

SIGNS OF MATURITY.

There are three different ways by which the ripeness of a grape can be tested—saccharometer, taste, or colour. The saccharometer is a well-known instrument, consisting of a graded glass tube that will sink to different depths in liquors containing different percentages of sugar. There are different kinds of saccharometers, but the most practical one for the general raisin-grower is one divided into 100 degrees, each degree showing one per cent. of sugar to every hundred of water. Thus, if the saccharometer sinks down to 25, we know that the "water or must" contains 25 per cent. of saccharine and 75 per cent. of water. To properly test the grapes, a few bunches should be picked from several vines; the juice should be squeezed out and passed through a towel or otherwise strained. The must is then poured into the test tube and the saccharometer inserted. If it shows 25 degrees or more of sugar, the grapes will make good raisins, but for very superior raisins, several degrees more of saccharine are needed. It is not unusual to find the grapes reach 30 degrees in favoured localities and in favoured seasons. Only inexperienced vignerons will require the aid of the saccharometer to determine the state of ripening of the grapes; the more experienced judge by taste and colour. The taste, of course, is the most commonly used method of ascertaining the ripeness of the raisin grapes. Every grower, experienced or not, should examine his grapes repeatedly. To give directions for tasting the ripeness of grapes is, of course, impossible; it must be learned and can only be learned by practice. It is enough to say here that the grapes should taste very sweet, contain no acid, and, if possible, be rather solid.

The colour is also a valuable adjunct in determining the ripeness of the rasin grapes. Fully ripe and perfect fruit should be amber-yellow, somewhat transparent and waxy. If this colour is combined with great sweetness, and in Muscatels with absence of acidity, we can be sure the grapes are ripe. Some grapes do, however, especially when too much exposed to the sun, acquire the yellow amber tint without being sweet, but they are readily distinguished from the ripe grape, by their being of smaller size, and harder, tasteless, and acid. Such grapes never develop into good, mature grapes, and do not make good raisins. All ripe grapes do not become amber-coloured. Those that grow in the shade and on very damp ground, remain always green, although they acquire a certain sweetness and will make good raisins. The Muscatel grapes will make saleable raisins if not fully ripe, but in order to make superior and good raisins all grapes should be dead ripe, especially so if the grapes are to be dipped in lye. If unripe or partially ripe grapes of Muscat or Sultanas are dipped, they make very poor and red raisins; it would be better if they had never been dipped. This is especially so with the Sultana, which begins to ripen and is eatable long before the Muscat, but which only makes a good dipped raisin after the Muscat has been ripe for some time. Three or four days make a great difference sometimes in the amount of sugar in the grapes, and consequently in the quality of the raisins, and the experienced grower will keep his grapes on the vines as long as possible to attain the greatest possible amount of sweetness. But, on the other hand, it takes judgment to foresee how sweet the grapes will be, as in unfavourable seasons they will not attain their full sweetness even if allowed to hang long on the vines. To know the time after which the grapes do not increase in sugar, requires much experience and acquaintance with the locality where they are grown. In this respect different years vary very much.

PICKING.

Many vignerons pick their grapes too green or before they are fully ripe. Not all grapes ripen at the same time, and to make the best possible raisins out of the grapes, it is necessary to pick over the vineyard several times, each time picking only the ripest grapes.

In places where there are two crops of grapes, at least two pickings are necessary, and in many places two pickings are enough. The green grapes of the first crop are then left to be picked with the second crop, at which time they will probably be perfectly ripe and very choice. But if the vineyard is small and easily managed and the owner wishes to realise the most he possibly can, he should make at least three different pickings, each time taking care to pick only those that are fully ripe, and which would make a first-class quality of raisins. The pickers generally use small, pointed knives for separating the bunches, and they are preferable to small shears, as better enabling the picker to reach farther in between bunches and branches and to cut the former without injuring the branch.

In picking great care should be taken. It is always best to begin picking in the poorest part of the vineyard, and some experience is needed by the pickers that they do not pick too many green grapes. The poorest part of the vineyard is also apt to have the ripest grapes. The large fine bunches should be handled with the greatest care, so that the bloom of the grapes may not be injured. The bunches generally should be handled by the stems only, and if this be impracticable, by the stem as much as possible. In separating a large bunch from the vine, the bunch should be cut as close to the stem as possible, and at the end of the stem of the bunch there should remain a portion of that broader part by which the bunch is attached to the main branch. A picker should average not less than fifty trays a day of cleaned and assorted grapes. The picking of the grapes is facilitated by the previous care given to the vines. Neglected and entangled vines are much more difficult and expensive to pick than those which have been properly cared for and correctly pruned the season before.

CLEANING.

When the bunch is picked or cut from the stem, it should be cleaned. If it is a first-class, or even an ordinary large bunch, every sunburnt berry, every leaf, twig, or other conspicuous foreign substance must be carefully removed with the picker's right hand while the left hand holds the bunch by the stem. This cleaning must at some time be done, and at no time can it be performed with better results than when the grapes are green. The stems are then soft and flexible, while later on they are brittle, and in endeavouring to remove foreign substances many berries will be detached and sometimes even the whole bunch broken. This cleaning of the bunch does not extend to third-rate or small bunches which are to be used for loose raisins. The latter can be cleaned very rapidly by machinery, and it would only be a waste of time to clean them by hand-picking. The use of a pair of bellows is also very practical. With these much of the spiders' webs and smaller refuse can be removed, which could not be got rid of in any other way. If the grapes are carefully assorted when picked, and the different grades placed on separate trays as they should be, this cleaning is done rapidly, as the largest part of the crop, which will only make loose raisins, need not be cleaned.

DRYING ON TRAYS.

As soon as the grapes begin to ripen, the trays should be distributed along the rows in the vineyard. They may either first be placed in piles at every row where the roads cross the vineyard or at once distributed along the vines. The former method is to be preferred, as it protects the trays from dirt and dust. Muscat vines in proper bearing require one or two trays to the vine, while for young vines one tray will suffice. The ripe grapes are placed directly on the trays and not previously packed in boxes. In placing the bunches on the trays, it is better the picker should have two trays, one for each grade. On one tray he places the large bunches that promise to make first-class bunch raisins; on the other, the inferior and loose berries. The large bunches should be placed on the trays, stem-side down, as this side will, when cured, become the finest and will eventually be graded by the careful packer as first-class. The smaller bunches and loose berries may be placed any way almost, so long as they are not heaped on one another. That part of the raisin which, in drying, touches the tray, will also present, when cured, a flat surface with several concentric layers, which are considered a prominent feature in the perfect raisin. The large bunches dry the slowest, and by having them from the beginning separated from the small and the loose, the latter can be brought away to the sweat boxes when ready without necessitating the reassorting and handling from the trays, which at this time, when the stems are brittle, is expensive and injurious to the fine bunches. The larger bunches which are to produce layer raisins require less drying, as they are to be sweated or equalised before being packed. The smaller and inferior bunches, on the contrary, must be stemmed and assorted before they are equalised and immediately after they are taken from the trays. In order to stem readily, these raisins must be rather overdried, as if soft they would tear from the stems instead of having the latter broken. The advantage is, therefore, seen of having the two grades on different trays. Without the necessity of assorting, the layer trays can be taken up when they are ready and the loose can remain as long as necessary without fear of the layers being overdried. By this assorting when green, each grade can be treated separately in a quick and effective way. A tray 2 ft. by 3 ft. may be made to hold comfortably from 18 to 20 lb. of grapes. The first crop should be placed pretty close on the trays so that no part of the tray may be visible, as the reflected heat will be too great and may injure the raisins. The second crop should be packed less closely, as the reflected heat from the surface of the tray will help to dry the grapes. This, of course, only refers to localities where the temperature during the first drying is high. The warmer it is, the closer should the bunches be packed on the trays, but when the drying weather is unfavourable, plenty of space should be given to the grapes. It is often said that grapes, to make good raisins, should not only dry but cure. Good raisins should dry and cure at the same time, by which is meant that a chemical process is taking place which is something more than the mere evaporation of the water in the grape. The heat necessary and favourable for drying the grapes is different in different localities. At certain temperatures the raisins will get cooked and spoil, assume a red colour, lose their sweetness, become sour and hard, and covered with large, sharply-defined corrugations—signs of a very inferior or even entirely worthless raisin. It is thought that from 90 to 103 degrees in the shade would be the best temperature for drying perfectly ripe and sweet Muscat grapes. When grapes are very ripe, a much higher temperature will not injure them, while sour and unripe grapes, especially of the second crop, will burn or cook at a lower temperature than would be the proper one for ripe grapes. It is not always advisable to stop picking when the heat becomes too great. A better method is to stack the trays in the field so as to protect the raisins from the sun. When the heat subsides, the trays are again spread. Some packers have suggested that to secure good raisins the trays should be stacked for several weeks in the beginning of the period of the drying. For the production of the usual dark-coloured raisins this is not necessary nor even advisable, except when the heat is such that the raisins would cook and spoil. With a little experience this cooking of the grapes can easily be detected by the smell emitted by the grapes. As soon as they are the least injured by the heat, a cooked flavour begins to pervade the whole vineyard. When this peculiar flavour is noticed, and when the berries begin to show small red and soft blotches on the side facing the afternoon sun, the stacking should be commenced as quickly as possible. If the trays are kept in piles for several days, the injured grapes will partially recover and at least to some extent regain their colour. Greatly injured grapes will dry much slower, sometimes remaining several weeks behind those which were not injured by the sun. Slightly discoloured raisins may partially regain their colour by sweating, but they will not otherwise improve.

After the trays are filled with grapes the best way is to put several rows of trays together, or, rather, place the trays from three rows of vines along one of the spaces between the rows. This gives more compactness to the crop, makes it easier to handle the trays, and facilitates the stacking of the trays, their turning and reversing, or any labour with them that may be required. By thus clearing some of the spaces between the rows, admissions for trucks and wagons is obtained close to the trays.

TURNING.

After the grapes have been exposed to the sun for some time they must be turned. By this time it will be found that the grapes have dried principally on the upper side, while the lower side is comparatively green. The time when the turning of the grapes should be done depends entirely upon the weather. One-half of the drying process should be over, and this requires a longer or a shorter time. When the time for turning has arrived, it will be found that the under side of the grapes, or, rather, the side of each berry that was placed against the trays, has flattened out and shows concentric circles, which are considered of much beauty, and greatly valued in all good raisins. When they are well formed and established it is generally time to turn. If the grapes are turned before these concentric circles are hardened, the latter will open and become less distinct. Another objection to turning too early is, that the upper side of the grapes, if not properly dried before turning, will dry but very slowly afterwards, and often so slowly that the raisins may have to be turned a second time, which will prove both expensive and to the disadvantage of the raisins. One turning is always enough and the only one proper. Turning should, as much as possible, be done in the morning or at least in the forenoon, while the air is yet cool and the stems of the raisins damp.

REVERSING.

This is an operation not properly understood by every raisin-grower, but it is still of the utmost importance, especially for the first-class bunches of the first crop, which naturally dry much slower than the smaller bunches. But the method is also very useful for the second crop, when late in the season the drying is slow and uncertain. The reversing consists simply in reversing the trays in such a way that the edges which first faced the north, afterwards face the south, and *vice versâ*. The object of reversing is plain. It will nearly always be found that the raisins at the top or on the side of the tray nearest the north will dry much more slowly than those on the side facing the south. To prevent this and to ensure equal drying at the top and bottom, the reversing is performed after the trays have been first turned. This will enable the grower to dry his raisins several days sooner than he otherwise would. Indeed, at a critical period of drying, as when rains may fall and injure the raisins, it is of the utmost importance to hurry the crop as much as possible. The reversing at this time is almost as important as turning.

ELEVATING THE TRAYS.

It is a good thing to elevate the trays containing the tail end of the second crop. The best way is to place the trays on the top of the vines, when it will be found that the free circulation of air underneath will help to dry the raisins, and prevent rot and mould.

STACKING AGAINST RAIN AND DEW.

The stacking of the trays is also a valuable help in keeping out dew and cold. When heavy rains are expected, the grapes, whether partially dried or not, should always be stacked. It will keep the stems from rotting off from the berries, and will generally save the crop from being seriously injured. There are several ways of stacking. The flat stacking is used principally when the raisins are very dry, and when it is of importance that no air should enter the trays. In flat stacking, one tray is simply placed on top of another, and the circulation of air is thus brought to a minimum. In rainy weather the roof stacking is to be preferred. Instead of placing one tray on the top of another, the trays are placed in two piles, joining each other in such a way that the inner end of every tray overlaps the edge of the tray in the adjoining pile. The lifting up of one edge of the tray gives to the whole pile a roof-like appearance, and the angle in which the trays join together becomes steeper the higher the pile grows, until at the height of 3 or 4 feet the trays slant so much that the raisins cannot rest on them, but are in danger of sliding off, when, of course, the pile should not be made any higher. The advantage of roof-stacking is that it admits the air and sheds the rain better. In damp weather the piles should not be covered on the sides for any length of time, as the raisins will then mould more rapidly. If instead of joining two piles of trays three are made to join, the centre stack will be flat, while much air is admitted to the raisins. In this stacking the two first trays are placed flat on the ground at almost the distance of one tray. It must be remembered that in very rainy weather no kind of stacking will be of any value, while when the showers are few and far between stacking may save the crop. Stacking is especially valuable in conjunction with dryers, when protection during a few days only is all that is needed.

[TO BE CONTINUED.]

Tropical Industries.

COCOA.

The "Journal of the Jamaica Agricultural Society" of November, 1916, gives the results of experiments which have been carried on for a series of years in the manuring of cocoa and shade for cocoa. From this we gather that from 1914 to 1915 the rainfall on River Estate, Trinidad, was only 60·44 in., and the season is represented as not being a favourable one. Nevertheless several of the manured plots gave an increase in yield compared with the crop of the previous year. The previous results that we published in this Journal showed great variation of yields from different combinations of manures and fertilisers. By manures we mean animal and vegetable matter; by fertilisers mineral plant foods. In Dominica results of experiments on cocoa resulted in the heavily mulched plots giving the best yields and best net results in profit. In Trinidad mulching was found too expensive, and while often resulting in large yields did not give substantial net profits. It is the net profit that counts. For instance, a combination of 200 lb. sheep manure, 100 lb. bonemeal, and 25 lb. sulphate of potash resulted in a return of 10,542 pods per acre over five years, while no manure gave 9,501 pods, but the net profit after deducting cost of manuring was 73·74 dollars for the manured plot and 87·12 dollars for the non-manured plot. On the contrary, a combination of 3,600 lb. pen manure, 100 lb. basic slag, and 13 lb. sulphate of potash per plot. gave 16,146 pods and a net profit of 128 dollars, the fourth largest of all. The third largest resulted from an application of 178 lb. bird manure, which gave a net profit of 132·88 dollars. A second control plot, to which no manure was added, gave 14,055 pods and a net profit of 128·81 dollars. The second largest net profit resulted from an application of 94 lb. bird manure, 25 lb. sulphate of ammonia, and 50 lb. sulphate of potash, giving a yield of 19,857 pods and a net return of 163·59 dollars. This was also the second largest yield of pods and of dry cocoa, the latter being 1·655 lb. Each plot is 1 acre and contains 300 trees. The largest net profit of 173·41 dollars from 21,000 pods and 1,750 lb. of dried cocoa resulted from an application of 3,600 lb. of pen manure, 13 lb. sulphate of ammonia, and 25 lb. sulphate of potash, the cost of which was 19·09 dollars. Lime alone gave a poor return of only 58·03 dollars and 10,000 lb. of mulch only gave a net return of 51·64 dollars, both much poorer than no manure at all. Mulching apparently is of no avail on that particular estate.

In the second series of experiments, comparisons are made of the yield of individual trees under the same conditions. The yields vary from an average over four years of 14·67 pods up to 70. These are from the manured fields. The natural yield of unmanured trees ranged from 16·93 to 34·26. The average number of pods per lb. of dry cocoa was 11·32 over four years.

* * * * * * *

The next series of experiments is with—shade, partial shade, no shade. The following are the results for trees thirty to thirty-five years old this year, average number of pods over five years:—

Full shade	8·863
Partial shade	10·222
No shade	9·889

In the experiments on nine to ten years old trees where suckers were allowed to grow, the 3, 2, 1 and no suckers resulted as follows:—

	Pods.
No suckers	12,333
One	12,375
Two	11,505
Three	11,124
All suckers	9,768

In twenty-five to thirty years old trees the result was as follows:—

	Pods.
No suckers	13,140
One	11,257
Two	8,645
Three	11,541
All	12,514

THE GERMINATION OF THE COCONUT.

In the "Journal of Heredity" for April last is to be found the result of a most interesting study of this phenomenon by Messrs. Cook and Doyle, of the U.S.A. Department of Agriculture.

The article opens with the laconic remark that "coconuts are seeds," but as the term coconut is applied in the article itself to the nut with the husk on, the statement is somewhat misleading. In reality the coconut is a drupe or stone-fruit, in which the stone is enveloped in a fibrous mesocarp. The true seed lies within the hard woody endocarp or shell of the so-called "nut," which, by the way, is again a misnomer.

The authors dispute the theory of maritime distribution, maintaining that the coconut is neither a seashore plant by nature nor dispersed by the sea. In support of their contention they state that the same type of husk which characterises the coconut, and leads people to believe that it is intended to float in water, is found in many other species of palms which do not grow on the seacoast and are known never to be distributed by water; while the waxy coating on the husk (believed to be a waterproof material) is common to all palms and found specially well developed in many inland species.

In spite of the coconut being so abundant and of such economic importance in the Pacific Islands, there is, according to the authors, nothing to show that its habits enable it to exist permanently or in a truly wild state in a littoral or oceanic environment. The common belief of its being a native of this region is stated to be contrary to the opinions of those who have studied the palm as it grows in the Pacific Islands. These authorities are of the view that there are no wild coconut palms in the Pacific, that it has everywhere been actually planted by man, and that the palm does not survive human neglect for any period.

It is argued from the store of water in the interior, the large supply of solid endosperm and the thick fibrous husk, that the native habitat of the coconut must have been a relatively dry clime where the plant had to grow to a fairly large size before it could draw upon soil moisture; while on the other hand such provision would seem unnecessary in a maritime plant. The great size of the nut would indeed be a disadvantage in this latter situation as preventing it from being buried in the sand. We must, therefore, according to the authors, think of the coconut as an interior palm growing in an alkaline soil and subject to prolonged droughts, in order to appreciate the significance of its large seed, its copious supply of endosperm and water and thick spongy husk capable of absorbing moisture when brought within reach of it. As is generally known, the coconut is also intolerant of shade, and this points to its original habitat being a region where other vegetation was absent or very sparse.

Going back to the husk, one cannot fail to notice its suitability as a medium of starting the growth of roots. Indeed, the coconut may be likened to "a self-potted plant," and the hanging up of coconuts till the whole process of germination is complete, and the green plant has appeared, is a fairly common practice which supports this view.

A remarkable thing about the coconut is the small size of the embryo or living germ in comparison to its other parts. It is a tiny cylindrical body lying just beneath the largest eye in the shell. When germination begins the embryo elongates and enlarges at both ends. From the outer end arise the young stem and roots, while internally is formed a large spongy mass called the cotyledon through which are scattered vascular strands which converge and become fibrous at the narrow neck connecting the spongy mass with the stem.

The function of the cotyledon is to convey the food material derived from the solid endosperm to the seedling plant. In order to be absorbed this material has to be digested under the influence of the ferments secreted by the cotyledon and passed into the water contained in the central cavity.

The fluid-filled cavity would in addition to its storage function appear to play the part of a stomach to provide for the digestion and absorption of food material stored in the solid endosperm. In this way the milk would be periodically recharged with food materials to replace those absorbed by the cotyledon.

It is unnecessary to follow the various changes in composition of meat and water which take place as the process of germination goes on.

The original article appeared in the "Journal of Heredity," to which periodical we duly acknowledge our indebtedness.—"Fiji Planters' Journal."

THE ALGAROBA TREE IN CYPRUS.

The seeds are placed in layers in damp sand and, being well watered, they are left thus for about twenty days, by which time the shell has burst, and the young cotyledon visibly projects. The germinated seeds are then taken up from the boxes or beds and sown directly into holes properly prepared for their permanent growth. The plan is simple, and does away with the trouble and expense of pots and of watering the plants while in pots or in beds. The young plants grow much more quickly and sturdily than when transplanted at a later age, and the number of failures is quite insignificant. The Department of Agriculture in Cyprus, after some trouble, induced the villagers in a district characterised by a total absence of vegetation to plant algaroba and almond trees in Morphou Plain, providing both seed and expert advice. The result in 1916 was that some 15,000 trees were raised in that year, and large numbers were also planted in other parts of the island. Seedlings do not come true to product in the case of the carob, another variety of tree bearing the fruit known as Locust, or St. John's Bread, and these require to be grafted, as the tree is diœcious—*i.e.*, bearing male and female flowers on different plants. In the case of the Algaroba it would seem that grafting or budding are not necessary, in proof of which a number of Algaroba seedlings were taken from Sydney to the Pera Artesian Bore, near Bourke, a distance of 500 miles. The trees throve wonderfully, and developed into magnificent specimens, bearing heavy crops of fruit.

We have a great deal to learn about the Algaroba, which is usually confounded with the carob, the botanical name of the former being *Prosopis juliflora,* and of the latter *Ceratonia siliqua.*

STATE INSTRUCTOR IN POULTRY.

Mr. J. Beard, who has been appointed Instructor in the Poultry Industry in this State, has a long record as a successful breeder of most varieties of poultry. His successes in prize-taking at many agricultural shows in Queensland, and notably at the National Agricultural and Industrial Association's exhibitions at Bowen Park, have been almost phenomenal. His services as a judge at country shows were constantly requisitioned, and in no case, as far as we know, were his judgments called in question by exhibitors. In connection with his work at the Department of Agriculture and Stock, Mr. Beard will give his attention to compiling a booklet dealing with all phases of the industry—a work for which his intimate knowledge of the business especially qualifies him.

Entomology.

THE CANE-BEETLE.

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

With reference to investigations conducted this season to study more fully the nocturnal habits of our "grey-back" cane-beetle, it may be of interest to record additional data relating to this insect, and to *Lepidiota frenchi,* Blackb., a smaller reddish-brown scarabaeid affecting cane.

These observations were made at the "Carrah" Plantation, near Gordonvale, on fourteen different evenings, between the hours of 6 and 10 p.m., the artificial light used being an acetylene lamp giving an illumination of 21 litres.

The following notes briefly summarise results obtained in this connection from the dates 15th November to 28th December:—

1. Unlike previous experience, in 1914, many specimens of albohirta were attracted before daylight had quite disappeared. Early in the season (15th to 25th November) flight commenced at 7 o'clock, reaction generally taking place at about 7.20 p.m.; whereas during December, 1914, the time spent on the wing prior to entering the light-trap was just forty minutes (7.20 to 8 p.m.).

2. This species displays great aerial activity when the thermometer stands above 80 and not lower than 75 degrees Fahr., but at 70 degrees Fahr. flies less freely, while a low temperature, such as 65 degrees Fahr., apparently stops flight altogether and renders the beetles torpid.

3. The duration of the period usually passed on the wing each evening depends, too very materially, on the amount of moisture in the ground. Emergence of the beetles this season was not followed by showery weather, and in proportion as the surface soil each day became drier the time occupied by flight during twilight decreased very noticeably. On 21st November, for example (seven days subsequent to the appearance of this insect) albohirta flew for about twenty-five minutes only, the temperature at the time being 76 degrees Fahr.; and a couple of days later, the weather still continuing very sultry, not a single specimen was heard flying at the usual hour, although the dry bulb registration was 78 degrees Fahr. This failure of albohirta to appear on the wing was again noted on 25th November (75 degrees Fahr.), when, however, numbers of *Anomala australasiæ,* Blackb.—a small cane-beetle of a deep bronzy-green colour—were observed at dusk circling about and settling upon the foliage of certain native shrubs. Further scientific data respecting albohirta was obtained, but need not be recorded at present.

On 13th to 14th December heavy rain fell at Meringa, and was at once followed by the primary emergence of *Lepidiota frenchi.* This well-known cockchafer, which occurs practically throughout open forest country, proved excessively abundant last December.

Its larvæ subsist on the roots of grasses and various herbaceous plants, but frequently attack sugar-cane, and are, no doubt, responsible at times for much damage to this plant.

At "Carrah," on 15th December, ample opportunity was afforded for studying the aerial movements of frenchi, which, being on the whole rather remarkable, are worthy of brief notice.

Flight commences upon the first approach of twilight (6.45 p.m. on the occasion in question), when suddenly, and without warning of any kind, myriads of these beetles start up simultaneously from every quarter and wildly dash to and fro as though determined to exercise their wings to the utmost. The scene strikes one as being decidedly novel, and, apart from its scientific aspect, well worth witnessing.

Standing among the cane-stools one seems to be encompassed by an immense swarm of beetles—thousands being in view at the one time—which in their erratic and ill-directed flight are constantly striking against the cane-leaves, the clapping noise produced by the sudden impact being plainly audible at a distance of several yards.

In addition to this oft-repeated sound the air, so still before, vibrates loudly with a continuous hum due to the accumulated buzzing of countless numbers of these insects. Although scarcely within the province of a monthly progress report, it may be of passing interest to mention that I found this humming note to be B natural—eight tones below the middle C of a piano at concert pitch—and very different from the deep tremulous drone that characterises the flight of our "grey back" cane-beetle.

The turmoil I have tried to depict lasts for about ten minutes, and then, ceasing abruptly, is immediately succeeded by copulation. At this stage the beetles may be seen on all sides clinging in couples to the cane-leaves at a height of 3 or 4 ft. above ground level, and if picked off from the foliage will lie quietly in the hand without making the least attempt to escape.

As previously pointed out in 1915 ("Australian Sugar Journal," Vol. VI., p. 893), plantations allowed to remain weedy whilst this cockchafer is in evidence are subject to infestation. I regret, however, to have to record that conclusive proof as to its having acquired a decided liking for cane was obtained last month, when upon examining land at Meringa under thoroughly clean cultivation both the eggs and newly-hatched grubs of this beetle were discovered among the main roots of the cane within an inch or two of the stools.

Important laboratory experiments were instituted this month (January), with a view to determining the effect of different stomach poisons upon very young larvæ of *Lepidiota albohirta,* Waterh.

This line of research work has necessitated the design and construction of special apparatus, by means of which it is possible to conveniently study the movements or tropic reactions of a grub to various stimuli whilst it is in the soil.

Some of the results obtained in this connection are decidedly encouraging, and will be reported in due course.

THE COTTON-BOLL WORM.

In the issue of this Journal for August, 1916, we suggested a method of protecting the cotton-bolls from the worm which attacks maize in the cob, by planting alternate rows of cotton and maize. In January last, a letter was received by the Department of Agriculture and Stock from the Assistant Director of Agriculture, Department of Agriculture and Forests, Sudan Government, inquiring which boll-worm it is that can be dealt with in this manner, and stating that "in the Sudan cotton is liable to attack from two boll-worms—the Egyptian boll-worm (*Earias insulana*) and the Sudan boll-worm (*Diparopsis castanea*), while in one isolated district we have a slight infection of the pink boll-worm (*Gelechia Gossypiella*), which has caused so much loss in Egypt during the last three or four seasons." The Assistant Director of Agriculture in the Sudan, Mr. R. Hewison, further writes: "None of these pests, so far as my experience goes, ever attack either maize or cowpeas in the Sudan, but confine their attention to cotton or other malvaceous plants."

The matter was referred by this Department to the Government Entomologist, Mr. H. Tryon, who reported as follows:—

"The reference in the 'Queensland Agricultural Journal' (August, 1916) to a method of trapping boll-worms by interplanting with maize or cowpeas, doubtless relates to the larger of the two lepidopterous insects that in Queensland affect the cotton in such a manner as to merit the designation of 'boll-worm." This insect is the pyralid moth (*Dichocrosis punctiferalis*), that not only feeds upon the cotton but includes a number of other plants in its dietary, and has, moreover, a wide range of occurrence in India, the Eastern Archipelago, Australia, &c. We have a second boll-worm that is congeneric with the Egyptian boll-worm, if not identical with it, but this, of course, is not partial to the maize.

"It may further be pointed out that this office* is not only not responsible for advocating the method of controlling or subjugating the Queensland Cotton-boll Worm prescribed in the official organ of our Department of Agriculture, and that has claimed Mr. Hewison's attention, but it is a method that it has positively discountenanced, observation having shown that the growing maize will attract the insect to places where already it does not occur, and that, when thus attracted, the moth will attack, simultaneously and indifferently, cotton and corn (maize) alike, the former being damaged where otherwise it might escape injury."

* Office of the Government Entomologist and Plant Pathoolgist.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH JANUARY TO 26TH FEBRUARY, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Sylvia II. ...	Shorthorn... ...	16 Jan., 1917	1,115	4·6	60·44	
Lady Margaret	Ayrshire	6 Jan. ,,	1,111	4·3	56·21	
Miss Edition	Jersey	25 Dec., 1916	942	3·8	41·96	
Violette's Peer's Girl	,, ...	13 Dec. ,,	671	5·2	41·22	
Lady Spec...	Ayrshire	17 Jan., 1917	925	3·8	41·21	
Iron Plate ...	Jersey	9 Dec., 1916	725	4·8	41·04	
Comedienne	,, ...	24 Nov. ,,	604	5·6	40·00	
Thorntons Fairetta	,, ...	26 May ,,	542	6·2	39·81	
Constancy ...	Ayrshire	27 Dec. ,,	822	4·1	39·60	
Sweet Meadows	Jersey	18 Aug. ,,	538	6·0	38·24	
Twylish's Maid	,, ...	2 Nov. ,,	602	5·3	37·70	
Miss Bell ...	,, ...	1 Aug. ,,	542	5·8	37·19	
Lady Annette	Ayrshire	11 Nov. ,,	747	4·2	36·87	
Lilia ...	,, ...	4 Sept. ,,	653	4·6	35·38	
Bluebelle ...	Jersey	22 June ,,	633	4·7	35·07	
Jeannie ...	Ayrshire	27 Oct. ,,	677	4·3	34·25	
Nina ...	Shorthorn... ...	23 June ,,	742	3·9	33·95	
Lady Dorset	Ayrshire	14 Sept. ,,	610	4·4	31·59	
Princess Kate	,, ...	20 June ,,	468	5·1	28·18	
Queen Kate	,, ...	15 June ,,	716	4·2	28·18	
Skylark ...	,, ...	21 March ,,	518	4·6	28·07	
Hedges Dutchmaid	Holstein	22 Aug. ,,	565	4·2	27·89	
Mistress Bee	Jersey	21 Jan., 1917	523	4·5	27·72	
Glen ...	Shorthorn... ...	18 Jan. ,,	680	3·4	27·01	
Rosine ...	Ayrshire	16 July, 1916	570	4·0	26·77	
Netherton Belle	,, ...	11 March ,,	438	4·9	25·31	
Charity ...	Jersey	28 May ,,	444	4·6	24·06	
Auntie's Lass	Ayrshire	4 April ,,	469	4·2	23·14	
La Hurette Hope	Jersey	6 Oct. ,,	412	4·7	22·82	
Leonie ...	Ayrshire	16 Aug. ,,	463	3·7	20·07	

The above cows were grazed on natural pasture only.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
	AYRSHIRES.			
Queensland Agricultural College	Gatton	14	45	Ayrshire Herd Book of Queensland
State Farm	Warren, Rockhampton	9	88	ditto
H. M. Hart	Glen Heath, Yalangur	6	15	ditto
L. H. Paten	Jeyandel, Calvert ..	8	20	ditto
J. H. Paten	Yandina	8	23	ditto
J. H. Fairfax	Marinya, Cambooya	9	55	ditto
State Farm	Kairi	4	8	ditto
F. A. Stimpson ..	Ayrshire Stud Farm, Fairfield, South Brisbane	17	68	ditto
J. W. Paten	Wanora, Ipswich ..	10	42	ditto (Includes 29 cows in advanced register.)
J. Holmes	"Longlands," Pittsworth	6	20	Ayrshire Herd Book of Queensland
	JERSEYS.			
W. Siemon & Sons Ld.	Roma st., Brisbane..	6	60	Queensland Jersey Herd Book
Queensland Agricultural College	Gatton	13	30	ditto
W. J. Barnes	Cedar Grove ..	10	27	ditto
W. J. Affleck	Grasmere, N. Pine ..	6	31	ditto
M. W. Doyle	Moggill	4	12	ditto
State Farm	Kairi..	6	40	ditto
James T. Turner ..	The Holmwood, Neurum	1	5	ditto
Robert Conochie ..	Brookland Jersey Stud Farm, Brooklands, Tingoora	9	21	ditto
G. A. Buss	Bundaberg	5	14	ditto
T. V. Nicholson ..	Windsor	2	8	ditto
Geo. H. Crowther ..	Montrose, Oakey ..	7	43	ditto
E. F. Fitzgibbon ..	Listowel, Oakey ..	7	30	ditto
M. F. aud R. C. Ramsay	Talgai, Clifton ..	5	37	Jersey Cattle Society, Queensland
J. N. Waugh & Sons..	"Prairie Lawn," Nobby	2	44	Queensland Jersey Herd Book
T. Mullen	Chelmer	3	20	ditto
	GUERNSEYS.			
Queensland Agricultural College	Gatton	2	2	Eligible but no Herd Book in Queensland

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
HOLSTEINS.				
Queensland Agricultural College	Gatton	3	10	Holstein-Friesian Herd Book of Australia
George Nowman ..	Wyreema	9	37	ditto
F. C. G. Gratton ..	Towlerton, Kingsthorpe	2	11	Eligible for entry n Holstein-Friesian Herd Book of Australia
State Farm	Kairi..	1	2	ditto
R. S. Alexander ..	Glenlomond Farm, Columboola	3	1	Holstein Friesian Herd Book of Australia
S. H. Hosking ..	Racing Plains, Toogoolawah	2	23	ditto
C. Behrendorff ..	Inavale Stud Farm, Bunjurgen, *via* Boonah	5	10	ditto
ILLAWARRA.				
John Hardcastle ..	Dugandan	5	17	Illawarra Herd Book of Queensland
Hunt Bros.	Maleny	3	62	ditto
W. F. Savage ..	Ramsay	2	29	ditto
G. E. J. Chaseling ..	Brundah, Coolabunia	1	45	ditto
P. Biddles	Home Park, Netherby	3	14	ditto
A. N Webster ..	Yaralla, Maleny ..	5	65	ditto
A. Pickels	Blacklands, Wondai	4	82	ditto
J. P. Perrett & Son ..	"Corndale," Illawarra Stud, Coolabunia, *viâ* Kingaroy	4	52	ditto
H. Marquardt.. ..	Oak Villa Stud, Wondai	5	20	ditto
Wm. Wyper	"Strathobi," Maleny, Landsborough	3	100	ditto
MILKING SHORTHORNS.				
A. Rodgers	Torrans Vale, Lanefield	3	18	Milking Shorthorn Herd Book of Queensland
Wm. Rudd	Airedale, Christmas Creek, Beaudesert	6	30	ditto
W. Middleton	Devon Court, Crow's Nest	3	27	ditto
P. Young	Talgai West, Ellinthorp	11	60	ditto
BEEF SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	..	17	Queensland Shorthorn Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	20	Australian Herd Book
HEREFORD.				
H. F. Elwyn	Gunyan, Inglewood	250	750	Australian Hereford Herd Book
Mrs. Lumley Hill ..	Bellevue	45	127	Entered or eligible for entry A.H.H.B.
James T. Turner ..	The Holmwood, Neurum	25	50	Australian Hereford Herd Book
A. J. McConnel ..	Dugandan, Boonah	43	60	ditto

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
ABERDEEN ANGUS.				
G. C. Clark	East Talgai, Ellinthorp	4	10	Entered or eligible for N.Z.H.B.
SHORTHORN.				
C. E. McDougall ..	Lyndhurst, Warwick	25	50	Entered or eligible Q.H.B.
W. B. Slade	East Glengallan, Warwick	77	283	Queensland Shorthorn Herd Book
W. T. Scrymgeour ..	"Tara," Arthur st., Toowoomba	79	300	ditto
McFarlane Bros. ..	Kilbirnie Stud Farm, Radford	4	37	Milking Shorthorn Herd Book
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book

PAINLESS DEHORNING.

We have published, on several occasions, directions for dehorning calves and cows, the first of which appeared in the issue of the Journal for February, 1899; but, notwithstanding the obvious advantage of preventing the growth of horns on dairy stock, very few dairymen appear to appreciate the fact that horns, although they may sometimes be ornamental, are usually useless, expensive, and dangerous luxuries. To prevent the growth of horns, calves under three weeks of age, and even up to twenty months, can have the embryo horns removed, and no sign of a horny growth will appear on them again. Mr. R. E. Swan, of Landsborough, sends us the accompanying photograph of a portion of Mr. R. L. Burn's dehorned dairy herd at Mondure North, Wondai. The latter has made dehorning a practice among female cattle for seven or eight years, and is quite satisfied with its economy and the expedition with which it can be done. The process is practically painless to the animal, and consists in removing the embryo horns ("the buttons") with a sharp knife, and then applying caustic potash. For this purpose, the hair should be clipped from above or around the horn and then rubbing on the spot, wherever the latter has been removed, the moistened caustic potash for about a quarter of a minute. The stick of potash must

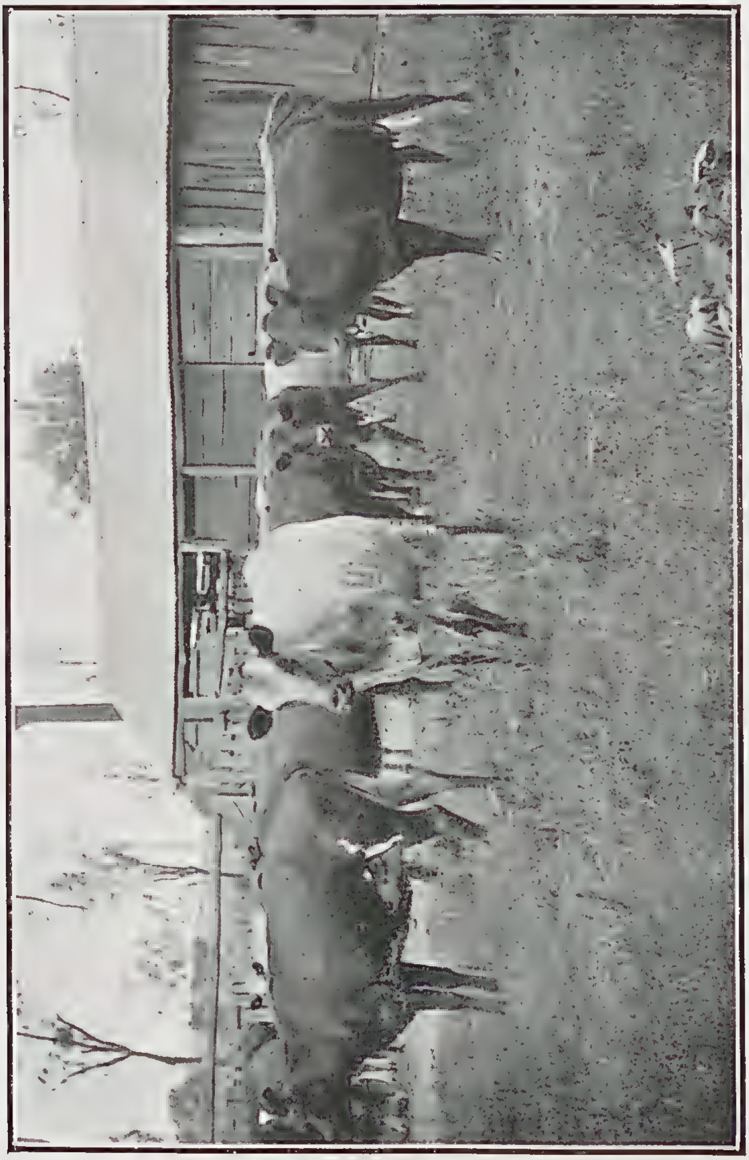


PLATE 9.—DEHORNED DAIRY HERD ON MR. R. L. BURN'S FARM, WONDAI.

not be moistened too much, or the caustic may spread to the skin and destroy the flesh. For the same reason, the calf should be kept from getting wet for some days after the operation.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY 28 TO FEBRUARY 27, 1917.

Seven thousand six hundred and thirty-eight eggs were laid during the period under review, an average of 104·5 per pen. Mr. J. R. Wilson wins the monthly prize with 147 eggs. The following are the individual records:—

Competitors.	Breed.	Dec.	Total.
*Miss M. Hinze	White Leghorns	135	1,417
*T. Fanning	Do.	140	1,417
*J. Zahl	Do.	105	1,406
J. R. Wilson	Do.	147	1,392
*A. T. Coomber	Do.	117	1,387
W. Meneely	Do.	124	1,384
Geo. Tomlinson	Do.	129	1,376
G. H. Turner	Do.	120	1,370
*J. M. Manson	Do.	102	1,368
*E. A. Smith	Do.	123	1,322
A. Howe, N.S.W.	Do.	103	1,317
Dr. E. C. Jennings	Do.	113	1,317
*A. E. Walters	Do.	120	1,314
Mrs. Munro	Do.	115	1,289
J. M. Manson	Black Orpingtons	104	1,279
A. W. Bailey	White Leghorns	120	1,278
*W. H. Knowles, junr.	Do.	141	1,276
*E. F. Dennis	Do.	83	1,270
*J. H. Gill, Victoria	Do.	122	1,269
Mrs. W. D. Bradburne, N.S.W.	Do.	100	1,266
G. Prince	Do.	110	1,261
H. W. Broad	Do.	113	1,251
*Dixie Egg Plant	Do.	88	1,248
A. H. Padman, S.A.	Do.	118	1,248
T. Taylor	Do.	101	1,247
Cowan Bros., N.S.W.	Do.	139	1,247
*J. F. Dalrymple, N.S.W.	Rhode Island Reds	112	1,240
F. Clayton, N.S.W.	White Leghorns	116	1,234
E. Pocock	Do.	103	1,231
W. Lyell	Do.	84	1,229
T. E. Jarman, N.S.W.	Do.	95	1,224
*Mrs. J. H. Jobling, N.S.W.	Black Orpingtons	97	1,224
T. B. Hawkins	White Leghorns	103	1,224
*C. Knoblauch	Do.	110	1,214
W. Purvis, S.A.	Do.	98	1,212
P. Brodie	Do.	97	1,210
E. F. Dennis (five birds)	Black Orpingtons	121	1,209
R. Burns	S. L. Wyandottes	109	1,207
Kelvin Poultry Farm	White Leghorns	72	1,202
A. F. Camkin, N.S.W.	Do.	96	1,196
*E. West	Do.	107	1,197
King and Watson, N.S.W.	Do.	119	1,195
T. Fanning	Black Orpingtons	113	1,193
H. Jobling, N.S.W.	Do.	104	1,185
Mars Poultry Farm	White Leghorns	81	1,185
G. W. Holland	Do.	125	1,183
J. Anderson, Victoria	Do.	77	1,171

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Dec.	Total.
Cowan Bros., N.S.W.	Black Orpingtons ...	99	1,167
W. Becker...	White Leghorns ...	99	1,160
Mrs. C. Davis	Do.	78	1,153
A. Hirst, N.S.W.	Do.	105	1,152
Mars Poultry Farm	Black Orpingtons ...	125	1,151
*W. L. Forrest, N.S.W....	Do.	101	1,145
J. G. Richter	Do.	101	1,132
*Kelvin Poultry Farm	Do.	64	1,107
H. Hammill, N.S.W.	Do.	139	1,106
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	117	1,100
C. P. Buchanan	White Leghorns ...	70	1,093
Moritz Bros., S.A.	Do.	124	1,092
F. Clayton, N.S.W.	Rhode Island Reds ...	89	1,091
R. Burns	Black Orpingtons ...	85	1,081
S. B. Tutin	White Leghorns ...	67	1,076
*J. W. Macrae	Black Orpingtons ...	98	1,075
W. Lindus, N.S.W.	White Leghorns ...	95	1,031
Harveston Poultry Farm	Do.	102	1,062
F. W. Leney	Do.	89	1,026
J. Gosley	Do.	74	1,025
*J. Anderson, Victoria	Red Sussex	96	1,020
L. K. Pettit, N.S.W.	White Leghorns ...	89	995
A. T. Coomber	Sicilian Buttercups ...	124	985
W. H. Forsyth, N.S.W.	Black Orpingtons ...	69	948
F. W Leney	Rhode Island Reds ...	67	896
E. F. Dennis	White Wyandottes ...	101	871
Totals	...	7,638	87,321

* Indicates that the pen is taking part in single hen test.

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
Miss M. Hinze	242	214	266	218	247	230	1,417
T. Fanning	252	248	250	242	215	209	1,417
J. Zahl	235	251	216	239	242	223	1,406
A. T. Coomber	240	250	237	212	212	236	1,387
J. M. Manson	201	263	217	218	251	218	1,368
E. A. Smith	245	243	216	244	191	183	1,322
A. E. Walters	224	254	215	199	230	192	1,314
W. H. Knowles, junr.	201	208	216	188	239	224	1,276
E. F. Dennis	200	222	184	249	216	199	1,270
J. H. Gill	192	217	215	246	193	206	1,269
Dixie Egg Plant	269	248	245	246	...	240	1,248
J. F. Dalrymple	191	211	225	174	243	196	1,240
Mrs. J. H. Jobling	192	254	188	201	187	202	1,224
C. Knoblauch	188	218	203	182	205	218	1,214
E. West	234	219	189	191	169	195	1,197
W. L. Forrest	232	229	54	180	234	216	1,145
Kelvin Poultry Farm	187	167	159	183	245	166	1,107
J. H. Madrers	144	211	216	203	165	161	1,100
J. W. Macrae	153	217	197	200	146	162	1,075
J. Anderson	192	166	213	102	196	151	1,020

General Notes.

THE RAW COTTON SUPPLY.

In December of last year, an important conference of the Council of the British Cotton-growing Association with representatives of the Lancashire cotton trade, to discuss the cotton situation, was held in Manchester. The proceedings were fully reported in "Cotton," the official journal of the Manchester Cotton Association, of 16th December. It was shown that the work of the association had passed the experimental stage, and it had proved that cotton of the requisite quality and in sufficient quantity can be grown in the Empire. The question now arose as to what further developments were to take place. The difficulties which the association now were involved in were the result of the success which had been attained; the 1916-17 cotton crop, produced under the auspices of the association, was expected to exceed 100,000 bales, worth £2,500,000, and there was every reason to anticipate increased quantities next year and the following years.

A few years ago the association decided to concentrate their efforts on the West Indies, the Sudan, Uganda, Nyasaland, and N.E. Rhodesia.

The association was started mainly to prove whether the cotton wanted by Great Britain could be grown in the Empire, and the council claimed that they had proved their case up to the hilt as far as both quality and quantity were concerned. It was now a question of time, capital, and management. The work of the association being practically completed, the question was, what was to be done in the future? The financial difficulty was already a very serious one. It was expected that at least 70,000 bales would have to be purchased and financed by the association, representing a value of £1,500,000, and the great difficulty in financing this cotton lay in the fact that so much of it had to be bought before any of it could be ginned, baled, and shipped; and consequently it could not be financed in the ordinary way. The association had arranged with their bankers for open overdrafts amounting to £500,000, but the banks were of the opinion that the association's liquid capital was not sufficient to justify them in asking for such assistance in future.

The association's capital was nearly £500,000, of which £170,000 had been spent in experimental work, and of the balance about £180,000 was locked up in plant, machinery, investments in cotton companies, &c., leaving only £150,000 liquid assets. The banks would, however, be quite prepared to find the association all the money required for financing cotton provided the Government would guarantee them against loss. Furthermore, the production of cotton had increased so rapidly in Nigeria that it was absolutely essential that another ginning factory should be sent out at once at a cost of about £25,000, and other ginning factories would also be required shortly. The association found that the best way of developing the industry was to pay the native producer a good price for his cotton, and also to buy all the cotton he offers.

The council realised that the association were at the end of their resources; it was impossible for them to undertake any new proposition of any sort whatever; it was not possible for them to develop cotton-growing further.

As a result of the increase in the home consumption of American cotton—which had increased from 5,500,000 bales in 1913-14, 6,000,000 bales in 1914-15, to 7,250,000 bales in 1915-16, and in 1916-17 it would show a further increase—we had American cotton at 1s. per lb., and Egyptian cotton at 2s. per lb.*

There are many people who think that the cotton situation to-day is more than dangerous, and is a most serious matter for the future welfare of the whole country. If Lancashire really realised this, and would back up the council, the association proposed to approach the Government and insist that this was a matter which must be taken in hand at once. Everyone recognised that the country was at war, and that the main proposition to-day was the winning of the war, but there was no reason why the possibilities of the future should not be taken into consideration now.

As regarded the future, there seemed to be three alternatives—

(*a*) That a Government Department should be formed to take over the work of the association;

(*b*) That the association should be reconstructed as a public trust, with Government assistance and under Government control;

(*c*) That the work might be left to ordinary commercial enterprise.

During the palmy days of cotton-growing in Queensland, the acreage under this crop rose from 2,884 in 1866 to 14,674 in 1870, declining to 9,663 in 1873; and 26,000,000 lb. of ginned cotton were exported, worth £1,300,000. To stimulate the industry, the Government gave a bonus of £5 (later reduced to £2 10s.) on every 500-lb. bale of cotton exported. This enabled the ginowners to pay 3d. per lb. to the farmers for their seed cotton. With a crop of only 1,000 lb. of seed cotton per acre, the latter received £12 10s. per acre. The cost of production and marketing, if hired labour was employed, was £3 6s. 4d., and if the crop was picked, as it usually was, by farmers with families, the cost of picking, £2 1s. 8d., was retained in the family. What was done then can be done now, notwithstanding the higher rate of wages paid to-day, as was evidenced last year by the amounts paid by the Department of Agriculture for cotton purchased from the growers. Next season's crop will also be purchased by the Department at 1¾d. per lb., and a *pro ratâ* division of the profits on sale after ginning, and deduction of actual expenses for ginning, bailing, carriage, freight, &c.

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* The total American cotton crop was set down by Messrs. Neill Bros., U.S.A., on 16th December, 1916, at 13,150,000 to 12,750,000 bales (and this included "linters"), but they made no change in their figures of the probable consumption of 14,750,000 bales.—Editor, "Q.A.J."

FEEDING PIGS.

With reference to a statement concerning a feeding trial with pigs at Rothamsted, taken from the "London Live Stock Journal," and republished in the February issue of this Journal, Mr. A. J. Simpson, Mount Russell, New South Wales, writes:—

"It is a very well-known fact that the quantity of food required per 100 lb. of gain increases rapidly with the weight of the pigs. Experiments, especially valuable by reason of the large number of animals reported on, go to prove this." Our correspondent supplies the following interesting figures, which are the results of experiments made in Wisconsin, United States of America:—

Average Weight.	Number of Pigs Fed.	Average Feed Eaten per Day.	Average Gain per Day.	Feed Eaten per 100 Lb. Gain.
Lb.		Lb.	Lb.	Lb.
38	174	2·23	·76	293
78	417	3·35	·83	400
128	495	4·79	1·10	437
174	300	5·91	1·24	482
226	223	6·57	1·36	498
271	105	7·40	1·46	511
320	36	7·50	1·40	535
378	36	5·52	1·98	431
429	18	8·18	1·71	479
471	18	10·00	1·77	562

"Feeding on meal," says Mr. Simpson, "I find that it requires about 310 lb. of meal per lb. of pork in pigs from 54 to 82 lb.; 375 lb. of meal per lb. of pork in pigs from 82 to 115 lb.; 438 lb. of meal per lb. of pork in pigs from 115 to 148 lb.; 455 lb. of meal per lb. of pork in pigs from 148 to 170 lb."

SOCIETIES.

Aloomba.—Aloomba Farmers' Association. George Hesp, Secretary.

Beenleigh.—Beenleigh A. and P. Society. R. Newham, Secretary.

Charters Towers.—Charters Towers P. A. and M. Association. Show dates: 10th and 11th July, 1917.

Dalby.—Dalby Pastoralist and Agricultural Association. J. A. J. Hunter, Secretary.

Ipswich.—Ipswich Horticultural Society. S. H. Macartney and W. S. Johnston, Joint Secretaries.

Mackay.—Pioneer River Farmers and Graziers' Show Association. Show dates: 22nd and 23rd May, 1917.

Nambour.—Maroochy P. A. H. and I. Society. J. J. Wilkinson, Secretary.

Nambour.—Maroochy P. H. A. and I. Society. Show dates: 4th and 5th July, 1917.

Rockhampton.—Rockhampton Agricultural Society. Show dates: 21st, 22nd, and 23rd June.

Woolooga.—Woolooga and District Farmers' Progress Association. J. Chamberlain, Secretary.

Woombye.—North Coast Agricultural and Horticultural Society. E. E. McNall, Secretary. Show dates: 6th and 7th June, 1917.

Wowan.—Wowan Farmers' and Settlers' Progress Association. , Secretary.

MR. J. F. BAILEY.

The Government Botanist, Mr. J. F. Bailey, who has for many years done excellent work as Director of the Brisbane Botanic Gardens, and later as Government Botanist, in succession to his late worthy father, has accepted an appointment as Curator of the Botanical Gardens in Adelaide. Mr. Bailey's grandfather was the creator of those beautiful gardens, and it goes without saying that the grandson will carry on the work with the same energy and scientific knowledge which he brought to bear on the beautiful Brisbane gardens. Whilst regretting Mr. Bailey's departure, we wish him every success in his new career.

FISTULA.

When a fistula on withers is forming, it is customary to apply a blister or hot fomentations. This on rare occasions appears to effect a cure, but in the majority of cases it hastens the swelling and brings it to a head. After it has broken, surgical treatment is required.

The next thing is to find out the direction and depth of the fistula. This is done by using a flexible probe, some 8 or 9 in. in length. Free drainage must now be given by opening along the full length of the probe; or, if thought advisable, an opening can be made at the lower part of probe, and a seton of tape or other material passed through and tied on the outside. A seton keeps the wound open and assists in draining the cavity, but the first method of opening up is generally found more satisfactory. Both sides of the withers should be opened if necessary, and any necrosed (dead) tissue removed. The top of withers should not be opened crossways—from side to side—because there is a ligament which runs along the middle line of the shoulders from the head, which if cut causes serious consequences.

The chief points to remember are: Free drainage, the removal of all dead tissue, and the prevention of pockets where pus can accumulate.

The following lotion should be used every third day on the fistula after it has been opened up, until four applications have been applied:—Corrosive sublimate, ½ oz.; methylated spirit, 1 pint. This is best applied by soaking some cotton-wool or other absorbent material with the lotion, then packing the saturated cotton-wool in the fistula. This treatment can be repeated if necessary after ten or fourteen days' interval. Knives, probes, &c., should be thoroughly disinfected before using by placing them in boiling water or some disinfectant such as carbolic acid, Condy's Fluid, &c. Knives and other steel instruments should not be allowed to come in contact with the corrosive sublimate solution.

"QUEENSLAND AGRICULTURAL JOURNAL," 1916.

Should any of our subscribers have any spare copies of the Journal for February, 1916, we would be obliged if they would forward them to this office, Department of Agriculture and Stock.

Answers to Correspondents.

MILCH GOATS.

J. H. TERSTEEG, Deeford—

1. The age to which a goat will live before ceasing to yield milk is about nine years.

2. There is no special breeding-place of milch goats in Queensland. The common goat is the best, Angoras being of little use for milk production.

3. The age of a goat may be ascertained in the same way as the age of the cow, the dentition being the same. At 5 years, full mouth with all incisors well up; at 2 years, 2 permanent incisors well up; at 3 years, 4 incisors; at 4 years, 6 incisors; at 5 years, 8 incisors well up. After that, broken mouth.

MEASUREMENT OF AN EXCAVATED TANK.

"TANK" Mount Perry—

Your tank is shown on your plan as being 150 ft. square at the surface, 50 ft. square at the bottom, the depth being 20 ft. Multiply the length on the surface by the breadth. Thus:

length on the surface by the breadth. Thus:	$150 \times 150 = 22{,}500$
Multiply the length by the breadth at the bottom	$50 \times 50 = 2{,}500$
The middle section will be 100×100. Add 4 times the area of the middle section—*i.e.*, $100 \times 100 \times 4$	40,000
	65,000

Now multiply by 20 (the depth) $65{,}000 \times 20 = 1{,}300{,}000$. Divide this by $6 = 216{,}666\frac{2}{3}$ cubic feet. Then divide by 27 and you have the cubic yards 8,025, the content of the tank, equal to $1{,}354{,}166\frac{2}{3}$ gallons.

KAPOK.

"KAPOK," N.C. Line—

You can obtain young plants of Kapok from Mr. C. F. Dennis, Hawthorne road, Bulimba. They can be planted out in the spring.

THE PRICE OF RENNET.

In our issue of February last we published an article on the cost of pepsin and rennet, which was supplied to us by the hon. secretary of the Queensland Committee of the Commonwealth Advisory Council of Science and Industry. The price of rennet is therein given as £4 15s. per gallon. Mr. H. W. Smith, manufacturing chemist, of Melbourne, has informed us that this is not correct, as he manufactures and sells Genuine Australian Extract of Calf Rennet at the wholesale price of £1 5s. per gallon. The retail price to cheesemakers would be about £1 10s. per gallon.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR FEBRUARY, 1917.

Article.		FEBRUARY. Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	4s. 3d.
Bran	ton	£5 15s.
Broom Millet	„	£18 to £23
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£2 10s. to £4
Chaff, Oaten	„	£4 10s. to £6
Chaff, Lucerne	„	£3 to £3 5s.
Chaff, Wheaten	„	£4 10s. to £4 15s.
Cheese	lb.	9d. to 9½d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£4 10s.
Hay, Lucerne	„	£2 to £2 10s.
Honey	lb.	3d.
Maize	bush.	2s. 6d. to 2s. 7½d.
Oats	„	3s. to 4s.
Onions	ton	£7 10s. to £9 10s.
Peanuts	lb.	3d. to 4½d.
Pollard	ton	£5 5s.
Potatoes	„	£4 to £6
Potatoes (Sweet)	cwt.	2s. to 2s. 6d.
Pumpkins (Cattle)	ton	£1 15s. to £2
Eggs	doz.	1s. 3d. to 1s. 10d.
Fowls	pair	2s. 6d. to 3s. 9d.
Ducks, English	„	3s. 9d. to 4s.
Ducks, Muscovy	„	5s. 6d. to 6s 6d
Geese	„	7s. to 8s. 6d.
Turkeys (Hens)	„	7s. 6d. to 9s. 6d.
Turkeys (Gobblers)	„	16s. to 20s.
Wheat	bush.	3s. 6d. to 3s. 9d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	...
Cabbages, per dozen	1s. to 6s. 6d.
Cauliflowers, per dozen	...
Celery, per bundle	...
Cucumbers, per dozen	3d. to 1s.
Beans, per sugar bag	1s. to 2s.
Peas, per sugar bag	4s. to 10s.
Carrots, per dozen bunches	4d. to 9d.
Chocos, per quarter-case	1s. 6d. to 2s.
Beetroot, per dozen bunches	8d. to 9d.
Marrows, per dozen	1s. to 3s.
Lettuce, per dozen	4d. to 6d.
Parsnips, per dozen bunches	9d. to 1s. 6d.
Sweet Potatoes, per sugar bag	2s. to 2s. 3d.
Table Pumpkins, per dozen	1s. 6d. to 2s. 6d.
Tomatoes, per quarter-case	1s. to 2s.
Vegetable Marrows, per dozen	1s. to 5s.
Turnips, per dozen bunches	...
Rhubarb, per dozen bundles	9d.

SOUTHERN FRUIT MARKETS.

Article.	FEBRUARY. Prices.
Bananas (Queensland), per case	5s. to 10s.
Bananas (Fiji), per case	17s. 6d. to 19s.
Bananas (G.M.), per case	19s. to 21s.
Custard Apples, per tray	...
Lemons (Local), per bushel-case	6s. to 10s.
Mandarins, per case	...
Mangoes, per bushel-case	6s. to 8s.
Oranges (Navel), per case	...
Oranges (other), per case	5s. to 7s.
Pears, per case	...
Papaw Apples, per half-bushel case	3s. to 7s.
Passion Fruit, per half-case	1s. 6d. to 4s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	3s. to 6s.
Pineapples (Ripleys), per double-case	3s. to 5s.
Pineapples (Common), per double-case	3s. to 5s.
Strawberries (Local), per dozen punnets*	16s. to 18s.
Tomatoes (Queensland), per half-bushel-case	2s. to 5s.

* 1 punnet = 1 quart.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	FEBRUARY. Prices.
Apples, Eating, per case	6s. to 8s. 6d.
Apples, Cooking, per case	3s. to 6s. 6d.
Bananas (Cavendish), per dozen	1d. to 2d.
Bananas (Sugar), per dozen	1d. to 2½d.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	...
Granadillas, per quarter-case	...
Grapes, per lb.	3d. to 4d.
Lemons(Lisbon), per quarter-case	2s. 6d. to 4s.
Limes, per quarter-case	3s. to 4s. 6d.
Mandarins, per quarter-case	6s. to 8s.
Mangoes, per case	2s. to 3s.
Nectarines, per case	2s. to 3s.
Oranges (Navel), per case	15s.
Oranges (other), per case	4s. 6d. to 5s.
Papaw Apples, per case	9d. to 1s.
Passion Fruit, per quarter-case	1s. 6d. to 4s.
Peaches, per quarter-case	1s. 6d. to 4s.
Pears, per quarter-case	2s. to 3s. 6d.
Peanuts, per lb.	3d. to 4½d.
Persimmons, per quarter-case	1s. 6d. to 2s.
Plums (light), per quarter-case	1s. to 1s. 6d.
Plums (prime eating), per case	3s. to 4s. 6d.
Pineapples (Ripleys), per dozen	1s. to 2s.
Pineapples (Rough), per dozen	4d. to 1s. 6d.
Pineapples (Smooth), per dozen	1s. 6d. to 2s.
Quinces, per quarter-case	2s. 6d.
Rockmelons, per dozen	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	1s. to 2s.
Watermelons, per dozen	2s. 6d. to 7s.

TOP PRICES, ENOGGERA YARDS, JANUARY, 1917.

Animal.	JANUARY. Prices.
Bullocks	£17 10s. to £22 10s.
Bullocks (Single)	£24 10s.
Cows	£12 2s. 6d. to £16
Merino Wethers	34s.
Crossbred Wethers	36s. 9d.
Merino Ewes	27s. 9d.
Crossbred Ewes	32s. 6d.
Lambs	30s. 3d.
Pigs (Porkers)	60s.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

1917.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·46	5·21	6·41	5·41	6·19	5·58	5·46
2	4·58	6·46	5·22	6·41	5·41	6·18	5·59	5·45
3	4 59	6·46	5·23	6·40	5·42	6·17	5·59	5·44
4	4·59	6·46	5·24	6·40	5·43	6·16	6·0	5·43
5	5·0	6·46	5·25	6·39	5·44	6·15	6·0	5·42
6	5·1	6·47	5·25	6·39	5·45	6·14	6·1	5·41
7	5·2	6·47	5·26	6·38	5·45	6·13	6·1	5·39
8	5·3	6·47	5·27	6·37	5·46	6·12	6 2	5·38
9	5 3	6·47	5·28	6·36	5·46	6 11	6·2	5·37
10	5·4	6·48	5·29	6·35	5·47	6·10	6·3	5·36
11	5·5	6·48	5·29	6·35	5·47	6·9	6·3	5·35
12	5·6	6·47	5·30	6·34	5·48	6·8	6·4	5·34
13	5·6	6·47	5·31	6·33	5·48	6·7	6·4	5·33
14	5·7	6·47	5·32	6·32	5·49	6·6	6·5	5·32
15	5·8	6·47	5·32	6 32	5·49	6·5	6·5	5·31
16	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·30
17	5·9	6·47	5·34	6·30	5·50	6·2	6·6	5·29
18	5·10	6·47	5·35	6·29	5·51	6·1	6·7	5·28
19	5·11	6·47	5·35	6·28	5·51	6·0	6·7	5·27
20	5·12	6·46	5·36	6·28	5·52	5·59	6·8	5·26
21	5·13	6·46	5·37	6·27	5·52	5·58	6·8	5·25
22	5·13	6·46	5·37	6·26	5·53	5·57	6·8	5·24
23	5·14	6·45	5·38	6·25	5·53	5·56	6·9	5·23
24	5·15	6·45	5·38	6·24	5·54	5·55	6·9	5·23
25	5·16	6·45	5·39	6·23	5·54	5·54	6·10	5·22
26	5·16	6·44	5·39	6·22	5·55	5·52	6·10	5·21
27	5·17	6·44	5·40	6·21	5·55	5·51	6·11	5·20
28	5·18	6·43	5·40	6·20	5·56	5·50	6·11	5·19
29	5·19	6·43	...	...	5·57	5·49	6·12	5·18
30	5·19	6·42	...	...	5·57	5·48	6·12	5·18
31	5·20	6·42	...	..	5·58	5·47	...	...

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

			H. M.
8 Jan.,	○	Full Moon	5 42 p.m.
16 ,,	☽	Last Quarter	9 42 ,,
23 ,,	●	New Moon	5 40 ,,
30 ,,	☾	First Quarter	11 1 a.m.

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

7 Feb.,	○	Full Moon	1 28 p.m.
15 ,,	☽	Last Quarter	11 53 a.m.
22 ,,	●	New Moon	4 9 ,,

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

1 Mar.	☾	First Quarter	2 43 a.m.
9 ,,	○	Full Moon	7 58 ,,
16 ,,	☽	Last Quarter	10 33 p.m.
23 ,,	●	New Moon	2 5 ,,
30 ,,	☾	First Quarter	8 36 ,,

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m.

7 Apr.	○	Full Moon	11 49 p.m.
15 ,,	☽	Last Quarter	6 12 a.m.
22 ,,	●	New Moon	12 1 ,,
29 ,,	☾	First Quarter	3 22 p.m.

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of Years' Records.	Jan., 1917.	Jan., 1916.
	In.		In.	In.
North Coast.				
Atherton	13·63	15	3·75	7·64
Cairns	17·17	34	5·57	32·01
Cardwell	17·24	44	10·01	19·90
Cooktown	15·32	40	7·23	16·33
Herberton	10·02	29	6·78	5·50
Ingham	16·84	24	11·02	21·08
Innisfail	21·83	35	10·31	22·33
Mossman	16·75	4	6·21	21·66
Townsville	11·52	45	20·97	9·89
Central Coast.				
Ayr	11·70	29	21·80	5·66
Bowen	9·59	45	12·76	7·76
Charters Towers ..	5·53	34	14·72	1·85
Mackay	14·02	45	10·26	9·25
Proserpine	16·37	13	19·95	8·71
St. Lawrence ...	9·38	45	4·28	0·41
South Coast.				
Biggenden	5·51	17	*	0·76
Bundaberg	9·45	33	9·05	1·30
Brisbane	6·49	66	9·07	2·34
Childers	8·37	21	5·28	1·39
Crohamhurst ...	13·28	23	10·32	3·71
Esk	5·60	29	7·01	1·54
Gayndah	4·84	45	6·77	0·60
Gympie	6·75	46	4·48	4·02
Glasshouse M'tains	9·43	8	7·56	3·48
Kilkivan	5·76	37	4·27	1·68
Maryborough ...	7·46	45	5·90	1·82
South Coast—continued:	In.		In.	In.
Nambour	9·44	20	5·43	4·03
Nanango	4·52	34	7·98	2·36
Rockhampton ...	9·05	29	5·27	0·39
Woodford	7·13	29	9·90	4·42
Darling Downs.				
Dalby	3·28	46	3·64	3·59
Emu Vale	3·25	20	5·09	2·25
Jimbour	3·88	28	4·01	2·20
Miles	3·99	31	3·72	3·52
Stanthorpe ...	3·70	43	3·20	3·39
Toowoomba ...	5·12	44	4·76	1·70
Warwick	3·73	29	3·90	2·77
Maranoa.				
Roma	3·44	32	3·01	1·67
State Farms, &c.				
Bungeworgorai ...	1·08	4	2·58	0·55
Gatton College ...	4·43	17	4·81	2·04
Gindie	3·28	17	4·50	2·37
Hermitage ...	2·76	10	4·50	2·99
Kairi	7·29	4	4·06	10·08
Kamerunga ...	18·41	26	3·60	32·15
Sugar Experiment Station, Mackay	14·82	19	11·80	7·56
Warren	2·08	4	5·33	0·16

* Incomplete

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for January this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

Farm and Garden Notes for April.

Field.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will be ready for a first or second hilling up. The last of the maize will have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slacked off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out paspalum roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Intsead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light, sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

Kitchen Garden.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

FLOWER GARDEN.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, pentstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

Orchard Notes for April.

THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.

2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.

3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.

4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.

5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and, when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

Queensland Agricultural College.

FOR SALE.

Grass Roots, Rhodes and Paspalum, are obtainable at 2s. 6d. per sack, f.o.b. Gatton.

There are no farm seeds for disposal at the College.

POULTRY.

The following breeds are available:—Brown Leghorn, White Leghorn, Indian Game, Black Orpington, Silver-Laced Wyandotte, Rhode Island Reds. In last-named breed, no birds will be available this year, and only a limited number of eggs at 21s. per setting f.o.b.

Prices:

Cockerels—10s., 15s., and 21s.	f.o.b. Gatton.
Pairs—Cockerel and Pullet, 30s. and 42s.	
Trios—Cockerel and two Pullets, 42s. and 63s.	

Prices vary according to quality. Unless crates are returned promptly, an extra charge of 2s. for a single bird and 1s. for each additional bird will be incurred.

Settings of eggs of the above breeds are available from 1st July up to 30th November Price, 10s. per setting, f.o.b. Gatton. Nine eggs in each setting guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle twenty-four hours before being placed under the hen.)

IMPORTED JERSEY BULL—Star Turn, 718 Q.J.H.B. Calved 5th August, 1913. Sire, Self Acting (4674). Dam, Solid Star (15934). Bred by Elias Cabot, St. Clements, Jersey Island.

IMPORTED AYRSHIRE BULL—Netherton King George (8181). Calved 9th December, 1909. Sire, Netherton King Arthur (7431). Dam, Midlands Young Greenfield (22621). Bred by Thomas Clements, Netherton, Newton Mearns, Scotland.

IMPORTED HOLSTEIN BULL—Froxfield Dairyman (12611). Calved 26th March, 1912. Sire, Froxfield Duke Bob (155). Dam, Froxfield Doris (1150). Bred by J. F. N. Baxendale.

Ayrshire Bulls.

No. 165. Sire, Stewart of Wanora. Dam, Lucinda. Date calved, 14th October, 1915. Price, £15 15s.

No. 177. Sire, Stewart of Wanora. Dam, Constancy. Date calved, 24th November, 1915. Price, £10.

Jersey Bulls.

All cattle sold accompanied by pedigree.

Pigs.

"Gatton Dandy Dick," by imported stock, Reg. B.H.B. of A., 18 months old. Price, £8 8s.

Orders will be received for Yorkshire boars and sows, from 2 to 3 months old, at £2 10s. each.

All prices—F.O.B. Gatton.

FOR SERVICE.

CLYDESDALE STALLION—**Lord Cellus** (imp.).
Service fee, £3 3s. per mare and 1s. 6d. per week agistment.

AYRSHIRE BULLS—**Netherton King George** (imp.).
Stewart of Wanora.

JERSEY BULLS—**Star Turn** (imp.).
Service fee, 10s. per cow; agistment, 1s. per week.

CUTHBERT POTTS, Principal.

Queensland Agricultural Journal

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Agriculture.

AGRICULTURAL EDUCATION FOR WOMEN.

For a long series of years the emancipation of women from their centuries of long exclusion from any but household duties has been advocated by far-seeing leaders of the movement in all countries of the world. In many European countries the peasant farmer's wife and daughters were obliged to assist in various ways in the field, in the stall, and in carrying the produce to market, in addition to attending to household affairs.

It has remained for the present European war to bring women's work more in line with that of men in many ways which would never have been dreamt of four years ago. No longer do parents think it degrading to let their daughters attend to the orchard, the dairy, poultry yard, or apiary. It has been found that women are capable also of very strenuous work in foundries, munition factories, as well as on the farm and market garden. They have largely taken the places of men who have joined the army in such capacities as railway porters, tram and omnibus conductors, letter-carriers, and are engaged in a host of employments which previously were considered to be only fit for strong men and lads. Nor is this now universal employment differentiated by rank and position in life. Ladies of high social standing are now working like their sisters in less fortunate circumstances in factories, laundries, warehouses; in the field; on the roads; in all sorts of employment—all working long hours, in many cases as much as twelve hours a day, and that often for seven days in the week. Thus has been, once for all, exploded the theory that women are not fitted for any but household employment.

Here is an example of what the women of England are doing at this time of writing:—"The Devon Women's Agricultural War Committee organised a ploughing and agricultural demonstration for women at Ketterton, Exeter, England, which was attended by a large concourse. There were nearly 100 competitors for prizes in ploughing, rolling, harrowing, milking, sheep-shearing, harnessing, &c. The champion ploughing prize was won by a girl only fifteen years of age. The sheep-shearing was pronounced by the judges to be remarkably well done, many farm men being unable to do as well."

In the year 1900 the Russian Imperial Society for the Development of Agricultural Education took the matter in hand at the National Congress held at Moscow. From all parts of the Empire there was a cry for ladies with an agricultural education. The head of the movement was Professor Stebut, and he met with enthusiastic support amongst Russian women. In many places private ladies established schools of rural and domestic economy for ladies. The peasant girls are being taught vegetable and fruit growing, rural economy, and agriculture. The more highly educated women undergo a three years' curriculum:—First year: Cattle-rearing, dairying, butter-making, and cheesemaking. swine rearing and feeding, poultry-farming, gardening, vegetable and fruit growing, horticulture, washing and ironing, spinning and weaving, sheep rearing and feeding, cutting up killed meat, the preparation of simple and of more complicated food; candle, soap, and starch making; jams, jellies, and preserved fruits, &c.; beekeeping; reading, writing, bookkeeping, and two languages. Second year: Mother tongue, letter-writing, bookkeeping, elements of hygiene, first aid in case of accidents, nursing the sick and wounded, elements of veterinary medicine, linen washing and ironing, salting and smoking of meat, &c., &c.

Ladies efficient in the above subjects complete their technical education by getting lessons in growing ornamental trees and in landscape gardening, botany, zoology, chemistry, mineralogy, and drawing. All those theoretical subjects are accompanied by practical work and demonstrations.

At the expiration of three years the pupils are severely examined, and if found efficient they receive a diploma to that effect. The fees are £20 per annum, which includes board, residence, and tuition.

Since the date mentioned the agricultural education of women has made great strides. It needs only a glance at the illustrated British journals to show how women of all classes have thrown themselves heart and soul into industrial work; and it is largely due to the self-denying work of these noble women that both British and their Allies have received the vast quantities of shells, machine guns, &c., which have enabled them to continually press forward towards the great objective—the destruction of German militarism and the freedom of Belgium, Northern France, and Alsace-Lorraine from the brutal rule of the Hun.

The women of Australia are also doing their utmost towards the same end, and all classes have vied with their sisters overseas in providing every possible thing for the alleviation of the labours and sufferings of those heroic Australian soldiers who are so gallantly fighting for not only Britain and her Allies, but for the salvation of Australia; for, if Germany should win in this war, then would Australia be practically enslaved, and the German would crush the hated Australian British with an iron hand.

ONION-GROWING.

The next two months are the most favourable for getting the seed in, so as to harvest the crop about the end of the year. To be successful with this crop it is necessary that the land proposed to be planted out, as well as the seed-bed, be turned up and exposed to the weather some months ahead of planting. If this is done, and frequent stirring made, most of the weed seeds will be induced to germinate, when complete destruction will be easy. The common practice of ploughing and putting the land in order just previous to planting cannot be too strongly condemned in onion culture, as weeds will cause endless trouble and expense. Getting the land into good order includes well rolling it, for an indispensable cultural condition for onions is to get the soil well firmed underneath without "panning" it. This condition is often lost sight of. If the soil is carefully worked, reduced to a fine tilth, and the plants are set out in a soil which has been loosened to a depth of, perhaps, 8 in., no good results can be expected without rolling. The onion requires a firm bed; otherwise the plant, instead of making a large, well-shaped bulb, will run to "neck," and have more the appearance of a leek than an onion.

The most suitable soil is a rich sandy loam, free, friable, and easy to work—a soil that will not cake, and not lying so low as to retain the superabundant moisture after heavy rains. In the latter case, the land should be well drained. An eastern or south-eastern aspect has been proved to be better than if the land sloped to the west, as the onion does not require intense heat to bring it to perfection.

The best way to sow onions is to drill them in, although for small areas the seed may be sown in a seed bed and the young seedlings planted out. The drills should be from 8 in. to 15 in. apart, which will require from 2 lb. to 10 lb. of seed per acre. The seed should be dropped at a distance of 2 in. to 3 in. apart in the drills, and the plants will afterwards be required to be thinned out with the hoe to 6 in. apart in rich land. The drills should be slightly raised, and the *roots* of the plants be firmly embedded in them. The *bulb* is not the *root*, and it should be allowed, so to speak, to squat *on* the surface, not *under* it.

When sowing the seed, it need only be put just under the ground, as it requires but a very slight covering of soil. If sown deep, many seeds fail to germinate, and most of those that do appear will make an abnormal growth of neck, causing much labour in drawing away the soil from the incipient bulbs. There are few seeds so annoyingly deceptive as onion seeds, as old seed loses its germinating power, and imported seed, unless carefully packed in airtight bottles or soldered tins, will scarcely germinate at all. Therefore, it is well to make sure of getting new seed. After sowing, germination should take place in about a week, and the onion comes to maturity in from 120 to 180 days (spring onions in from 60 to 90 days). As the plant grows, the soil must be kept perfectly clear of weeds; and where the working of the ground has thrown the soil against the bulbs, it must be drawn down so that only the roots are in the ground. Where this has not been attended to, the remedy for the resulting want of bulb-formation is to wring the necks of the plants, or, at least, to bend them down with a twist. This will have the effect of inducing the formation of bulbs. Onions may be known to be ripe by the drying up of the tops. As soon as this happens pulling should be done quickly, because, if wet should come on, the bulbs may start a fresh root action. This, besides making them harder to pull, will seriously impair their quality. After they are pulled, the onions are left in narrow "windrows" to get well dried and ripened, and may then be removed to a dry barn, subject to a free current of air. Should they show any sign of heating, they must be at once turned over, and the bad ones picked out. The best varieties for our Queensland climate are Mammoth Silver King, Brown Spanish, Brown Globe, Yellow Globe, and Silver Skin. For spring onions sow White Tripoli in drills about 9 or 10 in. apart. Beyond a little hoeing in summer, they require no attention.

Sometimes the crop suffers from the ravages of a green grub which is numerous in some soils, especially in badly tilled ground. These come forth at night, and cut the young plants off level with the surface. One of the best preventives is to use the hoe frequently, by which means the green grubs, wire worms, &c., are brought to the surface in view of birds, which soon destroy them.

Thrips are a small, pale-green, elongated insect, belonging to the family of fringe-winged flies, which bite the plants, leaving small white specks on the foliage. On tearing the foliage open, minute green elongated insects are found. These are thrips. The onion being a very delicate plant, the sprays used on fruit trees cannot be employed. Roughly cured tobacco leaves made into a decoction of 1 lb. of tobacco in 2 gallons diluted to 4 gallons for use, with a little soap or molasses added to make it adhere to the plants, may be safely used for the destruction of thrips. It would pay all farmers and market gardeners to grow a patch of tobacco for use as an insecticide.

STORING ONIONS.

In the event of a slow, over-stocked market, onions may have to be held over for a rise. The chief difficulty in this case is their liability to sprout; and it is well known that whenever onions are stored in a damp building they are almost certain to sprout, even if the temperature is nearly down to freezing-point. This has to be avoided, because, whenever growth is set up in any bulb or seed, that bulb or seed deteriorates in proportion to the extent of growth. Onions, when pulled, should not be stored away at once, but should be left on the ground for a few hours to dry. Then they should be put away dry, in the coolest shed or barn available. They require constant looking over to sort out any bad ones, for, as in the case of fruit such as oranges, apples, pears, &c., a single rotting onion will infect all those in its immediate neighbourhood. In an article in a French journal mention is made of an experiment which deserves the attention of farmers and market gardeners. Experiments with onions were made on ten plots manured with chemical fertilisers, and the resulting crops were put away in bags and carefully numbered, with a view to planting them out in the following spring to obtain seed from them. When the time for planting had arrived it was found that, under identical conditions of temperature and light, certain lots had sprouted and were exhausted by young, premature shoots, whilst the other lots still remained hard and solid without a trace of a shoot. The collection having been carefully ticketed, it was easy to prove that the produce from plots deprived of sulphate of potash were exhausted by a too hurried vegetation, whilst that which had received the potash manure was perfectly preserved. One hundredweight of sulphate of potash per acre will have the effect above described. Meanwhile, until after the war, potash is unobtainable.

A good manure for onions is a light dressing of dung, supplemented by 4 to 6 cwt. of superphosphate, 1 cwt. of sulphate of potash (or 4 cwt. of kainit), and 4 cwt. of nitrate of soda. Potash is of vital importance

GROWING FOR SEED.

Inferior seed is the source of frequent losses in onion culture; and many gardeners and onion specialists in Europe and America raise their own seed. The best bulbs are selected at harvest time. A short neck is considered an advantage. Uniformity in all the essential characteristics is exceedingly important in choosing bulbs for seed purposes. Seed bulbs should be carefully stored as above described, and should be planted in the autumn. The ground should be only moderately fertile, especially in nitrogen. Furrows are made 4 or 5 in. deep, and 14 to 30 in. apart, depending upon the method of cultivation. After placing the bulbs about 6 in. apart in the bottom of the furrow, they are covered with a hoe or small plough. The long slender seed stalks should have some support, which may be provided in two ways:—(1) By ridging with soil to the height of 7 or 8 in., which is the usual plan; and (2) by driving stakes at the end of the rows and at frequent intervals, and then stretching strong twine on either side. When mature, or ripe, the heads turn yellow. At this stage they should be removed promptly, with 6 to 8 in. of the stalk, before any seed is lost. As the tops do not ripen at the same time, it is necessary to make several cuttings to prevent loss. A basket with a cloth lining should be used in collecting the seed. The tops are spread in an airy room with a tight floor until dry enough to separate with a flail or by other means. Winnowing will remove most of the chaff. The seeds may then be placed, a few pounds at a time, in a vessel of water. The heavy seeds which sink are saved, while the light ones and the remaining chaff are poured off. After thorough drying and curing, the seeds may be stored in any dry room.

THE PECULIARITIES OF COTTON VARIETIES.

BY A. M. SOULE, Georgia State College of Agriculture.

The farmer who cultivates cotton is probably interested in two things—first of all, the quantity and quality of the lint he can obtain; and, second, the character and value of the seed produced. Of course, the lint brings in the larger revenue, and naturally his attention would centre in this item first of all; though, strange to say, probably nothing like as much consideration is given to this important subject as it deserves. The chances are that very few farmers have studied varieties of cotton and are acquainted in any sense with the wide variation in the essential characteristics which are shown, even where a test of these varieties be made on soil of uniform type and quality, and fertilised and cultivated in the same manner. Relatively speaking, much less attention has been given to a study of cotton seed than to lint; yet some very remarkable differences in the character and yield of seed obtained from different varieties of cotton have been recorded; and in fact they mean so much in a financial way to the farmer that some suggestions along this line may not be out of place.

In a variety test made on the College Farm in Athens, Georgia, in 1912, the following data were secured:—One variety from the first picking yielded 1,445 lb. of seed cotton; from the second picking, 680 lb., and from the third picking, 21 lb. This was a total yield of 2,146 lb. of seed cotton per acre, or 901 lb. of lint per acre. It took 4,000 seeds to make 1 lb. The length of the staple was 15/16 of an inch; the per cent. of lint, 40; and the per cent. of disease, 2. Growing alongside this cotton was another strain, which yielded 701 lb. of seed cotton from the first picking, 212 lb. from the second picking, and 21 lb. from the third picking. The total yield of seed cotton per acre was 934 lb. The yield of lint was 280 lb. The lint, however, was 17/16 in. in length. The per cent. of lint fell to 36, and the per cent. of diseases ran up to 20. Notice the astonishing contrast between these two varieties of cotton, and if you are farming go out into the field and make a few observations for yourself, and see which one of these strains the variety you are growing most nearly corresponds with.

In this instance observe that there was more than three times as much lint produced by the first variety as by the second. A part of the difference between these strains was no doubt due to the high per cent. of disease. The yield of seed from the two strains also showed a marked difference. Undoubtedly the seed from the first variety was more desirable for planting and for milling than from the second variety. The reason is obvious: there was a smaller percentage of disease. In the case of the first strain, practically all of the cotton was got out with the second picking, thus insuring its perfect maturity before frost. These are advantages of great concern to the farmer, for his seed are worth more for manufacturing purposes than that derived from an inferior strain of cotton, and they will also germinate better; and his chances of securing a stand the next year are greatly enhanced thereby.

Observations made on the college farm show that the number of bolls required to make 1 lb. of seed cotton varied from 54 up to 105; that the number of seeds to the lb. varied from 2,688 to 6,100. There was also a marked variation in the length of the lint and in the per cent. of disease. The seed must be in perfect condition in order to produce a fine quality and quantity of lint. Therefore, their study and consideration become matters of the utmost importance. Those strains which will enable the farmer to produce the largest quantity of medium to large-sized, sound, wholesome seed, high in oil and protein, should be selected for planting. Study along this line will enable much information to be gained and much progress to be made. In view of the large interests involved, it is time that attention was directed to this matter. Every farmer should go into his field and study his crop carefully and compare it with his friends' and neighbours', and so be in position to select seed from the most vigorous and productive types and which produce seed and lint of a desirable quality. As he selects and improves his strain of seed, they will command a higher and higher price for manufacturing purposes, and he will gain the monetary advantage which is certain to accrue to him from producing a better quality of lint and seed.

The farmer should also select his seed with the idea of early maturity —that is, getting the largest amount of lint and seed from the first picking. In this respect a wonderful variation is shown in varieties. As already noted, only 21 lb. of seed cotton was obtained from the third picking of the two strains mentioned above. On the other hand, varieties grown alongside these strains yielded from 170 to 382 lb. from the third picking. Naturally, there was a corresponding low yield from the first picking. In fact, several of the varieties produced from the first picking from 1,020 to 1,445 lb. A failure to emphasise earliness results in the production of a large quantity of undesirable lint and imperfect seed. Both of them are of much less value than they would be in varieties where early maturity has been emphasised.

These facts would indicate that a number of the most desirable qualities in the production of seed of a superior value for milling purposes, and of a lint which will command a premium on the market, can be successfully correlated in varieties of cotton through the exercise of patience and skill in seed selection. This work is entirely practicable for the average farmer, and will result in a variety of benefits. The issues involved are of very great importance and cannot be over-emphasised in view of the approach of the boll weevil* and the relatively high cost of labour and fertilisers now entailed in the production of cotton. To meet the new conditions of production which circumstances have placed upon the farmer, he must increase his yield of lint and improve the quality of his seed. The suggestions made will be helpful in this direction.—"Press Bulletin."

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* This refers to the American boll weevil. Fortunately this pest has never appeared in Queensland.—[ED. "Q.A.J."]

The Orchard.

A WINTER MELON.

THE CASSABA.

There is a class of musk melons grown in the United States of America known as Winter Musk Melons (*Cucumis melo,* var. *inodorous*), which, if picked before frost and stored in a cool place, ripen up very slowly, often keeping until after Christmas time. These melons are of a sweet melon flavour, and are valuable for their long-keeping qualities. Amongst the best are: Winter Climbing, Nutmeg, White Antibes, Pineapple, and Golden Beauty, of which latter we give two illustrations.

When Mr. W. H. Mobsby was at the Panama Exposition in San Francisco, he obtained some seeds of the winter melon known locally as "Cassaba," and since his return he has succeeded in raising some plants which have lately fruited. From his description of the Cassaba it appears that in the United States the fruit ripens in July, and continues bearing and ripening all the summer and autumn until the frosts come. The fruit can be stored in a cool place, and it will ripen slowly, so that they can be marketed from time to time until late in January (in the U.S.A.). The fruit is of a bright yellow colour, nearly globular in shape, with a wrinkled skin, and is slightly pointed at the stem end. In size the fruits vary from 6 to 8 in. in diameter. The flesh is pure white and very thick, as shown in the illustration. Such a class of fruit would travel well, and could be placed in a perfectly sound condition in the markets of the Southern and Western States of the Commonwealth. The seed should be sown in Queensland after all danger to the young plants from late frosts is past—say, at the end of August or in September.

Whilst in San Francisco, Mr. Mobsby had a full opportunity of observing the many fruits grown in California, and how the American "boost" their vine production. Each of the principal fruits has a special day when in season, such as Orange Day, Prune Day, Melon Day, &c., and to such an extent do they patronise such productions that instructions are given as to how to place the fruits on the show tables, and such fruits are well advertised by the Californian Fruit Growers' Exchange, who act as the medium between the growers and the buyers. No other middleman is allowed in this important work; consequently the grower gets a fair price for his fruit, which is graded and distributed in the market, so that the consumer in turn gets full value for his money. Amongst other fruits the cassaba is a great favourite, and Mr. Mobsby considered it would be an ideal fruit for Queensland owing to its type and keeping qualities.

Plate A shows the fruit cut, and B a fruit raised at Indooroopilly by its introducer.

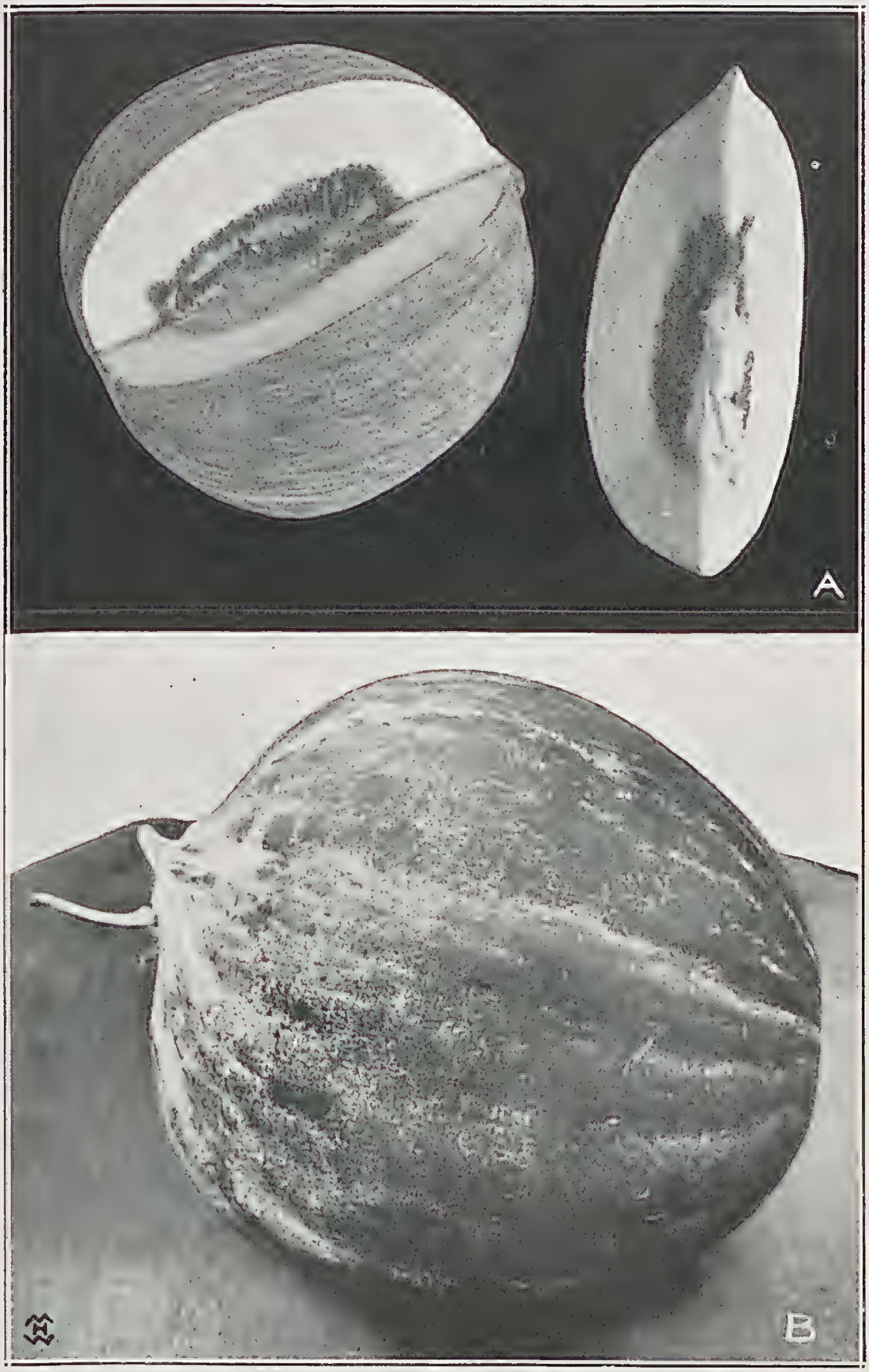

Plate 10.—The Cassaba: A Winter Melon.

TO TRAP ORANGE MOTHS AND FRUIT FLIES.

"Fruit World's" Queensland correspondent gives the following advice to citrus-growers, who will doubtless have trouble with these pests during the coming few months:—

"The fruit of the new crop of citrus trees will be showing signs of ripening towards the end of the month. As the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

"Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and, as they always select the first fruit that shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on the barn floor and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths but also the fruit flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit flies may also be caught in large numbers by means of such artificially ripening fruits. The fruits are smeared with tanglefoot and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit flies."

DEPUCKERISING THE PERSIMMON.

The "Monthly Bulletin" of the California State Commission of Horticulture for January, 1917, describes a method of removing the astringent properties of the persimmon as practised in Japan, and mentioned in an article in the Bulletin on ripening the persimmon by Mr. Sumito Fujii. Mr. O. E. Bremner, Horticultural Commissioner, Sonoma County, says:—

"The Japanese have a method, the origin of which, as with all other such processes that have been handed down from generation to generation, is probably unknown. They take a soy tub which has just been emptied of the soy and fill it with persimmons, covering the top tightly. After a few weeks the persimmons are removed perfectly ripe and without the astringent property. Mr. Roeding tried this process, but says it is not practical on account of the difficulty in securing fresh soy tubs.

"The soy tub and the soy are not essentials to the process, although the Japanese believe they are. A simple manner and one perfectly effective is to place the persimmons in layers of chaff or fine straw or hay in the boxes so as to exclude the light. The fruit will ripen in from two to six weeks, depending on its condition when picked. They may be gathered even before they have begun to take on the yellow colour and yet ripen so perfectly that they may be eaten like apples without even removing the skin. This is not strictly true of some of the seedlings, but does refer to the varieties mentioned in Mr. Fujii's article.

"It is not essential to the ripening of persimmons that they remain on the tree until slightly frosted. The longer they remain on the tree the higher the colour and the quicker they ripen. We usually put away about five lug boxes, each containing two or three layers of persimmons, according to the size of the fruit. When cured this way, persimmons make an elegant appetizer served either with cream or without."

GIRDLING OR CINCTURING FRUIT TREES.

There would appear to be some doubt in the minds of our fruit-growers as to the efficacy of girdling citrus and other fruit trees, as described in occasional articles which have appeared in this Journal, for the purpose of inducing the setting of the fruit. Some growers have reported that the method proved successful; others that no appreciable difference was observable in the crops produced by girdled and ungirdled trees in the same orchard. It would be very instructive if growers who have tried the system would give us their opinion on the subject for the benefit of other orchardists. In this way very valuable testimony *pro* and *con* could be placed before our readers.

REGISTRATION OF ORCHARDS.

Under the "Diseases in Plants Act," every orchard must be registered by the owners or occupiers thereof on or before the 31st day of March in every year. The form of application is to be filled in and forwarded to the Under Secretary, Department of Agriculture and Stock, Brisbane, on or before the date mentioned in each year.

An orchard is defined as "Any place within a fruit district where one or more fruit-producing plants are grown."

Forms of Registration of Orchards may be obtained from Clerks of Petty Sessions, or at the Head Office, Department of Agriculture and Stock, Brisbane.

Under "The Diseases in Plants Act of 1916" it is notified that "failure to comply with this section of the Act renders the occupier or owner liable to a penalty of not less than one pound nor more than five pounds for a first offence, and not less than two pounds nor more than ten pounds for any subsequent offence."

No fee is charged for registration.

Horticulture.

HOW TO KEEP POT PLANTS ALIVE WHEN ABSENT FROM HOME.

"South African Gardening and Home Life" is a very interesting and useful paper devoted to the interests of gardeners, amateur and professional. It is published monthly at Johannesburg, Transvaal; and each month three prizes (seeds or garden sundries to the value of £1 1s., 10s., and 5s.) are awarded to the reader who sends in the best dodge to save time and labour in any gardening operation. The following "dodge" was published in the February issue of the above journal, and deservedly obtained first prize. Many people in this State leave their homes for a week or two at holiday time, and there being no one to look after the garden or pot plants, the latter are liable to succumb to the want of water. The remedy is simple; but how many have discovered it?

"Take a large tub or pan and as many common bricks as there are plants. Place the bricks in the tub and just cover them with water; then

stand the plants on them. Being porous, the bricks will absorb the water, and the plants will draw up all the moisture they require and keep in good condition for some time.

"Trusting this hint will be of use to those of our readers who will be holiday-making this summer-time."

Viticulture.

RAISIN DRYING AND CURING—No. 2.

Taking Up.—When the raisins are sufficiently dried, they must be taken up as quickly as possible. This process, again, consists of three different labours—the stacking, assorting, and boxing. It is of great importance to know exactly when the raisins have sufficiently dried to be ready for the sweatboxes. This can properly be ascertained only by experience; still, a few directions will materially help. A perfect raisin should be neither too hard nor too soft. The raisin is too soft when, after rolling it between the fingers, the least particle of juice exudes through the cracked skin or meat. Such raisins will "sugar" in course of time, and will not keep a year. If the raisins or the majority of them on a bunch are too wet, they should be spread to the sun for some time longer. If, however, there are only a few underdried raisins in a bunch, the bunch may be taken in, and the soft raisins clipped off afterwards. A raisin is too dry when, in pressing and rolling it between two fingers, the pulp does not move readily inside the skin. Such overdried raisins will not again become first-class raisins; their skin will always be tough, and their colour will be somewhat inferior. If but slightly overdried they may be brought out by equalising. To know when the raisins are in a proper condition to take up is most important to every raisin man, and he should never neglect to watch his trays early and late. Upon his good judgment and watchfulness depends the quality of his crop.

To prevent too rapid drying out after the raisins are nearly ready, the practice now is to stack the trays in the field. This stacking simply consists in placing the trays which contain the ready raisins on top of each other in piles 5 ft. high. On the top of each pile are placed several loose trays crosswise, so as to shelter the pile from the sun, and possibly even from rain, and other trays are raised up against the sides of the pile in order to exclude as much air as possible. If, however, the raisins are rather underdried, the side trays may be left out so as to allow the raisins to dry more. It is always best to stack the trays before the raisins are fully dried, as they will finish drying and curing in the stack much better than in the sun. After the stacking is done, the assorting is in order. This consists in taking out every bunch that is not sufficiently dried to go into the sweatbox, and placing them on new trays to dry more. At this time also the bad or inferior and red berries may be taken out if present in a large quantity on good bunches; but when there are only a few on it is better not to touch the bunch, as, in handling, it is apt to break. The boxing and assorting, which may be considered together, consist in transferring the different grades of the now dried raisins to separate sweatboxes. This is done in two ways. The No. 1 bunches, which have been placed on separate trays, may now be slid into the sweatbox. Between every two layers of these first-class bunches should be placed a clean paper, cut so as to exactly fit the box. It is of importance to have the paper to fit the box, and not to be too large or too small, as in either case the raisins may become mixed and the bunches broken. It must be remembered that the more paper is used the less apt are the bunches to be injured. On the top and in the bottom of every box must be one paper to keep out dust.

Covering.—If the weather has been favourable, the raisins may have been cured in twelve days. Of these twelve days the first seven or eight were used for drying the upper side of the raisins. On the seventh or eighth they were turned; and on the twelfth they were ready to put in the sweatboxes. But this is fast drying, and under favourable circumstances. It generally takes a longer time—from fourteen to twenty-one days. In Malaga they cover the raisin floors every night with canvas; and in the morning, when the canvas is unrolled, the raisins are yet warm. This method is to be recommended wherever there is any difficulty in curing the first or second crop. The method to be followed is to place the trays in rows; along and around the rows posts are driven, leaving 2 ft. clear of the ground. On one side (the south) the posts are not to project so high above the ground, so that the covering may be slanting; then by means of wires, rings, and canvas, a covering can be made which will protect the raisins from the dews of night and secure a uniform temperature for curing.

Dryers.—Dryers of different descriptions have from time to time been patented, and are for sale by various firms, as, for instance, Messrs. Ellwood, Cooper, and Co., of Santa Barbara, California, U.S.A., sell a dryer large enough to hold 1 ton of fruit for about £42.

The dryer is simply a wooden box with heating apparatus attached, about 17 ft. square and 6 ft. high, and looks from the outside like a chest full of drawers. These slide on frames, are deeper than they are broad, and contain movable bottoms or trays. The ventilation is had by small sliding doors at the bottom of the chest, through which the air rushes in, while it goes out through the drawers, which are open an inch or two for that purpose. Dryers are not for the purpose of entirely drying the raisins in them, but only to finish up the raisins when, on account of unfavourable climatic conditions, they do not dry any more out of doors. No one would think of drying raisins in the dryer altogether, as it would not pay. Raisins properly finished in the dryer are not inferior to those entirely sun-dried.

Sweatboxes.—These should be of 1-in. timber. The length and width should be according to the size of the tray, and always 1 in. larger every way than the tray, so that the raisins may be let down easily or that they may receive a tray. The height of a sweatbox should be from 6 to 8 in., no more. In order to secure the box and prevent it from splitting, the sides should be bound with iron or wire.

Trays for Drying.—The tray consists of a wooden frame made of well-seasoned $\frac{1}{2}$-in. timber nailed to cleats 1 in. by 1 in. by $\frac{1}{2}$ in., and of the desired length. The size of the tray varies according to the idea of the raisin-grower; but the size generally adopted is 2 ft. by 3 ft. When the season is over, every tray should be nailed up and washed, or at least swept clean, and stored dry. The age of a tray, if cared for, is about ten years.

Boxes and Cartons.—There are three kinds of packages in use in the raisin market—whole boxes of 20 lb., halves of 10 lb., and quarters of 5 lb. The wholes and quarters are those most used; while the halves are seldom used or required. The cartons are made of paper, and contain $2\frac{1}{2}$ lb. of raisins each.

The following are the measurements of raisin boxes and cartons, and of the timber required for making them:—

20-lb. box	$9 \times 18 \times 4\frac{3}{4}$ in.
10-lb. box	$9 \times 18 \times 2\frac{3}{8}$ in.
5-lb. box	$9 \times 18 \times 1\frac{3}{16}$ in.

The foregoing are inside measurements.

The tops and bottoms are $\frac{1}{4}$ in. thick, $19\frac{1}{2}$ in. long, and $9\frac{3}{4}$ in. wide.

The sides of the 20-lb. box are $19\frac{1}{2}$ in. long, $4\frac{3}{4}$ in. wide, and $\frac{3}{8}$ in. thick. The ends of a 20-lb. box are 9 in. long, $4\frac{3}{4}$ in. wide, and $\frac{3}{4}$ in. thick.

The sides of the 10-lb. box are $19\frac{1}{2}$ in. long, $\frac{3}{8}$ in. thick, and $2\frac{3}{8}$ in. wide. The ends of a 10-lb. box are 9 in. long, $\frac{3}{4}$ in. thick, and $2\frac{3}{8}$ in. wide

The sides of a 5-lb. box are $19\frac{1}{2}$ in. long, $\frac{3}{8}$ in. thick, and $1\frac{3}{16}$ in. wide.

CARTONS.

The $2\frac{1}{2}$-lb. carton is 5 in. wide, 10 in. long, and $1\frac{1}{2}$ in. deep.

	Sides.	Ends.
20-lb. box ..	$19\frac{1}{2} \times 4\frac{3}{4} \times \frac{3}{8}$ ..	$9 \times 4\frac{3}{4} \times \frac{3}{4}$.
10 lb. box ..	$19\frac{1}{2} \times 2\frac{3}{8} \times \frac{3}{8}$ ..	$9 \times 2\frac{3}{8} \times \frac{3}{4}$.
5-lb. box. ..	$19\frac{1}{2} \times 1\frac{3}{16} \times \frac{3}{8}$.	

Lye-dipped Raisins.—This process is of considerable importance, especially in localities where the drying of the first crop is accomplished with difficulty in the open air. The first and also most important condition in producing superior dipped raisins is that the grapes should be absolutely ripe. Unripe grapes will not produce any good raisins when dipped, but will turn reddish and otherwise become inferior.

Dipping Process.—Water must be continually flowing while the operation of dipping lasts, and if it be not available in a natural state, it must be produced by artificial means. Flowing water is of great importance in producing good dipped raisins, and is required for the perfect washing of the grapes. The following is a cheap and efficient arrangement for dipping in actual use in one of the largest vineyards where running water is not available, and the system can be recommended on account of its cheapness and easy working:—On one side of the trough in which the grapes are dipped is a stationary iron kettle with a fireplace underneath. By the trough is also placed an upright post about 5 ft. high, and on this is balanced a horizontal beam with a double motion. It can be raised and lowered at either end, or swung to the left or right with ease. On one end of the beam is a hook on which to hang the grape bucket. On the other side of the trough is a rough assorting table. Two or more buckets are needed. The buckets are common galvanised-iron buckets, perforated thickly with holes, the latter not large enough to let any loose grapes through. In the kettle, which is kept constantly boiling, is a solution of water and potash; soda is not suitable. The very best potash should be used, in the proportion of about 1 lb. to 12 gallons of water. The ripe grapes are now brought to the table and emptied into the buckets. A bucket is then hung on the beam, the latter swung round, and the bucket for a second lowered first into the pure water and then into the boiling potash; but it is immediately withdrawn and immersed in the water trough. When rinsed for a few seconds, the grapes are taken out and spread on common raisin trays. If the weather is warm, the trays are stacked one on top of the other, and the grapes thus prepared are dried in the shade. The rinsing of the fruit before drying is of great importance. In Valencia the finest raisins are treated in that way and thoroughly rinsed before being dipped in the lye. But nowhere in Spain are the grapes rinsed in water afterwards, and it is yet an undecided question whether the rinsing improves or injures the raisins. It is certain that the washing cleanses the berries, but whether it is an advantage to deprive the berries of the lye which more or less sticks to them is very doubtful. The arrangement of dipping kettles, &c., may, of course, be greatly varied. Steam may be used for heating the lye and the rinsing water, if it be desired to keep the latter hot; and regular trays might be used to hold the grapes instead of the buckets before mentioned. Every grower will, no doubt, vary these appliances to suit his own fancy and improve upon the method of others.

The length of time required for dipping can only be ascertained by experience, and must differ with the strength of the lye, with the heat of the solution, and with the thickness of the skin of the grapes. Thus, in different localities, the strength of the lye and the length of the immersion must always be different, and may even differ from year to year. When properly dipped, the skin of the grape must show some very minute cracks, similar to the cracks in glass which has been heated and suddenly immersed in or sprinkled with ice-cold water. Deep cracks are not desirable, as they will cause the juice of the pulp to leak out, after which the raisins will sugar. In Valencia the grapes used for dipping are the various varieties of Muscats; while in Smyrna both Muscats and Sultanas are used. Corinths are never dipped, as they dry readily and make superior raisins without this process.

Drying and Curing.—After the grapes are dipped, they must be immediately dried, either in the sun, or in the sun and shade alternately, or entirely in the shade. According to the circumstances attending the drying of the grapes the colour of the raisins becomes more or less red or yellow, transparent or opaque. The most perfect amber colour is attained in the shade; while in the sun the colour rapidly changes to reddish or to a less desirable colour in dipped raisins. The more favourable the weather for drying the choicer will be the raisins and the better their colour. If the sun is very warm and the chances are otherwise favourable for drying, the trays should be exposed to the sun only long enough to have their dip thoroughly evaporated, and for this purpose one day may suffice.

After this, the stacking of the trays is advisable, and only occasionally may the trays be spread if the drying does not proceed rapidly enough. Such shade-dried dipped raisins will assume a beautiful amber-yellow colour, and will bring more per pound than those exposed to a very warm sun. If, however, the weather is not very warm, the grapes must be dried in the sun, and the grower has then to be satisfied with the colour that Nature will give to his raisins. Dipped raisins do not necessarily require turning, as they generally dry well in from four to six days in fair weather. For this class of raisins dryers are very useful to help finish the drying. Such dryers must be almost airtight, as storms would invariably spoil the raisins, which, on account of their stickiness, are almost impossible to afterwards cleanse. Dipped raisins should always be dried on their trays.

Stemming, Grading, and Packing.—Dipped raisins should be stemmed when well dried, and then graded in two grades. The proper receptacles for them are either sacks lined with paper or 20-lb. boxes, in which they may be packed without fancy paper or in the same way as prunes or other dried fruit.

CONSERVATION OF THE WINE DURING THE FIRST YEAR.

By G. A. GATTINO.

In my previous notes referring to the above subject, I mentioned that the substances contained in the air, excepting the oxygen, are dangerous to the wine, and therefore the wine to be transferrd should avoid contact with the air as much as possible.

For this purpose (and without submitting the wine to agitations) force or suction pumps are used with great advantage.

Recently, on the market, there are several kinds of well-improved pumps; but I do not want to describe them here or to recommend any of them. It remains for you to choose the one which can combine the efficacy of the work with the economy of the cost.

The casks into which the wine will have to be transferred must be completely full and hermetically closed, to prevent any air getting in contact with the liquid.

The wine in the casks, however, gradually decreases in quantity, either by absorption of the wood or by evaporation effected through the pores of the latter, or also by the escape of the carbonic acid from the liquid.

It is, therefore, necessary to remedy this loss of quantity by keeping the casks always filled; otherwise an empty space would be formed on

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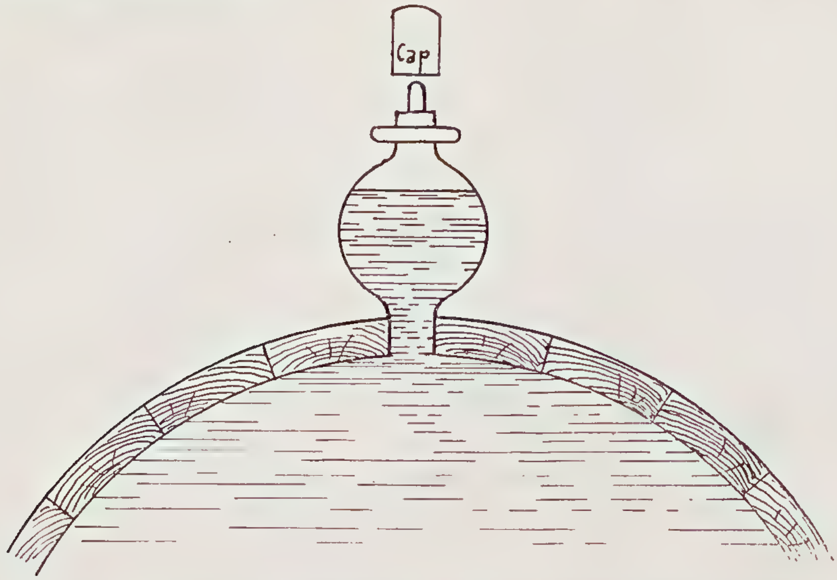
the superior part of the recipient, and this space would immediately be occupied by the air, with serious consequences to the wine.

During the first year such topping up will have to be made every week, using wine of the same quality purposely kept in separate jars.

There are various ways of topping up the casks. Generally, the wine is added through a funnel. This method will act if the recipients are of great capacity; but for small casks this direct down pressure would raise the sedimentations. A better result is acquired by a filler of glass as per illustration below—



As you see, it has a spherical form, and should have a capacity of a pint or a quart, whichever is the most suitable to the cask. Both extremities terminate in an opening. The bottom one is always open, and it is fixed to the bunghole of the cask. The top is provided with a glass stopper and a rubber cap.

By this method you can promptly see the diminishing level of the wine contained in the filler; and with a funnel, without prejudice to the mass, you can always add in the filler the quantity required for raising the wine to its original level.

The wine, after having been transferred, does not need any other care till next spring, except that of the topping up.

In the spring the wine must be racked, and the same rules described in last month's issue of the Journal have to be observed during this operation.

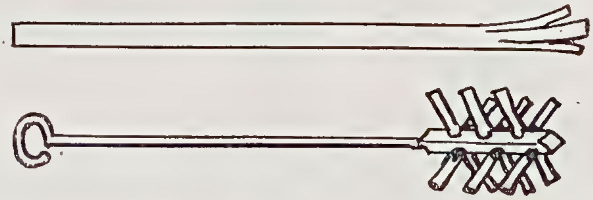
If a wine is kept to "ripen" (maturing it through age), then it should be racked twice every year—once in the spring and again in the autumn.

It often happens that the wine (to be sold during the first year), when it is racked in the spring, does not present that brilliancy which is one of the principal attributes of wine. This is because the wine contains azotated substances still in suspension or latent (concealed) ferment.

To prevent this inconvenience, there is adopted an artificial clarification. This clarification can be obtained by albuminous substances mostly drawn from animal solids and fluids. For instance, gelatine, isinglass, albumen of egg, blood of beef, milk. The gelatine or isinglass acts on the wine chemically and mechanically. They act chemically because they combine with the substances that the wine holds in solution and suspension, neutralising their action and preventing the development of the ferment. They act mechanically because they adhere to the particles existing in suspension in the wine, dragging them to the bottom of the cask. The albumen of egg acts in the same manner, but with greater efficacy. The blood of beef can be used either in its natural state or boiled in water, then dried up and reduced to powder. The blood has great and prompt effect, twenty-four hours being sufficient for making a wine perfectly bright. I would, however, not recommend this clarifier for table or fine wines, as the blood is easily alterable, and would transmit an unpleasant smell to those wines. The milk presents the inconvenience of making a very strong deposit, and is liable to ferment, thus producing the lactic acid. Personally, I am against the use of milk, and I would not advise its use for clarifying wines.

Besides the above-mentioned substances, there are on the market to-day several gelatines and powders specially prepared for the clarification of wines; but you have to make sure that their purity is guaranteed. I do not need to describe how to use those powders, because the necessary instructions are generally printed on the packets. I find, however, from long experience, that gelatine, albumen of egg, and blood of beef are the best methods.

The gelatine is used in the proportion of about 1 dram Av. per gallon. Cut into small strips the quantity of gelatine or isinglass used for the clarification; put the said strips into a glass or earthenware vessel; add boiling water, and agitate well for a quarter of an hour. When the gelatine is completely dissolved and is reduced to froth, pour this substance into the cask, and stir the liquid mass with a split stick or whip as per illustration:—



After having well stirred the wine, cork the cask, and leave it from ten to fifteen days. When you see that the wine is perfectly clear, transfer it into another cask, taking it away from the dreggy deposit formed by the clarification.

In using the albumen of egg, it is necessary to have fresh eggs and separate the albumen from the yolk just at the moment you have to use them. The white of an egg (albumen) is sufficient for clarifying 1 gallon of wine. Put the quantity of albumen you require into an earthenware dish, add a small quantity of wine, and agitate well until it comes all froth. Then pour into the cask; and after stirring for about a quarter of an hour let the liquid stand. For facilitating the solubility of the albumen, add to the white of the eggs a pinch of salt.

In using the blood, practise the same method as for the albumen of eggs. Only very fresh blood has to be used, and about 2 drams Av. per gallon of wine. Do not use the blood as a clarifier for light wines, as it would weaken the latter too much.

Besides the clarifiers derived from animal solids and fluids, there are also others drawn from mineral substances, such as the allumine argil, special earth, &c. These clarifiers are cheap, but they must be first purified of all strange and impure substances, especially organic matter.

After applying any clarifier, the wine will have to be kept quiet for a certain time, so that the clarifying substances may produce the proper effect. When the wine is perfectly bright it must be racked off; otherwise the sedimentations would re-awake, rendering the clear wine again turbid. As a general rule, the "finings" will be effective only when the wine is complete, and all slow and sensible fermentations are finished. If, however, for trade purposes you have to make brilliant a wine not yet completely finished, then you will first have to stop the slow fermentation. This can be obtained by adding 3 drams Av. per gallon of metasulphite of potash. When all trace of fermentation is arrested, add the required clarifier to the turbid wine you have to finish off.

[TO BE CONTINUED.]

COTTON AND KAPOK FOR UPHOLSTERY.

An impression having gone abroad that kapok should be used for upholstery purposes, such as stuffing sofas, chairs, pillows, &c., instead of cotton, on the extraordinary ground that cotton is affected by disease germs, we would point out that cotton has been used in Queensland and in other parts of the world for these purposes for a long series of years, and no ill effects have ever attended its use. It is far more likely that kapok might carry disease germs, owing to the insanitary conditions under which it is grown, prepared, and baled for export in some tropical countries, where coloured labour is employed, and where such diseases as cholera, malarial fevers, skin diseases, smallpox, &c., are frequent amongst native labourers. Cotton in Queensland is grown and prepared under the best hygienic conditions, under the supervision of the Department of Public Health, so that it is practically impossible for Queensland-grown cotton or cotton-seed to be prejudicial to health. Kapok, on the other hand, may easily convey disease germs, since there is no supervision exercised over the gathering and treatment of the crop. Our cotton-growers, ever since cotton was largely grown in the State, have used cotton for stuffing mattresses, pillows, chairs, &c., and nothing was ever heard of the article spreading diseases. It seems to us that the impression has arisen owing to some trade rivalry, of which we know nothing, but users of cotton in any shape may rest assured that our cotton has never carried any disease germs.

Entomology.

THE LANTANA PEST.

A NEW FLY IMPORTED FROM HAWAII.

Many persons favour the lantana plant for its soil-fertilising properties, but in some districts in Queensland it has smothered extensive areas and constitutes a veritable pest. This fact recently led the Department of Agriculture, through its entomological scientists, to make investigations as to the means whereby it might be combated, and following on representations made by the Government Entomologist (Mr. H. Tryon), the assistant (Mr. H. Jarvis) visited Honolulu and Fiji to make further inquiry with respect to the lantana combating insect employed there, and to secure a number of the insects. Mr. Jarvis has now returned to Queensland, and Mr. Tryon stated that he had succeeded in safely transferring overseas a large number of lantana seed destroying flies. Some of them were secured in Honolulu and some in Fiji.

It was explained by Mr. Tryon that steps were being taken to establish the flies in three distinct localities where the conditions under which the host plant is growing differ notably in respect to climate and other conditions. The first district is that of Brisbane, the second the North Coast, while the remaining district will be the Mackay or Townsville areas. Insects were liberated in the Brisbane district on Monday and Tuesday, and on Wednesday the flies were being freed in the North Coast district. With regard to the experiment in the Northern area, Mr. Jarvis left Brisbane on Friday, 16th March, and the flies he would liberate would be those secured in Fiji. The Government Entomologist emphasised the fact that the outcome of these operations scarcely could be fully ascertained for a considerable time. Although the fly multiplied rapidly, the task before them is so enormous, and the area over which the lantana extends is so vast, that results could not be expected until a long period elapsed, provided that the flies subsisted under our climatic and other conditions. He felt, however, that there was every prospect of the project proving successful. He also pointed out that the introduction of the insect would present no interference with the use of lantana by those who desired to do so as a cover crop or as a means of honey production, and added that the habits of the fly so far as they relate to forms of vegetation other than lantana had also been under close observation for years. It was, therefore, possible to affirm that neither in its native home—Mexico—nor in any of the countries to which it has been introduced, has it ever associated itself injuriously with any plant other than lantana. There was no ground for any suggestion that the insect was likely to change its habits, the experience being that in the absence of lantana no propagation took place, and that eventually it died. The fly laid numerous eggs, depositing a single one in the lantana berry while it was still green, and therefore it did not ripen properly, but dried up. The plant was not destroyed, but the seed, not coming to maturity, would no longer be available for the propagation of the plant and the extension of the infested area.

Mr. Tryon has assumed that the fly will be able to live under the climatic conditions of Queensland, but he is by no means confident that this will be the case so far as the southern localities are concerned. That was a matter to be determined by the experiments. The number of flies at present available is not sufficient to permit of immediate distribution to those who desire to use them for lantana repression. The Government Entomologist's first business is to establish them locally by colonising and breeding them. He stated that the fly was first procured by Mr. Albert Koebele, the well-known entomologist employed by the Hawaiian authorities to discover insects injuriously affecting the lantana plant and to introduce them into the Sandwich Islands. In the course of this undertaking he discovered the fly in Mexico, to which country lantana is indigenous. The insects were transferred to Honolulu, where they and other lantana-injuring insects were established. Eventually the fly was also established at New Caledonia and Fiji.

Mr. Tryon said that Mr. Jarvis's mission was most successful, and he had accomplished all that was expected of him. Thanks were also due to the official entomologists at Hawaii, who had done all they could to assist the undertaking.

DESTROYING NUT GRASS IN GARDENS.

The presence of this pernicious weed in small gardens disheartens many small householders to the extent of causing them to give up all hope of successfully raising either vegetables or flowers. Many requests reach us for information as to how the pest may be destroyed. It was pointed out at an agricultural conference held at Mackay in June, 1899, by Mr. W. Gibson, Bingera, that a patch of nut grass on rich soil was successfully destroyed by the use of molasses. A few casks of molasses were poured over it, and water on the molasses. It all fermented, and by keeping this going for a week the whole of the nut grass was destroyed, since which the land had been wholly free from it.

Mr. P. McLean said that a small area of nut grass may be completely eradicated by laying sheets of iron over it, so as to exclude it from light and air. This, he said, was on the same principle as Mr. Gibson's molasses. Both were effectual remedies, but, of course, it could only be done on small areas. We advise anyone having nut grass in a small garden to give these simple remedies a trial.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

Milking Returns of Cows from 27th February to 26th March, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Sylvia II. ...	Shorthorn... ...	16 Jan., 1917	802	4·8	45·40	
Lady Margaret	Ayrshire	6 Jan. ,,	830	4·4	42·99	
Lady Melba	Holstein	14 Feb. ,,	1,035	3·4	41·13	
Miss Edition	Jersey	25 Dec., 1916	756	4·6	40·96	
Iron Plate ...	,, ...	9 Dec. ,,	615	5·1	37·04	
Twylish's Maid	,, ...	2 Nov. ,,	493	6·2	36·22	
Miss Bell ...	,, ...	1 Aug. ,,	475	6·4	36·04	
Comedienne	,, ...	24 Nov. ,,	466	6·2	34·23	
Violette's Peer's Girl	,, ...	13 Dec. ,,	507	5·7	34·20	
Lady Spec...	Ayrshire	17 Jan., 1917	710	4·0	33·34	
Constancy ...	,, ...	27 Dec., 1916	613	4·6	33·22	
Sweet Meadows	Jersey	18 Aug. ,,	404	6·5	31·14	
Lady Annette	Ayrshire	11 Nov. ,,	577	4·2	28·48	
Thornton's Fairetta	Jersey	26 May ,,	379	6·3	28·29	
Nina ...	Shorthorn... ...	23 June ,,	595	4·0	27·94	
Lady Dorset	Ayrshire	14 Sept. ,,	462	4·7	25·59	
Jeannie ...	,, ...	27 Oct. ,,	494	4·4	25·58	
Queen Kate	,, ...	15 June ,,	492	4·4	25·48	
Hedges Dutchmaid	Holstein	22 Aug. ,,	469	4·6	25·41	
Bluebelle ...	Jersey	22 June ,,	430	4·8	24·33	
Glen ...	Shorthorn... ...	18 Jan., 1917	505	4·2	24·93	
Lilia ...	Ayrshire	4 Sept., 1916	412	5·0	24·30	
Belonda ...	,, ...	23 Feb., 1917	519	3·8	23·13	
Rosine ...	,, ...	16 July, 1916	397	4·9	22·94	
Netherton Belle	,, ...	11 Mar. ,,	294	6·5	22·65	
Cocoatina ...	Jersey	6 Mar., 1917	407	4·3	20·59	
Skylark ...	Ayrshire	21 Mar., 1916	314	5·4	20·01	

The above cows were grazed on natural pasture only.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered:—

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
		AYRSHIRES.		
Queensland Agricultural College	Gatton	14	45	Ayrshire Herd Book of Queensland
State Farm	Warren, Rockhampton	9	88	ditto
H. M. Hart	Glen Heath, Yalangur	6	15	ditto
L. H. Paten	Jeyandel, Calvert ..	8	20	ditto
J. H. Paten	Yandina	8	23	ditto
J. H. Fairfax	Marinya, Cambooya	9	55	ditto
State Farm	Kairi..	4	8	ditto
F. A. Stimpson ..	Ayrshire Stud Farm, Fairfield, South Brisbane	17	68	ditto
J W. Paten	Wanora, Ipswich ..	10	42	ditto (Includes 29 cows in advanced register.)
J. Holmes	"Longlands," Pittsworth	6	20	Ayrshire Herd Book of Queensland
		JERSEYS.		
W. Siemon & Sons Ld.	Roma st., Brisbane..	6	60	Queensland Jersey Herd Book
Queensland Agricultural College	Gatton	13	30	ditto
W. J. Barnes	Cedar Grove ..	10	27	ditto
W. J. Affleck	Grasmere, N. Pine ..	6	31	ditto
M. W. Doyle	Moggill	4	12	ditto
State Farm	Kairi..	6	40	ditto
James T. Turner ..	The Holmwood, Neurum	1	5	ditto
Robert Conochie ..	Brookland Jersey Stud Farm, Brooklands, Tingoora	9	21	ditto
G. A. Buss	Bundaberg	5	14	ditto
T. V. Nicholson ..	Windsor	2	8	ditto
Geo. H. Crowther ..	Montrose, Oakey ..	7	43	ditto
E. F. Fitzgibbon ..	Listowel, Oakey ..	7	30	ditto
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	37	Jersey Cattle Society, Queensland
J. N. Waugh & Sons..	"Prairie Lawn," Nobby	2	44	Queensland Jersey Herd Book
T. Mullen	Chelmer	3	20	ditto
J. C. Brimblecombe ..	"Lolworth," Kingsthorpe	1	13	ditto
James Strong ..	Woodlands	5	18	ditto
		GUERNSEYS.		
Queensland Agricultural College	Gatton	2	2	Eligible but no Herd Book in Queensland

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
	HOLSTEINS.			
Queensland Agricultural College	Gatton	3	10	Holstein-Friesian Herd Book of Australia
George Newman ..	Wyreema	9	37	ditto
F. C. G. Gratton ..	Towlerton, Kingsthorpe	2	11	Eligible for entry in Holstein-Friesian Herd Book of Australia
State Farm	Kairi..	1	2	ditto
R. S. Alexander ..	Glenlomond Farm, Columboola	3	1	Holstein Friesian Herd Book of Australia
S. H. Hosking ..	Racing Plains, Toogoolawah	2	23	ditto
C. Behrendorff ..	Inavale Stud Farm, Bunjurgen, *via* Boonah	5	10	ditto
	ILLAWARRA.			
John Hardcastle ..	Dugandan	5	17	Illawarra Herd Book of Queensland
Hunt Bros.	Maleny	3	62	ditto
W. F. Savage ..	Ramsay	2	29	ditto
G. E. J. Chaseling ..	Brundah, Coolabunia	1	45	ditto
P. Biddles	Home Park, Netherby	3	14	ditto
A. N Webster ..	Yaralla, Maleny ..	5	65	ditto
A. Pickels	Blacklands, Wondai	4	79	ditto
J. P. Perrett & Son ..	"Corndale," Illawarra Stud, Coolabunia, *viâ* Kingaroy	4	52	ditto
H. Marquardt.. ..	Oak Villa Stud, Wondai	5	20	ditto
Wm. Wyper	"Strathobi," Maleny, Landsborough	3	100	ditto
	MILKING SHORTHORNS.			
A. Rodgers	Torrans Vale, Lanefield	3	18	Milking Shorthorn Herd Book of Queensland
Wm. Rudd	Airedale, Christmas Creek, Beaudesert	6	30	ditto
W. Middleton	Devon Court, Crow's Nest	3	27	ditto
P. Young	Talgai West, Ellinthorp	11	60	ditto
McFarlane Bros. ..	Kilbirnie Stud Farm, Radford	4	37	ditto
	SHORTHORN.			
C. E. McDougall ..	Lyndhurst, Warwick	25	50	Entered or eligible Q.H.B.
W. B. Slade	East Glengallan, Warwick	77	283	Queensland Shorthorn Herd Book
W. T. Scrymgeour ..	"Tara," Arthur st., Toowoomba	79	300	ditto
T. B. Murray-Prior ..	Maroon, Boonah ..	..	17	Queensland Shorthorn Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	20	Australian Herd Book

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
HEREFORD.				
H. F. Elwyn	Gunyan, Inglewood	250	750	Australian Hereford Herd Book
Mrs. Lumley Hill ..	Bellevue	45	127	Entered or eligible for entry A.H.H.B.
James T. Turner ..	The Holmwood, Neurum	25	50	Australian Hereford Herd Book
A. J. McConnel ..	Dugandan, Boonah	43	60	ditto
ABERDEEN ANGUS.				
G. C. Clark	East Talgai, Ellinthorp	4	10	Entered or eligible for N.Z.H.B.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book

ELEPHANT GRASS.

We have received from Mr. W. Brotherton, Gladstone, the accompanying excellent photograph of his crop of Elephant grass. Dairymen and stock-raisers, he says, need not fear any loss of stock through drought if they would only plant this prolific fodder plant. We have had, a little while since, inquiries as to where seed or plants of Elephant grass can be obtained. Mr. Brotherton can supply both.

A "MILK IMPROVER."

Mr. William Lawton, secretary of the Society of Medical Officers of Health (England), claims to have invented a "milk improver," which he claims will convert a pint of milk, costing 3d., into a quart for the cost of another penny. At a demonstration Mr. Lawton described his "milk improver" as a synthetic powder extracted from grass and herbs and ordinary cattle food. To make a quart of "milk," Mr. Lawton mixes 2 drachms of the powder into a thin paste with cold water, pours over it a pint of boiling water, and boils the whole for five or six minutes. A pint of cow's milk is then added, and the mixture again brought to

PLATE 11.—ELEPHANT GRASS ON MR. W. BROTHERTON'S FARM, GLADSTONE.

the boil, strained, and allowed to cool, when it is ready for use. The result is a quart of liquid unrecognisable in taste from ordinary milk. Mr. Lawton claims that his "milk" is richer than cow's milk; and when a jugful was compared with the same amount of pure milk, it was found that a greater coating of cream was on the top of the mixture.

"My aim in composing the milk substitute," said Mr. Lawton to a Press representative, " is to help the housewives of England. In fact, the women worried me into doing it. The 'milk improver' is being made under my supervision by a big firm of chemical mixers, and it will be supplied to members of the Brittania League of Housewives in 2-drachm packets. The 4,000 members of the league are testing the milk substitute, a week's supply of which will be provided at cost price on the receipt of an undertaking to reduce the daily milk supply by one-half, and make up the quantity with my powder."—"New Zealand Farmer."

THE JERSEY-HEREFORD COW.

In April, 1910, we gave an illustration of Mr. Munro Hull's Jersey-Hereford cow "Spot" (*Q.A.J.*, Vol. xxiv., part 4), whose dam, "Brownie," was a Hereford, and the sire was a Jersey. Mr. Hull bred thirteen calves from "Brownie," only two of which were heifers. The idea of the cross was to introduce stamina to a Jersey strain. The late Mr. P. R. Gordon expressed the opinion that the cross would be unsuitable for dairy purposes. It will be of interest to many of our readers to note the results which we have received from Mr. Hull.

The cow "Spot" referred to was born in 1904, and died during the drought of 1915, leaving behind five daughters, five grand-daughters, and one great-granddaughter. She had ten calves—six born in the month of May, two in April, and two in June—a fairly regular record, not missing once from 1906 to 1915. "Spot's" test was 4·00, and her record 4 gallons for the day. None of her heifers test below 4, and one goes 5·1—all equally good milkers.

With one exception, none of her descendants show more than faint traces of Hereford. One is "bally," and the others carry either a white speck or a "boomerang" in white over the eyebrow; the body colour a uniform yellow. Temperament, wholly Jersey. "Spot" had five bull calves, and out of fifteen grandchildren born to date, ten are bulls. Is this a Hereford peculiarity?* "Spot's" eldest daughter has calved yearly since 1909. Her second daughter missed once (1915) since 1911. Her third calved in 1915, and was dried off in February last.

As regards stamina, not a single beast out of the twenty-six head bred from this cow and her progeny died from disease.

*No.—Ed. "*Q.A.J.*"

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, FEBRUARY 28 TO MARCH 31, 1917.

Four thousand five hundred and forty eggs were laid during the period from 28th February to 31st March. This concludes the competition. The prizes for the highest aggregate are won by the following:—First—Miss M. Hinze, 1,542 eggs; second—T. Fanning, 1,530 eggs; third—J. Zahl, 1,516 eggs. The following are winners in the single hen competition:—Dixie Egg Plant, 291 eggs; Miss Hinze, 289 eggs; while J. M. Manson (2 hens) and Mrs. Jobling divide the third prize with 276 eggs each. Mr. Manson wins the monthy prize with 132 eggs. A full report on the whole of the competition will be issued later. The following are the individual records:—

Competitors.	Breed.	March.	Totsl.
*Miss M. Hinze	White Leghorns	124	1,542
*T. Fanning	Do.	113	1,530
*J. Zahl	Do.	110	1,516
*J. Manson	Do.	132	1,500
*A. T. Coomber	Do.	88	1,475
J. R. Wilson	Do.	70	1,462
Geo. Tomlinson	Do.	64	1,440
G. H. Turner	Do.	68	1,438
W. Meneely	Do.	34	1,418
*E. A. Smith	Do.	88	1,410
*J. H. Gill, Victoria	Do.	126	1,395
*A. E Walters	Do.	73	1,387
A. Howe, N.S.W.	Do.	69	1,386
*W. H. Knowles, junr.	Do.	104	1,380
Mrs. J. R. D. Munro	Do.	83	1,372
J. M. Manson	Black Orpingtons	87	1,366
Dr. E. C. Jennings	White Leghorns	45	1,362
*Dixie Egg Plant	Do.	106	1,354
*J. F. Dalrymple, N.S.W.	Rhode Island Reds	104	1,344
A. W. Bailey	White Leghorns	64	1,342
Geo. Prince	Do.	76	1,337
*E. F. Dennis	Do.	49	1,319
A. H. Padman, S.A.	Do.	66	1,314
H. W. Broad	Do.	62	1,313
Cowan Bros., N.S.W.	Do.	57	1.304
Mrs. W. D. Bradburne, N.S.W.	Do.	31	1,297
R. Burns	S. L. Wyandottes	84	1,291
*Mrs. J. H. Jobling, N.S.W.	Black Orpingtons	64	1,288
E. Pocock	White Leghorns	55	1,286
W. Purvis, S.A.	Do.	72	1,284
F. Clayton, N.S.W.	Do.	47	1,281
E. F Dennis	Black Orpingtons	71	1,280
T. Taylor	White Leghorns	28	1,275
W. Lyell	Do.	45	1,274
*E. West	Do.	73	1,270
*C. Knoblauch	Do.	53	1,267
T. E. Jarman, N.S.W.	Do.	37	1,261
T. Fanning	Black Orpingtons	65	1,258
T. B. Hawkins	White Leghorns	37	1,261
King and Watson, N.S.W.	Do.	61	1,256
P. Brodie	Do.	45	1,255
A. F. Camkin, N.S.W.	Do.	55	1,251

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	March.	Total.
Cowan Bros., N.S.W.	Black Orpingtons ...	75	1,242
G. W. Holland	White Leghorns ...	57	1,240
H. Jobling, N.S.W.	Black Orpingtons ..	47	1,232
Mars Poultry Farm	Black Orpingtons ...	74	1,225
Kelvin Poultry Farm	White Leghorns ...	23	1,225
Mars Poultry Farm	Do.	36	1,221
J. Anderson, Victoria	Do.	44	1,215
*W. L. Forrest, N.S.W....	Do.	68	1,213
W. Becker...	Do.	43	1,203
H. Hammill, N.S.W.	Do.	96	1,202
W. Hirst, N.S.W.	Do.	34	1,186
Mrs C. Davis	Do.	21	1,174
Moritz Bros., S.A.	Do.	71	1,163
J. G. Richter	Do.	27	1,159
*Kelvin Poultry Farm	Do.	46	1,153
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	53	1,153
*J. W. Macrae	Black Orpingtons ...	68	1,143
F. Clayton, N.S.W.	Rhode Island Reds ...	50	1,141
C. P. Buchanan	White Leghorns ..	45	1,138
Harveston Poultry Farm	Do.	53	1,115
R. Burns	Black Orpingtons ...	34	1,115
S. B. Tutin	White Leghorns ...	14	1,090
J. Gosley	Do.	62	1,087
W. Lindus, N.S.W.	Do.	54	1,085
*J. Anderson, Victoria	Red Sussex	57	1,077
F. W. Leney	White Leghorns ...	37	1,063
A. T. Coomber	Sicilian Buttercups ...	74	1,059
L. K. Pettit, N.S.W.	White Leghorns ...	44	1,039
W. H. Forsyth, N.S.W.	Black Orpingtons ...	51	999
E. F. Dennis	White Wyandottes ...	77	948
F. W. Leney	Rhode Island Reds ...	19	915
Totals	...	4,540	91,861

* Indicates that the pen is taking part in single hen test.

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
Miss M. Hinze	266	223	289	241	270	253	1,542
T. Fanning	275	266	272	261	227	229	1,530
J. Zahl	258	270	216	262	259	251	1,516
J. M. Manson	224	276	239	242	276	243	1,500
A. T. Coomber	263	271	243	231	231	236	1,475
E. A. Smith	255	269	239	265	199	183	1,410
J. H. Gill	214	237	238	267	212	227	1,395
W. H. Knowles, junr.	201	233	238	202	261	215	1,380
Dixie Egg Plant	291	269	265	269	...	260	1,354
J. F. Dalrymple	198	236	236	196	265	213	1,344
A. E. Walters	241	275	229	203	239	200	1,387
E. F. Dennis	200	237	184	265	233	200	1,319
Mrs. Jobling	211	276	197	202	194	208	1,288
E. West	234	235	206	205	189	201	1,270
C. Knoblauch	191	235	223	189	205	224	1,267
W. L. Forrest	240	237	62	185	255	234	1,213
Kelvin Poultry Farm	193	167	159	194	266	174	1,153
J. H. Madrers	150	223	224	215	165	176	1,153
J. W. Macrae	157	232	214	222	148	170	1,143
J. Anderson	202	166	232	114	196	167	1,077

General Notes.

WINTER CEREALS AT ROMA STATE FARM.

In the March issue of the Journal the number of rainfalls was given as "thirty-seven." This should have read "thirty-two." The correction reached us too late for publication.

WHAT A FOUR-MILLION ARMY MEANS.

In an address given in London a few months ago, Mr. Herbert N. Casson gave some idea of what a four-million army means. He said Britain's little army of 275,000 became 4,000,000 in such quick time that we could not count the men as they came in. Four million soldiers meant one soldier for every acre in Yorkshire, one for every two houses in Great Britain, and thirty-three for every square mile. We had now an army which, marching four abreast, would be 760 miles long. Let every man carry 500 sovereigns, and there we had the army and the cost—an army which would reach from Land's End to John o' Groats. We could stand our army round the coastline, elbows touching, and with every man bearing his own weight of silver we had the cost.

THE PROTECTION OF MIGRATORY BIRDS IN CANADA.

Many years ago, when agricultural settlement in Queensland was in its infancy, and dense scrubs, rivers, lakes, and plains were the homes of vast numbers of game birds, it was no uncommon sight to see thousands of wild ducks, black swans, geese, plain and scrub turkeys. quail, plover, pigeons, and hosts of useful insectivorous birds in all directions. The lakes at Noosa, particularly Lake Cootharaba, were the homes of countless water-fowl; the scrubs still standing on the banks of the Brisbane, Bremer, Albert, Logan, Burnett, and Northern rivers were alive with birds. In the Far North wild geese could be seen in great numbers; and Torres Strait pigeons darkened the air at certain seasons of the year. Everywhere, even in close vicinity to the coastal towns, game was plentiful. There was then, unfortunately, no Native Birds Protection Act in force; and as immigration increased the destruction of the scrubs and the settlement of hundreds of farmers on the rivers and lakes resulted in the indiscriminate destruction of not only game birds, but of the smaller insectivorous birds, the decrease in the numbers of the latter being the primary cause of the increasing number of insect pests in our agricultural districts, orchards, and gardens.

In the "Agricultural Gazette" of Canada of December, 1916, we are given "An Account of the International Treaty of 1916 between Great Britain and the United States for the Protection of Migratory

Birds in the United States and Canada,'' by C. Gordon Hewitt, D.Sc., Dominion Entomologist, who writes—

''For many years the numbers of our migratory birds, such as ducks, geese, insectivorous birds, and shore birds—which class includes the plovers, sandpipers, snipe, woodcock, &c.—have been decreasing. This decrease is a matter of common knowledge and observation throughout the Dominion. Certain of these migratory birds—such as the Eskimo plover, which formerly existed in enormous numbers and was killed for the market, the Labrador duck, the passenger pigeon, and the great auk—have now become extinct. Others—such as the whooping crane and the wood duck, the most beautiful of our native ducks—have become so reduced in numbers as to render their continued existence without further protection a matter of doubt.

''From a national standpoint the prospect of this continued decrease involved serious economic considerations. Leaving out of account the value from an æsthetic point of view of this portion of our Canadian wild life, great as that is, and regarding it as an economic asset to the country, we were faced with the gradual reduction of our migratory wildfowl, whose value as food and as means of securing recreation are inestimable, and of our insectivorous birds, which are of even greater importance to the welfare of our agricultural interests.

Insectivorous birds constitute one of the chief natural agencies controlling insect pests affecting field crops, orchards, and forests. In field crops alone the annual loss in Canada due to the depredations of insect pests is, on a conservative estimate, not less than 125,000,000 dollars. And, with the development of the country, the damage caused by insect pests is increasing, while the numbers of insectivorous birds have been decreasing.

''The chief causes of this decrease in the numbers of our migratory birds are as follows:—Canada constitutes the chief breeding-place for the greater number of these birds. With the settlement of the country the breeding-places of many species have been destroyed. The clearing of the land has involved the clearing of the nesting sites of insectivorous birds; the draining of marshy areas and the settlement of the prairies have driven wild-fowl from their former breeding and feeding places. Such causes are, therefore, unavoidable to a large extent. On the other hand, while many of the provinces have excellent laws governing the protection of game, non-game, and insectivorous birds, it has not always been possible to give these birds adequate protection. The increase in the number of persons who carry guns and the improvement of modern sporting guns have had their effect on the abundance of wild fowl.

''Even with the strictest enforcement of protective laws, Canadians would have been unable to prevent the continued decrease of migratory birds unless the requisite protection were given to such birds during the time that they are in United States territory. In other words, our migratory birds cannot be adequately protected from continued decrease without co-operative protection in Canada and the United States.

"It is a well-known fact that while some of the States of the Union had excellent laws, which they enforced, others failed to protect their birds. In some States the shooting of wild fowl in the spring was permitted; this involved the killing of birds, usually mated at that time of the year, on their way to their breeding-grounds in the North. This discouraged many Canadians, who naturally asked why they should protect their wild fowl for the market gunners in the South. The existence of such market gunners, who annually killed enormous quantities of Canadian-bred ducks and geese for the markets of the big cities in the United States, constituted one of the greatest causes of reduction and one of the chief obstacles to any rational attempt to prevent such reduction and to maintain our stock of wild fowl. Not only were game birds affected, but insectivorous birds were likewise killed by thousands during their winter sojourn in the South; this destruction has been particularly serious in the case of the robin, one of our important cutworm destroyers.

"As a result of the efforts of sportsmen, game protective associations, and other organisations interested in the conservation of the wild fowl and other migratory birds in the United States, the Federal Migratory Bird Law was enacted in 1913, for the purpose of securing more adequate protection for migratory birds which, by reason of their migratory habits, could not be successfully protected by the efforts of individual States so long as other States were derelict in the matter. The objects of the Federal regulations were:—To reduce the open seasons, which varied greatly in different States; to secure a more uniform open season, not exceeding three and a-half months, fixed in accordance with local conditions, so that the sportsmen would have shooting at the best time of the year; and to prevent the shooting of migratory birds in the spring. A close season for a period of years was given to certain birds, particularly shore birds, and the shooting of insectivorous birds was entirely forbidden. The majority of the States amended their laws to conform with the Federal Regulations, and although certain States, in which the influence of the market hunter and gunners with no thought of the future appeared to predominate, objected to Federal interference, the outcome of this increased protection and elimination of spring shooting has been a noticeable increase in the numbers of wild fowl. This increase has also been observed by Canadian sportsmen.

"The treaty was signed in Washington on 16th August, 1916, by His Majesty's Ambassador, Sir Cecil Spring-Rice, G.C.V.O., and the Secretary of State of the United States, Mr. Robert Lansing. On the unanimous vote of the Committee on Foreign Relations, it was ratified by the Senate of the United States on 29th August, 1916.

"Of the eight articles of the treaty, the most important provision is Article II., providing for:—(1) A close season on migratory game birds from 10th March to 1st September, with the exception given; (2) an open season of three and one-half months; and (3) a close season throughout the year on insectivorous birds. The open season of three and one-half months may be fixed anywhere between 1st September and 10th

March to suit the local conditions. The restriction of the open season on wild fowl to three and one-half months will involve in some provinces a shortening of the present open season, but, in view of the objects of the treaty and the experience that such restriction in the United States is increasing the supply of birds, this change will undoubtedly meet with the support of sportsmen desirous of preventing the continued decrease in the numbers of wild fowl.

"The conclusion of this convention constitutes the most important and far-reaching measure ever taken in the history of bird protection. Some years ago efforts were made to secure the international protection of birds in Europe; but, while the general movement towards better protection for insectivorous birds was thereby furthered, the requisite co-operation on the part of all the countries interested was hampered by inactivity on the part of some of the Governments and a considerable diversity of interests and opinion. Fortunately, many of these difficulties do not exist in North America, and in the United States and Canada there is an ever-growing sentiment in favour of preserving what is left of our former wealth of wild life, which has been so seriously depleted by improvidence in the past. This international measure will affect over one thousand species and subspecies of birds from the Gulf of Mexico to the North Pole, and we may confidently look forward to not merely a cessation of the decrease, but to an increase of our migratory birds, which are so valuable a national asset."

QUEENSLAND AGRICULTURAL JOURNAL—FEBRUARY, 1916.

Our thanks are due to the undermentioned subscribers for their response to our request for spare copies of the above issue of the Journal:—

C. F. Dennis, Hawthorne road, Bulimba.
H. Reese, Canberra Springs, Eukey, *viâ* Ballandean.
Subscriber, Flagstone Creek, *viâ* Helidon.
H. Crewther, Baking Board, Western Line.
A. Walls, Flagstone Creek, *viâ* Helidon.
Wm. E. Stacey, Allambie Farm, Mount Perry,
"Cardwell" (anonymous).

JELLY MADE FROM COTTON BOLLS.

A lady in Florida, U.S.A., has sent to the Commissioner for Agriculture at Tallahassee samples of jelly made from cotton bolls and buds. It is well flavoured, and resembles somewhat in colour and taste jelly made from guavas.—"Cotton and Cotton Oil News."

[With cotton at 20 cents (10d.) per lb., we are inclined to think that it would pay better to let the cotton mature and utilise the waste for the manufacture of high explosives.—Ed. "*Q.A.J.*"]

A FINE CROP OF RHODES GRASS.

Mrs. J. Adams, of Henley Park, Yalleroi, sends us a photograph and description of Rhodes grass grown on her grazing farm at Henley Park, Yalleroi.. Planted last spring, it is now over 5 ft. high and just shedding its seeds (16th March). The grass was planted according to the manner advocated in the *Queensland Agricultural Journal*—viz., scattering the seeds in ashes—and proved a great success. At the time of writing it was throwing out runners, and rapidly travelling over the ground during the wet weather. The photograph shows what can be done in the way of growing artificial grasses in the Yalleroi district on the so-called desert country, where the summer heat is intense. Yalleroi is 348 miles west of Rockhampton. We regret that the halation on the lower half of the photograph will not admit of its being reproduced in the Journal.

QUEENSLAND SHOW DATES FOR 1917.

We have received from Mr. J. Bain, hon. secretary of the Queensland Chamber of Agricultural Societies, the following list of Queensland show dates for 1917 allotted by the Chamber:—

Goombungee A.H. and P. Society (J. J. Morgan, secretary), 7th March.

Chinchilla A. and P. Association (W. L. Archer, secretary), 10th and 11th April.

Toowoomba—Royal Agricultural Society of Queensland (G. Noble, secretary), 24th to 26th April.

Esk—Toogoolawah P.A. and I. Association (T. C. Pryde, secretary), 1st and 2nd May,

Pomona—Noosa A.H. and I. Society (H. Robinson, secretary), 2nd and 3rd May.

Nanango A.P. and M. Society (S. Cavaye, secretary), 2nd and 3rd May.

Charleville—Central Warrego P. and A. Association (T. C. Fallis, secretary), 8th and 9th May.

Lowood and Tarampa P. and A. Association (W. E. Michel, secretary), 9th and 10th May.

Kingaroy A.P. and I. Society (R. A. Pearse, secretary), 9th and 10th May.

Springsure P. and A. Society (W. Fisher, secretary), 9th and 10th May.

Mitchell—Maranoa P.A. and I. Association (T. E. Shannon, secretary), 15th and 16th May.

Wondai A.P. and I. Society (H. J. Compagnoni, secretary), 16th and 17th May.

Boonah—Fassifern A. and P. Association (J. McKenzie, secretary), 16th and 17th May.

Roma—Western P. and A. Association of Queensland (H. M. Campbell, secretary), 22nd and 23rd May.

Mackay—Pioneer River Farmers and Graziers' Show Association (Frank Black, secretary), 22nd and 23rd May.

Ipswich—Queensland P. and A. Society (G. W. Allen, secretary), 23rd and 24th May.

Kilkivan P.A. and I. Association (M. O. Aronsten, secretary), 23rd and 24th May.

Maryborough—Wide Bay and Burnett P. and A. Society (H. A. Jones, secretary), 29th to 31st May.

Beaudesert—Logan and Albert A. and P. Society (M. Selwyn Smith, secretary), 30th May.

Marburg A. and I. Association (F. H. Bielefeld, secretary), 2nd and 4th June.

Gayndah P.I.A. and H. Society (E. M. Stephensen, secretary), 5th and 6th June.

North Pine—The Pine River A.H. and I. Association (G. Armstrong, secretary), 8th and 9th June.

Woombye—North Coast A. and H. Society (E. E. McNall, secretary), 6th and 7th June.

Gin Gin A.P. and I. Society (Chas. M. Morris, secretary), 13th and 14th June.

Rockhampton Agricultural Society (H. Hill, secretary), 21st to 23rd June.

Nambour—Maroochy P.A.H. and I. Society (J. J. Wilkinson, secretary), 4th and 5th July.

Lockyer A. and I. Society (F. Roberts, secretary), 4th and 5th July.

Biggenden A. and P. Society (C. J. Stephenson, secretary), 5th and 6th July.

Crow's Nest A.H. and I. Society (W. B. Carlile, secretary), 10th and 11th July.

Charters Towers—Towers P.A. and M. Association (A. H. Pritchard, secretary), 10th and 11th July.

Kilcoy P.A. and I. Society (H. G. Fien, secretary), 12th and 13th July.

Barcaldine P.A. and H. Society (W. J. R. Chambers, secretary), 24th and 25th July.

Rosewood A. and H. Association (A. J. Loveday, secretary), 25th and 26th July.

Woodford A.P. and I. Association (G. H. Osmond, secretary), 26th and 27th July.

Dalby P. and A. Association (James Hunter, secretary), 1st and 2nd August.

Caboolture P.A. and I. Society (C. V. Hemming, secretary), 2nd and 3rd August.

Brisbane—National A. and I. Association of Queensland (J. Bain, secretary), 13th to 18th August.

Gympie A.M. and P. Society (F. W. Shepherd, secretary), 29th and 30th August.

Bundaberg A.P. and I. Society (Redmond Bros., secretaries), 6th and 7th September.

Clifton—Darling Downs P.A. and I. Association (P. G. A. Murphy, secretary), 12th and 13th September.

Zillmere A.H. and I. Society (A. B. Marquis, secretary), 22nd September.

Beenleigh—A. and P. Society of Southern Queensland (R. Newburn, secretary), 27th and 28th September.

Mt. Gravatt—Mt. Gravatt and District A. H. and I. Society (H. Trim, hon. secretary), 8th September.

Cleveland—Cleveland A. H. and I. Society (E. Lewis, hon. secretary).

Coorparoo—Coorparoo Horticultural and Industrial Progress Association (W. D. Dell, hon. secretary), 1st September.

Mackay—Pioneer River Farmers and Graziers' Association (P. T. Dunworth, secretary).

Ingham—Herbert River P. and A. Association (R. L. Jones, secretary), 31st August and 1st September.

Wellington Point—Wellington Point A. H. and I. Association (R. C. Flitcroft, secretary), 24th November.

Mundowran—Mundowran Pocket Farmers' Association (A. J. C. Mathieson, secretary).

Oakey Creek, *viâ* Eumundi—Kenilworth Farmers' Association (G. B. Sutton, Secretary).

Answers to Correspondents.

GEOLOGIST, Cairns—

Your question as to the origin of the Stassfurt potash deposits, and your suggestion that similar deposits might exist in some portion of Queensland, involve a lengthy explanation. Some time ago we received the following paper from an unknown correspondent, who did not, however, state the source of his information:—

THE ORIGIN AND GEOLOGICAL FORMATION OF THE STASSFURT POTASH DEPOSITS.

The Stassfurt salt and potash deposits, according to the generally accepted theory of Herr Lierke, the agricultural chemist to the "Verkaufs-Syndicat der Kalkwerke," originated as follows:—These deposits had their origin thousands of years ago in a sea or ocean, the waters of which gradually receded, leaving, near the coast, lakes which still retained communication with the great ocean by means of small channels. In that part of Europe the climate was then tropical, and the waters of these lakes rapidly evaporated, but were constantly replenished through small channels connecting them with the main body. Decade after decade this continued until, by evaporation and crystallisation, the various salts present in the sea water were deposited in solid form. The less soluble material, such as sulphate of lime or anhydrite, solidified first, and formed the lowest stratum. Then came common rock-salt with a slowly thickening layer, which ultimately reached 3,000 ft., and is estimated to have been 13,000 years in formation. This rock-salt (slow formation) is interspersed with lamellar deposits of anhydrite, which gradually diminish toward the top, and are finally replaced by mineral polyhalite, which is composed of sulphate of lime, sulphate of potash, and sulphate of magnesia. The situation in which the polyhalite predominates is called the "Polyhalite Region," and after it comes the "Kieserit Region," in which, between the rock-salt strata, kieserit (sulphate of magnesia) is embedded. Above the kieserit lies the potash region, consisting mainly of carnallit, a mineral compound of muriate of potash and chloride of magnesia. The carnallit deposit is from 50 to 130 ft. thick, and yields the most important of the crude potash salts, and that from which are manufactured most of the concentrated articles, including muriate of potash. Overlying this potash region is a layer of impervious salt-clay, which acts as a watertight roof to protect and preserve the very soluble potash and magnesia salts which, had it not been for the protection of this overlying stratum, would have been long ages ago washed away and lost by the action of the water percolating from above. Above this salt-clay roof is a stratum of varying thickness of anhydrite (sulphate of lime), and, still above this, a second deposit of rock-salt (later formation), probably formed under more recent climatic and atmospheric influences, or possibly by chemical changes in dissolving, and subsequent precipitation. The salt deposit contains 98 per cent. (or often more) of pure salt—a degree of purity rarely elsewhere found. Finally, above this are strata of gypsum, tenaceous clay, sandstone, and limestone, which crop out at the surface. At some few places, through cracks and fissures, surface water has entered and either entirely carried away the potash deposits or changed them into secondary products. Resulting from this later action are beds of kainit, sylvinit, and other less important compounds in the upper strata.

This is the generally accepted theory as to the origin and formation of these deposits, which are found so plentifully in the vicinity of the Hartz Mountains, in Germany, and nowhere else in the world, so far as is known; and the fact remains that the potash salt deposits of the Stassfurt mines are so enormous as to be practically inexhaustible.

The Discovery of the Potash Deposits in Germany.

In the year 1839 the Prussian Government commenced the sinking of a shaft for the purpose of mining rock-salt. In 1851 a peculiar layer of saline compounds was met with at a depth of 1,066 ft. These deposits were of great chemical value; and Mr. H. Rose, an analytical chemist, directed attention to the salt as a source for potash compounds. Acting on his suggestion, the Governments of Prussia and Saxony exploited these deposits, with the result that the potash, up to that time derived from wood ashes, seaweed, &c., was replaced by the newly discovered mineral compounds. The mines were energetically worked, and crude material extracted to the amount of 40,000 cwt. per day. Since then the Stassfurt mines have supplied the agricultural world with the potash so much needed in agriculture.

How the Potash is Obtained.

Of the crude salts in the mines, carnallit is the one that occurs in greatest quantity. Seams of pure carnallit, consisting of muriate of potash and chloride of magnesia, are occasionally met with; but, generally, the vast deposits of carnallit are interspersed with seams of rock-salt and kieserit. It is generally used in the manufacturing establishments connected with the mines for the manufacture of muriate of potash. In this process it is first roughly ground and placed in pans where it is treated with chloride of magnesia liquor, and steam is passed through it to assist in dissolving it. In this way the muriate is dissolved out, and the solution is run into large iron crystallising tanks, where it is allowed to cool for three or four days, and a muriate of potash of 60 to 75 per cent. purity crystallises out. Various measures of treatment, including washing with cold water to remove the common salt and chloride of magnesia, are further resorted to, and the product is a muriate of potash varying from 70 to 99 per cent. purity, according to the process adopted. This muriate will analyse from 44 to 56 per cent. of pure potash.

When we consider the geological conditions as above stated under which the Stassfurt salt and potash deposits were formed, the question arises whether similar conditions exist in any portion of Australia. In the Hartz region, in Germany, it appears that these deposits had their origin in what was, thousands of years ago, the tropical region of Europe. They originated in a sea or an ocean, which gradually receded, leaving lakes, the waters of which rapidly evaporated, but were always replenished through small channels connecting them with the ocean. In the centuries the salts present in the seawater were deposited in solid form.

In South Australia there are numerous and extensive salt lakes and lagoons—some near the coast, others inland—the principal ones being Lakes Eyre, North and South, Torrens, Gairdner, Frome, and Blanche. These and others are mainly large expanses of mud, and occupy low-lying portions of the plain country. Various bores have been put down to considerable depths up to 4,000 ft. in different parts. We cannot say with what result. The fact that most of the known minerals are found in different parts of Australia gives rise to the idea that there may be areas where potash deposits may exist.

DERIVATION OF THE WORD "SILO."

"CURIOUS," Julia Creek—

The derivation of the word "silo" was given in this Journal in April, 1911; but as you may not have a copy of that date, we give you the information you ask for:—

The silo itself means a very great deal to the dairy farmer, since by its help he can tide his stock over several months of scarcity of feed. But it seems that J.S., our correspondent, wants to know the meaning of the word—the derivation of it. Here it is. The word silo came from the Greek *siros*—a pit or hole sunk in the ground for keeping corn in. Then *siros* became Latinised into *sirus*, and in its turn *sirus* in Spanish and French was corrupted into *silos*, or, as is found in old books in those languages, *silo;* and in Spanish there is the verb *ensilor*, which signifies the putting of corn into a silo; and the French writers gave the term "ensilage" to the material thus stored away. The father of modern ensilage, M. Goffart, was practically the first to use it. As to silos and ensilage being modern inventions, it is, on the contrary, as old as the Pharaohs, and possibly Noah fed his stock in the Ark on compressed ensilage. The old naturalist, Pliny, mentions it as being known in Thrace and Cappadocia. The Roman generals in Africa and Spain (he says) dug holes in dry ground, spread chaff or stubble underneath, and laid up grain in the ear in them. Most of the Greek authors—Euripides, Theophrastus, Hesychius, and Suidas—speak of the siros or silo.

Amongst the Eastern nations ensilage has been largely used. In Barbary often 200 or 300 silos have been found together, the smallest holding 400 bushels. In Egypt a similar method has been in vogue for ages. Colonel Burnaby, in his "Ride to Khiva," and Mr. O'Donovan, in "The Merv Oasis," both refer to the subject. The colonel tells how he met a party of men and women near Khiva, who were engaged in unearthing a quantity of grass from a deep cutting in the ground. This grass had been mown the previous autumn, and was thus preserved until such time as the owner required it; the grass was as fresh as the day it was cut. It is remarkable that the Kafir word for a grain pit is *essisile*, which seems to have affinity with silo. The South Sea Islanders have long practised the ensilage of breadfruit, taro, yams, &c. The Mexicans knew all about silos centuries ago. But we could write a whole book on the subject. This will probably suffice; *but will it suffice to induce some of our farmers to rise to the wisdom of our savage ancestors and build silos?*

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MARCH, 1917.

Article.		March. Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	4s. 3d.
Bran	ton	£4 17s. 6d.
Broom Millet	"	£22 to £24
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£3 15s. to £4
Chaff, Oaten	"	£5 to £5 10s.
Chaff, Lucerne	"	£3 5s. to £3 15s.
Chaff, Wheaten	"	£4 10s.
Cheese	lb.	9½d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£1 10s.
Hay, Lucerne	"	£1 10s. to £2 5s.
Honey	lb.	3¾d. to 4d.
Maize	bush.	2s. 6d. to 2s. 7d.
Oats	"	3s. to 4s.
Onions	ton	£7 10s. to £9 10s.
Peanuts	lb.	2d. to 3d.
Pollard	ton	£6 12s. 6d.
Potatoes	"	£4 5s. to £7
Potatoes (Sweet)	sug. bag	1s. to 1s. 3d.
Pumpkins (Cattle)	ton	£2 10s. to £2 15s.
Eggs	doz.	1s. 2d. to 1s. 10d.
Fowls	pair	2s. 9d. to 5s.
Ducks, English	"	3s. 6d. to 4s.
Ducks, Muscovy	"	5s. 6d. to 7s. 6d.
Geese	"	7s. to 9s 6d.
Turkeys (Hens)	"	9s. to 12s. 6d.
Turkeys (Gobblers)	"	18s. to 25s.
Wheat	bush.	3s. to 3s. 6d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	...
Cabbages, per dozen	2s. to 8s.
Cauliflowers, per dozen	...
Celery, per bundle	...
Cucumbers, per dozen	3d. to 1s.
Beans, per sugar bag	1s. to 3s. 3d.
Peas, per sugar bag	4s. to 7s. 6d.
Carrots, per dozen bunches	10d. to 1s.
Chocos, per half-case	...
Beetroot, per dozen bunches	...
Marrows, per dozen	1s. 6d. to 4s.
Lettuce, per dozen	1s. to 2s.
Parsnips, per bundle	6d.
Sweet Potatoes, per sugar bag	2s. to 2s. 6d.
Table Pumpkins, per dozen	2s. to 4s.
Tomatoes, per quarter-case	1s. 6d. to 3s.
Vegetable Marrows, per dozen	...
Turnips, per dozen bunches	10d. to 1s.
Rhubarb, per dozen bundles	1s.

SOUTHERN FRUIT MARKETS.

Article.	MARCH. Prices.
Bananas (Queensland), per case	7s. to 9s.
Bananas (Fiji), per case	16s. to 17s. 6d.
Bananas (G.M.), per case	18s. to 19s.
Custard Apples, per tray	..
Lemons (Local), per bushel-case	2s. to 5s.
Mandarins, per case	...
Mangoes, per bushel-case	...
Oranges (Navel), per case	17s. to 19s.
Oranges (other), per case	...
Pears, per case	...
Papaw Apples, per double-case	7s. to 9s.
Passion Fruit, per half-bushel-case	3s. to 6s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	5s. to 7s.
Pineapples (Ripleys), per double-case	4s. to 6s.
Pineapples (Common) per double-case	4s. to 6s.
Strawberries (Local), per dozen punnets*	...
Tomatoes, per half-bushel-case	1s. 4d. to 3s.
Granadillas, per double case	18s. to 20s.

* 1 punnet = 1 quart.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	MARCH. Prices.
Apples, Eating, per case	6s. to 11s.
Apples, Cooking, per case	5s. 6d. to 7s. 6d.
Bananas (Cavendish), per dozen	1d. to $3\frac{1}{2}$d.
Bananas (Sugar), per dozen	1d. to 3d.
Citrons, per hundredweight	10s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	...
Granadillas, per quarter-case	...
Grapes, per lb.	2d to 4d.
Lemons (Lisbon), per quarter-case	3s. to 4s. 6d.
Limes, per quarter-case	3s. to 4s 6d.
Nectarines, per case	1s. to 3s.
Oranges (Navel), per case	9s. to 10s.
Oranges (other), per case	4s. to 8s.
Papaw Apples, per quarter-case	2s. to 3s. 6d.
Passion Fruit, per quarter-case	3s. to 4s.
Peaches, per quarter-case	1s. 3d. to 3s. 6d.
Pears, per case	2s. to 3s.
Peanuts, per lb.	2d. to 3d.
Persimmons, per quarter-case	2s. to 4s.
Plums, per quarter-case	4s. to 5s.
Plums (prime eating), per case	..
Pineapples (Ripleys), per dozen	1s. to 2s. 6d.
Pineapples (Rough), per dozen	4d. to 1s. 3d.
Pineapples (Smooth), per dozen	6d. to 2s. 6d.
Quinces, per quarter-case	3s
Tomatoes, per quarter-case	1s. 6d. to 3s.
Watermelons, per dozen	2s. 6d. to 7s.

TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1917.

Animal.	FEBRUARY.
	Prices.
Bullocks	£18 7s. 6d. to £23
Bullocks (Single)	...
Cows	£12 5s. to £13 15s.
Merino Wethers	34s. 9d.
Crossbred Wethers	35s. 6d.
Merino Ewes	30s. 3d.
Crossbred Ewes	32s. 3d.
Lambs	36s.
Pigs (Porkers)	...

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

1917.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·46	5·21	6·41	5·41	6·19	5·58	5·46
2	4·58	6·46	5·22	6·41	5·41	6·18	5·59	5·45
3	4·59	6·46	5·23	6·40	5·42	6·17	5·59	5·44
4	4·59	6·46	5·24	6·40	5·43	6·16	6·0	5·43
5	5·0	6·46	5·25	6·39	5·44	6·15	6·0	5·42
6	5·1	6·47	5·25	6·39	5·45	6·14	6·1	5·41
7	5·2	6·47	5·26	6·38	5·45	6·13	6·1	5·39
8	5·3	6·47	5·27	6·37	5·46	6·12	6·2	5·38
9	5·3	6·47	5·28	6·36	5·46	6·11	6·2	5·37
10	5·4	6·48	5·29	6·35	5·47	6·10	6·3	5·36
11	5·5	6·48	5·29	6·35	5·47	6·9	6·3	5·35
12	5·6	6·47	5·30	6·34	5·48	6·8	6·4	5·34
13	5·6	6·47	5·31	6·33	5·48	6·7	6·4	5·33
14	5·7	6·47	5·32	6·32	5·49	6·6	6·5	5·32
15	5·8	6·47	5·32	6·32	5·49	6·5	6·5	5·31
16	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·30
17	5·9	6·47	5·34	6·30	5·50	6·2	6·6	5·29
18	5·10	6·47	5·35	6·29	5·51	6·1	6·7	5·28
19	5·11	6·47	5·35	6·28	5·51	6·0	6·7	5·27
20	5·12	6·46	5·36	6·28	5·52	5·59	6·8	5·26
21	5·13	6·46	5·37	6·27	5·52	5·58	6·8	5·25
22	5·13	6·46	5·37	6·26	5·53	5·57	6·8	5·24
23	5·14	6·45	5·38	6·25	5·53	5·56	6·9	5·23
24	5·15	6·45	5·38	6·24	5·54	5·55	6·9	5·23
25	5·16	6·45	5·39	6·23	5·54	5·54	6·10	5·22
26	5·16	6·44	5·39	6·22	5·55	5·52	6·10	5·21
27	5·17	6·44	5·40	6·21	5·55	5·51	6·11	5·20
28	5·18	6·43	5·40	6·20	5·56	5·50	6·11	5·19
29	5·19	6·43	...	...	5·57	5·49	6·12	5·18
30	5·19	6·42	...	...	5·57	5·48	6·12	5·18
31	5·20	6·42	...	..	5·58	5·47	...	...

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

			H. M.
8 Jan.,	○	Full Moon	5 42 p.m.
16 „	☽	Last Quarter	9 42 „
23 „	●	New Moon	5 40 „
30 „	☾	First Quarter	11 1 a.m.

There will be a total eclipse of the moon on 8th Jan before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

7 Feb.,	○	Full Moon	1 28 p.m.
15 „	☽	Last Quarter	11 53 a.m.
22 „	●	New Moon	4 9 „

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

1 Mar.	☾	First Quarter	2 43 a.m.
9 „	○	Full Moon	7 58 „
16 „	☽	Last Quarter	10 33 p.m.
23 „	●	New Moon	2 5 „
30 „	☾	First Quarter	8 36 „

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m

7 Apr.	○	Full Moon	11 49 p.m.
15 „	☽	Last Quarter	6 12 a.m.
22 „	●	New Moon	12 1 „
29 „	☾	First Quarter	3 22 p.m.

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING FEBRUARY, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of Years' Records.	Feb., 1917.	Feb., 1916.		Feb.	No. of Years' Records.	Feb., 1917.	Feb., 1916.
North Coast.	In.		In.	In.	*South Coast—continued:*	In.		In.	In.
Atherton	9·83	15	9·83	7·06					
Cairns	15·41	34	6·09	7·34	Nambour	9·40	20	5·58	3·57
Cardwell	17·13	44	22·09	6·33	Nanango	4·69	34	1·68	2·21
Cooktown	13·87	40	11·57	4·97	Rockhampton ...	8·15	29	5·46	0·73
Herberton	7·37	29	7·79	10·48	Woodford	9·80	29	3·02	1·91
Ingham	15·51	24	23·93	10·86					
Innisfail	22·44	35	19·20	11·85					
Mossman	11·48	4	17·95	5·33	*Darling Downs.*				
Townsville	12·08	45	20·06	7·54					
					Dalby	2·94	46	3·45	4·45
					Emu Vale	2·27	20	2·73	5·78
Central Coast.					Jimbour	3·14	28	1·68	2·24
					Miles	2·69	31	4·12	3·30
Ayr	9·47	29	10·49	7·49	Stanthorpe ...	3·40	43	4·29	4·98
Bowen	8·76	45	12·04	6·85	Toowoomba ...	4·55	44	6·85	3·39
Charters Towers ...	4·19	34	7·45	8·78	Warwick	3·03	29	2·57	4·24
Mackay	11·78	45	18·49	4·92					
Proserpine	10·94	13	14·15	8·00					
St. Lawrence ...	8·34	45	10·58	2·19	*Maranoa.*				
					Roma	3·18	42	4·88	1·22
South Coast.									
Biggenden	3·92	17	2·93	4·06	*State Farms, &c.*				
Bundaberg	6·43	33	8·46	5·07					
Brisbane	6·63	66	1·64	15·21	Bungeworgorai ...	3·02	4	4·43	1·40
Childers	6·03	21	6·73	8·54	Gatton College ...	3·27	17	4·01	2·26
Crohamhurst ...	15·03	25	6·97	1·78	Gindie	2·68	17	6·17	0·48
Esk	6·00	29	3·89	6·15	Hermitage ...	2·33	10	2·83	4·55
Gayndah	4·29	45	3·11	3·65	Kairi	6·18	4	8·99	4·83
Gympie	6·91	46	2·84	3·19	Kamerunga ...	14·62	26	7·41	7·04
Glasshouse M'tains	11·07	8	3·90	2·55	Sugar Experiment				
Kilkivan	5·36	37	2·33	2·65	Station, Mackay	10·35	19	14·80	6·42
Maryborough ...	6·74	45	6·28	7·44	Warren	3·92	4	7·25	2·08

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for February this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

Farm and Garden Notes for May.

Field.—During this month, the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now at this work. Potatoes should be hilled up. Cut tobacco. The last of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Cotton-growers are notified that cotton-ginning and baling machinery has been installed on the premises of the Department of Agriculture and Stock in William street, where seed cotton will be received by the department from the growers. to whom an advance of 1¾d. per lb. will be paid. The cotton will then be ginned, baled, and marketed in the best market, and whatever balance to credit is shown when account sales are received will be distributed amongst the suppliers according to the amount of cotton supplied by them. Only bare expenses of preparing the shipments and freight, if the cotton is exported, will be deducted. Thus it will be seen that cotton-growers will have a sure market for their produce. Every effort should be made to ensure feed for stock during the winter by utilising all kinds of green fodder in the form of silage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to their particular district and soil. A few acres of artificial grass, notably Rhodes grass, will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West will carry ten to twelve sheep to the acre. Coffee-picking should now be in full swing, and the berries should be pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Annetta, Phenomenal, Hautbois, and Trollope's Victoria. Aurie and Marguerite are the earliest. In some localities, strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

Kitchen Garden.—Onions which have been planted in seed beds may now be transplanted. The ground should long since have been thoroughly cleaned, pulverised, and should be rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these as well as of peas, broad beans, kohl-rabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for asparagus.

Flower Garden.—Planting and transplanting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, pentstemons, heliotrope, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs such as anemones, ranunculus, snowflakes, freesias, ixias, watsonias, iris, narcissus, daffodils, &c. Tulips will not suit the Queensland climate, but hyacinths may be tried, although success is doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip hedges and edgings.

Orchard Notes for May.

THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this Journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to specking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this be done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil; keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting; but should there have been a dry spell, then, when the whole has been dug and the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free, sandy loams that are naturally scrub soils, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost—as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—way be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

THE TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild—viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the Southern Coast Districts being equally applicable here.

THE SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district the growing of a crop of blue or grey field peas, or a crop of vetches between the trees in the older orchards, is recommended as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas phosphate, or fine bonedust, per acre. The crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen, as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months, and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; scaly fruit, scabby, warty, or otherwise unsightly fruit is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruit and the work of the orchard generally, made when dealing with the coast districts, apply equally well here, especially as regards handling the crop and keeping down pests.

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Agriculture.

CEREAL CROPS.

WHEAT.

The Soil.

We know that all soils are not alike—all do not contain the same plant food. If you were to sow wheat in pure sand, or potatoes on stiff yellow clay, you could not expect to get a good crop of either. For a wheat crop, the most suitable soil is one containing a certain amount of clay, constituting a clayey loam. Light calcareous soils with a due proportion of clay are also suitable. Wheat is a crop which, all over the world, gives the best results on strong soils—*i.e.*, those having a considerable admixture of clay. On this account, deep, argillaceous soils, having a large proportion of humus, combined more or less with sand or gravel, are commonly known as "Wheat Lands." Nevertheless, wheat is often successfully grown upon sandy and alluvial soils, and in Queensland on the red volcanic soils common in nearly every part of the State. This, however, is always true: Wheat can only be grown systematically—that is, as a branch of general farming—upon land that is either naturally or artificially in high condition. Wheat makes heavy demands upon the soil, and takes from it its best and most precious constituents. The red, volcanic soils owe their great value as farming lands, not so much to their intrinsic fertility as to physical qualities. They are nearly always very deep, well-drained, and their ultimate particles exist in the form of an almost impalpable powder. They are as excellent for wheat-growing as they are for lucerne and sugar-cane.

The presence of lime in the soil is necessary for the production of good wheat crops and other cereals, such as barley, oats, maize, &c. Since wheat is a deep-rooting plant, it is essential that the land be deeply ploughed. In times past this was not considered necessary on some of the farms on the Darling Downs, but the practice of sowing on land barely scratched with the plough has long since been abandoned. On our western plains, where there is a sparse rainfall when the crop most requires the aid of moisture, deeply prepared soil is needed, as well as deep cultivation. But loose tilth is not required, as the wheat crop flourishes in a firm seedbed. Rolling may be done directly after harrowing or when the crop is beginning to cover the ground. It helps to firm the surface, levels down clods, and presses the earth about the roots of the plants. But rolling should only be done in dry weather, as the soil in wet weather adheres to the roller. The effect of rolling is to promote the growth of the crops and to facilitate harvesting operations. Again, the plant cannot grow if the soil does not support it in a fixed position, while the effects of alternating rainy and dry weather are to draw the soil away and to destroy that close relation between soil and plant which is necessary for the process of vegetation. The roller counteracts this loosening effect and restores the required close contact between soil and stem, and between soil and roots, and this is especially important for the wheat crop during its growth, and also in the matter of facilitating the harvesting by levelling the ground.

SEED.

The selection of seed is a most important matter—in fact, it may be said it is *the most important* operation in wheat-growing. In this connection, the Department of Agriculture and Stock has greatly assisted the farmer, both by importing the best varieties of seed wheat for them and also by breeding wheats at the Roma State Farm which have given excellent results.

If a farmer wishes to grow his own seed wheat, he should study the methods adopted at the State Farms, and, in a general way, proceed in this manner:—

Sow the seed on a specially prepared plat of, say, 1 acre, more or less, according to the size of the farm, and the quantity of land proposed to be put under wheat. Plough the plat early. Get it into the best possible condition, and keep it in a high state of fertility. When the wheat is in ear, go through the field and pick out and mark plants which show the qualities it is desired to perpetuate. Choose those which are well stooled, and whose heads are filled with plump grain. The straw should stand up well, and, as much as possible, be free from rust. When the wheat is ripe, cut these marked plants with a sickle, and thresh them out separately. Then, carefully screen the seed; pick it over by hand and save only the largest and plumpest grain for sowing. Next season sow the seed thus saved at the rate of 35 to 40 lb. per acre. Do the same every year, and it will be found that the wheat, so far from degenerating, will improve. It is well to locate the seed plat on a different part of the farm every year.

Smut and Bunt.

Before sowing for a crop, the wheat seed must be treated in a certain manner for the prevention of smut, a fungoid disease which, unless combated, will often cause the loss of half the crop. It attacks wheat, oats, barley, rye, and many grasses. When wheat is affected, the ears are seen to be covered with a dark powder, the floral organs and their coverings are destroyed, and in their place is a mass of dark, chocolate-coloured powder, consisting of small spores. Before harvest time these blow away, and settle on the healthy ears, and remain there till seed-times, when the disease again appears.

Bunt is another fungoid disease which attacks wheat. It differs somewhat from smut, for which it is often mistaken. The evil effects are not seen till harvest time, when, if an apparently healthy ear is opened up, it will be found to contain nothing but a greasy, evil-smelling mass of black spores. If bunted grain be mixed with healthy grain, the effect is that the whole is blackened and rendered practically unsaleable.

These spores of smut or bunt remain on the wheat after it is threshed, and unless precautions are taken they will be sown along with it, and the crop will, to a certainty, be bunted or smuted. There are at least two methods adopted whereby the smut spores are destroyed. One way is to pickle the seed it is intended to sow in a solution of sulphate of copper—1 lb. of sulphate of copper in 5 gallons of water, which quantity will steep 4 bushels of wheat. The wheat may be either put into a gunny bag, which is dipped into the solution and then allowed to drain. Or, the grain may be spread out on a smooth floor, and the solution poured over it, turning it once or twice with a shovel, but this is a very wasteful way. If the dipping plan is adopted, only a minute or two is necessary for the process, in the case of a bluestone solution, on account of its corrosive action. The seed is then spread out to dry, and, if left in a thin layer over night, it is ready for sowing in the morning. The copper will have formed a thin film on the seed, which effectually destroys the smut spores which may be adhering to it, without injury to the grain.

The second method is to treat the seed with a solution of formalin at the rate of 1 lb. of formalin to 40 gallons of water, but in this case five minutes are allowed for dipping. Both methods are equally efficient. The bluestone solution may be used again and again, but the formalin is volatile, and it follows, therefore, that only the amount of formalin should be prepared that is required for immediate use, and sprinkling in this case should be preferred to dipping. Formalin is poisonous, and must be kept where there is no chance of children or others obtaining it in ignorance of its nature. One gallon of formalin solution is sufficient for 4 bushels of seed.

Relative Merits of Formalin and Bluestone.

In comparing the two solutions of formalin and bluestone, it must be remembered that, as above stated, formalin is volatile and non-corrosive, while bluestone is very corrosive. The original formalin solution must be kept securely corked. The cost of either is practically the same, and the formalin is less injurious to the grain than bluestone. The corrosive action of bluestone can be lessened by dusting powdered lime over the grain immeditely after treatment, but this prevents sowing with the drill. The destruction of a certain proportion of the seed grain is not an unmixed evil, because it will act most injuriously on those grains already somewhat damaged, and which are consequently most likely to produce a weakened plant.

The Hot Water Treatment.

In addition to the above methods of "pickling" wheat seed, the "Hot Water Treatment" may be mentioned. For this purpose, either boilers or washtubs may be used. Two of these are required, also, a basket or, as before, a gunny bag. The latter is filled to three parts of wheat; then one of these is filled with water treated to 120 degrees Fahr., and the other with water heated to 135 degrees Fahr. A smaller vessel containing boiling water should be at hand, also a good supply of cold water. The seed to be treated is placed in a basket, gunny bag, or in a perforated kerosene tin. The vessel containing the seed is plunged into the first tub or boiler (120 deg. F.), and is moved about for a minute or two till the grain has all been warmed, lifting and lowering it several times meanwhile. A thermometer should be at hand to test the heat of the water, which must not be allowed to go lower than 120 deg. F. Then it is plunged into the second tub or boiler, in which the water has been heated to 135 deg. F. There it is left for ten minutes, and constantly moved about to agitate the grain. Should the temperature fall below 135 deg. boiling water must be added. The vessel containing the grain is then taken out and plunged into cold water, after which the grain is spread out on the barn floor to dry, when it will be ready for sowing.

Preparation of the Land.

The preparation of the ground for a wheat crop is very simple, yet there are still farmers who do not take any trouble to prepare the ground in such a manner as to ensure a fair crop. In some cases, they merely scratch the soil with the plough, and even, in the past, did not go beyond harrowing the seed into unploughed land. Wheat land should have two ploughings to a depth of at least 6 inches. In the United States of America, certainly, experiments in deep and shallow ploughing for wheat showed that the depth of ploughing is not of so much importance as a firm seed-bed, the upper portion of which is mellow and in good tilth, subsoiling not being considered financially profitable. Such shallow ploughing, however suitable it may be for the wheat-growing States of America, is not calculated to produce the best results in the climate of Queensland. After the first two ploughings, a first harrowing should follow and the ground be got into the best possible condition before sowing. In sowing, this may either be done broadcast or, as is now universally done, by a seed-drill. In sowing broadcast, one bushel per acre is more than sufficient. With a seed-drill 20 lb. is ample. Many farmers sow too much seed. Take the instance of 1 bushel to the acre. Fair average seed will run 800 grains, and good plump seed 700 grains to the ounce, so that a bushel of 60 lb. contains 750,000 grains. In a square acre there are 4,840 square yards, or 43,560 square feet. Thus, a bushel to the acre means from 15 to 18 seeds per square foot. Say that one-quarter of this fails to germinate, being partly eaten by birds, partly insufficiently covered, yet we still have from 12 to 14 plants per square foot—that is, just twice as many as there should be. A seed-drill is generally constructed to sow from 35 to 40 lb. per acre, and, since the seed is all properly covered, there will be nearly as many plants per acre as with a bushel sown broadcast. What is the result of this crowding of the plants? They have to fight each other for moisture and plant food, and thus become stunted and do not stool out properly. Far better, then, to drill in only 20 lb. of seed per acre.

Now, about harrowing after sowing. The harrowing should be done crosswise to the direction in which the land was ploughed. The work will thus be more effective, and it will be better for the crop. Rolling the wheat, even when it is a foot high, is also productive of good. The rolling prevents "lodging" by consolidating the soil, and thus, by decreasing its power to supply overmuch nitrogen to the plants, results in the production of a less luxurious plant, with roots which have a firm hold of the consolidated soil. In this way the danger of lodging is avoided.

Should the great enemy of wheat—rust—make its appearance, it is well not to be in too great a hurry to cut the crop for hay, as it is quite possible that a really good grain crop may be sacrificed. Should the rust, however, unfortunately go too far, then, by all means, cut it, for it will pay as hay, whereas it will be worth nothing for grain.

The best time to sow wheat in the Southern part of the State is from April to June. March is considered the best time farther North. If early sowing is necessary, sow thin; if late, sow thicker.

LIME IN AGRICULTURE.

The use of lime in agriculture is of more importance than is recognised by many farmers. If there is no lime in a soil, no crop can thrive on it, as all plants require more or less of it. Lime acts in two ways. It is not a direct fertiliser, but it acts with acids in making clay soils more friable and pervious to water, and it promotes the decomposition of vegetable matter and organic manures, and the formation of nitrates in the soil. It also acts in rendering available all three of the plant foods which lie dormant in the soil. That is its chemical action. Its physical action, as we have said, is to render stiff clays easier to cultivate, and better able to supply moisture, heat, and air to the plant. It improves the texture of sandy soils, making them more compact, and better able to retain moisture and fertilisers. The time to apply lime is a little while before planting a crop. It should not be ploughed in. It is of great value in destroying insects, worms, and fungi. As to how much to use, some farmers put on from 2 to 5 tons per acre at intervals of from five to ten years. Others put on half a ton annually.

Lime may be applied in the form of burnt lime or air-slaked lime, but pulverised limestone has several advantages over these forms. Much inquiry has been made by farmers as to supplies obtainable and prices of ground limestone, and the Department of Agriculture invited a number of firms in a position to supply the demand to quote prices for pulverised and burnt limestone.

The firms communicated with were the undermentioned:—

Messrs. Campbell and Amos, Bundaberg.
The Calcium Lime Quarries, near Townsville.
Chillagoe Limited, Cairns.
Australian Co-operative Fertilisers Company, Degilbo.
Mount Morgan G.M. Company.
Queensland Cement and Lime Company, Creek street, Brisbane.
The Proprietor, Ambrose Quarries, N.C. Line.

Four of these firms replied, and gave the following quotations:—

—	Ground Limestone. Per ton. In Bags—(Truck loads).	Burnt Limestone. Per ton. In Bags.	Burnt Limestone. Per ton. In Tanks.	
	£ s. d.	£ s. d.		
The Queensland Cement and Lime Company	1st year 1 0 0	2 15 0	..	On trucks at Gore. (Freight, Gore to Brisbane, 8s. per ton). These prices subject to reduction later.
Australian Co-operative Fertilisers Co.	2 5 0 (In 6-ton truck loads)	..	..	
Campbell and Amos..	..	1 10 0	..	Bags returnable at 3s. per dozen
Mount Morgan Gold Mining Company	0 17 6 In truck loads at Marmor, cost in Gympie, 28s. 6d., Brisbane, 32s. 11d.	..	.. £1 7s. 6d. net.	Bags returnable, at 3s. per dozen on rails, Raglan.

A reply has since been received from Mr. H. Ambrose (Ambrose Quarries), quoting burnt lime on trucks at 35s. per ton in bags, the latter to be returned or allowed for. Lime f.o.b. Rockhampton, £2 2s. 6d. per ton in tanks, the buyer to provide tanks, or the company will supply and charge for them.

SEVENTY BUSHELS OF OATS TO THE ACRE.

THE "LIFTER" OAT.

Mr. W. H. Mogridge, Tannymorel, writes us in reference to a valuable variety of oats, called the "Lifter," the seed of which he obtained last year from South Australia. He speaks very highly of this new variety, of which he has seed for disposal. The "Warwick Examiner" of 21st March, contains a very interesting article, giving the history of this oat, taken from the "Adelaide Chronicle," as follows:—

"In the Myponga district this year some of the finest crops in Australia may be seen at the present time, and yields of 4 tons of hay per acre will be a common harvest. Mr. G. Hunt, of Myponga, has what is described as one of the crop pictures of the year. It is a field of oats, from which a return of nearly 70 bushels per acre is confidently expected. Some years ago Mr. C. Forbes, of Yankalilla, imported from America a small sample of oats, which had produced wonderful crops there, and in characteristic fashion the American seedsman who supplied the sample pointed out in the printed particulars forwarded with the parcel that all who had so far planted this variety of oats had in a year or two ' lifted their mortgages' from the proceeds. Mr. Forbes dispensed the seed in small lots at the rate of about a shilling an ounce, and the enterprising farmers who obtained samples have reason to be grateful to the importer, for the new strain has yielded enormous crops on every farm on which it was planted. The process of raising enough to sow paddocks has been slow, but the corner in that respect has been rounded, and the grain will soon be found in other parts of the State. Mr. Hunt was one of the purchasers of the shilling packets about six years ago. He planted every seed—there were about sixty—and carefully harvested the crop, the result being about a gallon of splendidly-developed grains. In the following year he gathered about 1½ bushels of grain, and sowed the whole of it the next season. So prolific was the crop that he harvested at the rate of 64 bushels to the acre. With this 64 bushels in the succeeding year he planted 15 acres, and the portion reserved for grain yielded 50 bushels to the acre. This was last year, when the drought was so bad. Eight of the 15 acres were cut for hay, the balance of 7 acres giving him 151 bags of first-class seed. This year he has 80 acres under crop in different paddocks, and he expects to harvest at least 1,000 bags, in addition to cutting hay. The ' picture' crop consists of 9 acres, which stands fully 7 ft. in height. It is by far the best specimen of a crop seen this season, and Mr. Hunt says it will give nearly 70 bushels to the acre. In another paddock he has 16 acres that is about 6 ft. high, and will give over 3 tons of hay, or about 60 bushels of grain per acre. Still another fine crop, nearly 6 ft. in height, covers 27 acres, and a fourth paddock of 30 acres, which was sown later, is not out in head yet, although over 5 ft. high. Mr. Hunt's nephew at Myponga (Mr. J. Hunt) has 8 acres of the American oats alongside a field of Algerian, and the two are described as the best crops over seen in the Southern Hemisphere. These magnificent returns are the result of a shilling investment six years ago, and as the growers have lost the name of the oats received from the seller, they have appropriately given the variety the title of ' Mortgage Lifter.' "

FLAX-GROWING FOR FIBRE.

In the February issue of the Journal, we published some notes on growing flax for seed (linseed). Concerning the cultivation of the plant for the sake of the fibre, Dr. J. Vargas Eyre writes as follows in " The Times Trade Supplement":—

" From the agricultural point of view no difficulty is experienced in raising flax as a fibre crop, the choice of suitable land being moderately wide. The matters of greatest consequence are that the land be clean and well prepared, and that good seed be sown. It is a crop which grows rapidly, and when sown in March or early April comes to harvest before the usual grain crops. The value of the crop when grown for fibre purposes depends largely upon the manner in which it is harvested.

The stems must be arranged parallel with one another in neat bundles, and up to the present day this is done by pulling the stems from the ground by hand—an operation which is both strenuous and costly to perform.

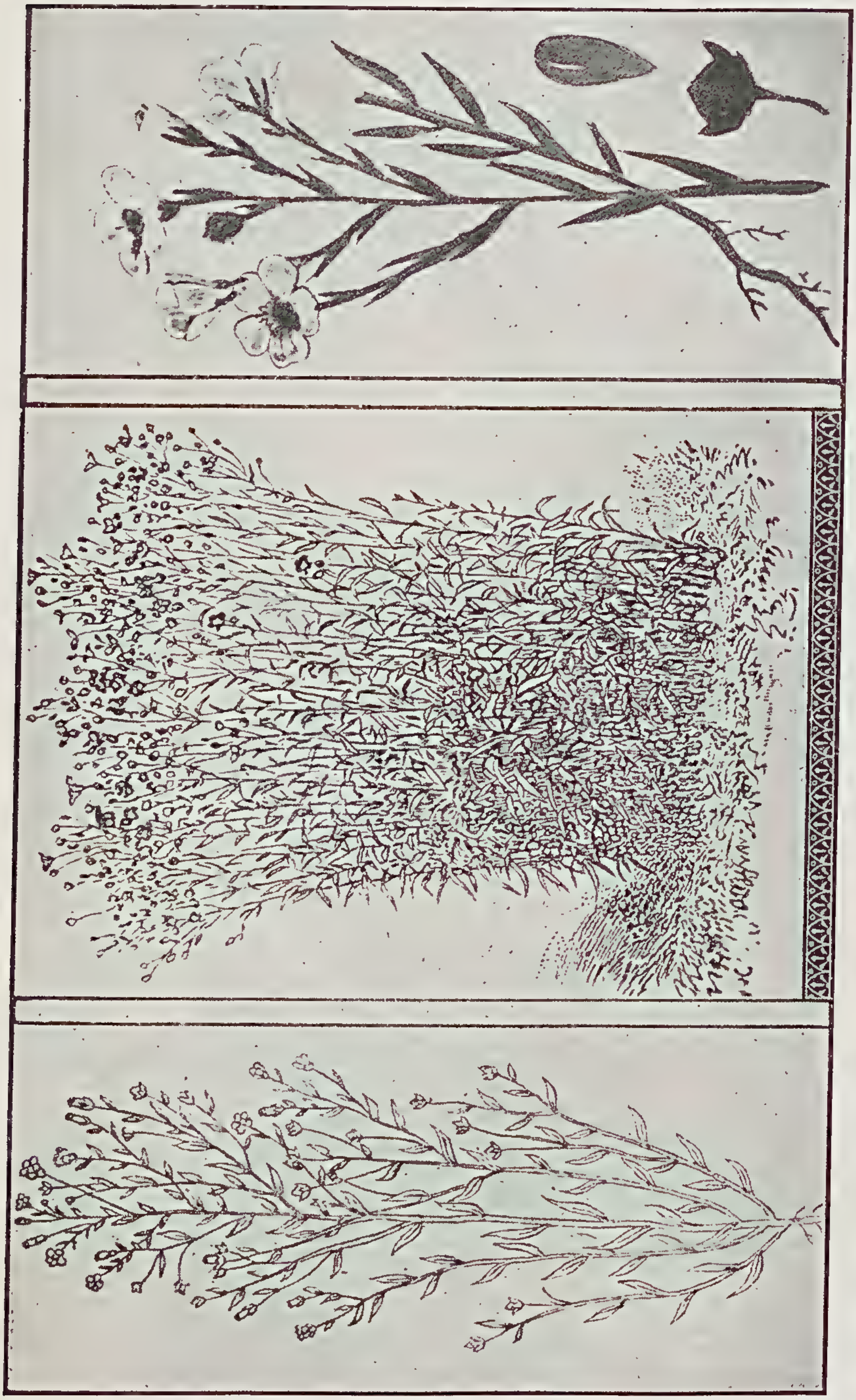

FIG. 1.—Flax Grown for Seed.

FIG. 2.—Flax for Fibre.

FIG. 3.—Flax Plant.

PLATE 12.—FLAX PLANT (LINUM USITATISSIMUM).

"After drying in the field for a few days, the seed is removed by some simple device which does not disarrange the long flax stems, and the straw is then ready for the operations necessary for separating the fibre from the straw. The valuable part of the straw—namely, the fibre —is situated almost on the outside of the stem, where it forms a series of irregular groups or bundles running longitudinally, which are held in position by a gummy or resinous material. Before the harvested straw can be utilised by the spinner in the customary way, these bundles of long fibres have to be isolated, and notwithstanding the large number of processes which have been devised for accomplishing this separation, the most satisfactory method is to allow the stems to damp-rot, a process which is known as *retting.*

METHODS OF RETTING.

"From the earliest times to the present the process of retting has been conducted either by submerging the flax stems in water or by allowing alternate dew, sunshine, and rain to carry forward the decomposition of the gum so that the fibre may be readily detached from the woody part of the straw. These operations, known respectively as water-retting, or steeping, and dew-retting, are still the most usual and most satisfactory means to adopt, and, as carried out to-day in the principal flax-growing districts of Europe, present little departure from the methods adopted in medieval times.

"Dew-retting is the simplest of all methods of retting which have been devised, as it only necessitates spreading the straws thinly over the ground in regular rows, where they are allowed to remain for about six weeks, during which time they are occasionally turned over. As might be expected, the fibre resulting from this treatment is generally discoloured and low in quality; nevertheless, enormous quantities of dew-retted flax are annually prepared in Russia, Austria-Hungary, and other countries.

"The other method of retting referred to—namely, water-retting, as practised in Ireland, Russia, Silesia, France, and parts of Holland and Belgium—is still conducted on primitive lines. The bundles of straw are packed closely into pits containing water, a light covering of straw or leaves put on the top, and upon this a suitable weight of stones is arranged so as to keep the whole mass submerged during the retting period. During summer weather the usual time for steeping flax is from ten to twelve days, and when the adjudged point has been reached the straw is removed and either spread over grass land or opened out and stood upon end to dry.

"In certain districts a somewhat different practice obtains. For instance, in the south of Holland and East Flanders the bundles of flax are kept submerged in the water by covering the entire mass with mud, whilst in Friesland the bundles are merely floated upon the surface of the water and are frequently turned over. There can be no doubt that the best flax fibre comes from the neighbourhood of the River Lys, near Courtrai, where the practice is followed of twice submerging the straw in the river—a method known as double-retting or Lys-retting. For the production of high-class fibre this method stands before all others which up to the present have been tried. It is a practice which originated in the neighbourhood of Courtrai about the middle of last century, soon after it had been discovered that retting is primarily a fermentation process.

" The Belgian workers have undoubtedly acquired remarkable skill and judgment in retting and handling the wet stems, but it is probable that their singular success is to be attributed in some measure also to the character of the River Lys, to its sluggish movement, to the organic matter it carries from towns higher up its course, and to the fact that large quantities of flax are annually retted in its waters.

" Following the retting process, the flax straw is carefully dried, then passed between fluted rollers so as to break up the brittle woody part of the stems and leave the long, more elastic fibres uninjured. These are then freed from the loosely adhering broken pieces of stem by a beating process which is known as *scutching,* now performed by machinery so devised that the old-fashioned hand-beating with flat wooden blades is reproduced."

RHODES GRASS AT YALLEROI.

We have received from Mrs. J. Adams another photograph of the remarkable crop of Rhodes Grass grown at Henley Park, and mentioned in the April issue of the Journal. The grass, we are informed, was

PLATE 13.—RHODES GRASS GROWING ON HENLEY PARK, 19TH MARCH, 1917; HEIGHT, FIVE FEET.

grown on unploughed land, the seed being scattered on the surface just before the spring showers. It is now 5 ft. high and spreading fast. It is grown in desert country.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towleston," Kingsthorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	2	6	Ayrshire Herd Book of Queensland
		2	3	Holstein-Friesian Herd Book of Australia
		3	13	Jersey Herd Book of Queensland
J. W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	9	37	Holstein-Friesian Herd Book of Australia
R. Conochie	Brooklands, Tingoora	9	21	Queensland Jersey Herd Book
W. J. Barnes	Cedar Grove ..	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine ..	6	31	Queensland Jersey Herd Book

Poultry.

FINAL REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1916, TO MARCH, 1917.

The thirteenth egg-laying competition at the Queensland Agricultural College was brought to a close on 31st March, 1917. In all, 438 birds were subjected to the year's test, 318 in groups of six, while 120 were tested individually. Last year the single-hen test was introduced for the first time in the Gatton competition, and the results obtained fully justify the innovation. In truth, the group testing has to a great extent served its purpose. It merely indicated the general quality of the competitors' flocks, and while this is certainly of value in letting the general public know where poultry of quality can be obtained, it does not serve any considerable purpose in indicating the qualities of the individual hen. But rapid improvement in stock can only be secured by mating together the individual best, and it is because the single-hen test finds the best individual layers that it is so important. Analysing the results of the single test, it is very significant that the Dixie Egg Plant should have entered five splendid layers who averaged 279 eggs per bird, while the sixth hen proved to be quite barren. In other cases considerable variation in the egg-laying capacity of individual birds is shown, while for such breeders as Miss Hinze, T. Fanning, J. Zahl, J. M. Manson, A. T. Coomber, and J. H. Gill, the test has proved of exceptional value in indicating the uniformity of their stock. It is the desire of the College authorities to replace all the six-hen pens with single-hen pens, and it is hoped that the Government will recognise the importance and value of such a move. At present money may not be available for such a reconstruction, but it is anticipated that this work will be carried out at the first opportunity. In regard to this, it cannot be forgotten that both in New South Wales and Victoria they have recognised the necessity of single hen testing only, and have dispensed with their group pens. Further, primary industries are destined to play a most important part in the Empire's recovery after the war. In no way can that section of primary production, egg production, be assisted better than by promoting ample facilities for single hen testing, so that the general efficiency of the flocks may be improved.

GENERAL DISCUSSION OF RESULTS.

Although in the past competition no records were broken, it is particularly interesting to note that four pens reach or exceed a total of 1,500 for six hens, while ten exceeded 1,400. On the other hand, a greater number than was expected fell below 1,200. As a result of the whole, the average per hen works out at 209·7 eggs. This is lower than any competition at the College for the past five years. In part, this can be explained by the fact that the number of competitors was increased by 20 pens, and probably younger or less experienced breeders were admitted, but the main cause was the weather conditions. The heavy egg-producing months were characterised by excessive rains, as shown by the following table:—

	Rainfall in Inches.	Number of Rainy Days.
1916—		
April	4·83	10
May	·30	2
June	1·95	9
July	1·57	5
August	1·79	6
September	1·84	6
October	2·93	9
November	4·96	11
December	2·63	10
1917—		
January	4·81	14
February	4·01	8
March	2·97	10

In examining the general results below, it is significant to note that the five leading teams were tested in single pens, and that all of them were owned by Queensland breeders, thus indicating a very high and uniform standard of egg production in some of our yards.

HEALTH OF THE STOCK.

During the year nineteen birds died—one from heat apoplexy, six from crop troubles following chicken pox, and twelve from ovarian disorders. During the year we had 471 cases of broodiness: one pen of six hens had 40 cases; others, 33, 28, 28, 23, 22, 22, 20, 18, 12, and down to 1 respectively.

FINANCIAL ASPECT.

Although it is difficult to draw definite financial conclusions from an egg-laying competition such as this, still it is of very considerable interest to see how the cost of feed compares with the net returns for eggs. Naturally, the cost of labour cannot be entered; for in a competition labour and supervision are far in excess of what is required in a commercial enterprise. Further, the cost of rearing pullets to the laying stage cannot be included, but this item can be practically cancelled, inasmuch as the sale of cockerels as table birds should cover this expenditure. Referring to the financial statement below, and neglecting the entry fees received and prize money paid, we have the average return per bird as 18s. 8d., and the average cost per bird for feed only 6s. 2¾d., giving an average profit per bird of 12s. 5¼d. Obviously this profit is much larger for the top pens than for the lower. Also, the returns shown scarcely indicate the relative values of each pen, as those which laid heavily during the winter months, or at times when eggs were dear, returned a higher profit than those which laid heavily during the flush season. It is hoped to keep records during the coming competition as will give these details.

A NOTE OF WARNING.

During the competition careful weighings of eggs were carried out, with the following results:—

RESULTS OF WEIGHING EGGS FROM SIX HEN PENS.

Competitors.	Breed.	Average Weight per Egg.	Competitors.	Breed.	Average Weight per Egg.
		Oz.			Oz.
A. T. Coomber ...	S. Buttercups	2·10	H. Hammill ...	W. Leghorns	2·00
P. Brodie	W. Leghorns	2·00	W. Lindus ...	Do. ...	2·00
S. B. Tutin ...	Do. ...	2·00	Mars Poultry Farm	B. Orpingtons	1·85
J. Anderson ...	Do. ...	2·15	F. Clayton ...	W. Leghorns	1·90
T. Taylor	Do. ...	1·95	Moritz Bros. ...	Do. ...	2·05
G. Tomlinson ...	Do. ...	1·90	A. F. Camkin ...	Do. ...	1·90
E. F. Dennis ...	B. Orpingtons	1·80	W. Becker ...	Do. ...	2·00
F. Clayton ...	R. I. Reds ...	1·95	E. F. Dennis ...	W. Wyandottes	1·60
Mrs. C. Davis ...	W. Leghorns	1·95	Harveston Poultry Farm	W. Leghorns	2·00
J. G. Richter ...	Do. ...	1·90	W. Purvis ...	Do. ...	1·95
G. H. Turner ...	Do. ...	2·00	W. Lyell ...	Do. ...	1·95
E. Pocock	Do. ...	1·95	R. Burns ...	B. Orpingtons	1·90
H. Jobling ...	B. Orpingtons	1·80	A. Howe ...	W. Leghorns	1·95
H. W. Board ...	W. Leghorns	1·90	L. K. Pettit ...	Do. ...	2·00
F. W. Leney ...	Do. ...	2·05	Mrs. Bradburne	Do. ...	2·00
W. Meneely ...	Do. ...	1·90	W. Hirst ...	Do. ...	1·95
J. R. Wilson ...	Do. ...	1·90	R. Burns ...	S. L. Wyandottes	2·00
T. Fanning ...	B. Orpingtons	1·80	T. B. Hawkins...	W. Leghorns	2·05
Cowan Bros. ...	W. Leghorns	2·10	Cowan Bros. ...	B. Orpingtons	1·95
A. H. Padman ...	Do. ...	2·00	Dr. Jennings ...	W. Leghorns	1·95
J. M. Manson ...	B. Orpingtons	1·70	T. E. Jarman ...	Do. ...	2·15
Mrs. Munro ...	W. Leghorns	2·00	J. Gosley ...	Do. ...	1·90
Geo. Prince ...	Do. ...	1·90	Kelvin Poultry Farm	Do. ...	1·85
W. H. Forsyth ...	B. Orpingtons	1·95	C. P. Buchanan	Do. ...	2·55
King and Watson	W. Leghorns	2·05			
Mars Poultry Farm	Do. ...	2·05			
A. W. Bailey ...	Do. ...	1·95			
G. W. Holland ...	Do. ...	1·95			
F. W. Leney ...	R. I. Reds ...	1·95			

SINGLE HEN TEST RESULTS. (Oz.)

Competitors.	Breed.	A.	B.	C.	D.	E.	F.	Average.
J. Zahl	W. Leghorns	2·15	2·15	2·00	2·05	2·00	1·90	2·04
Dixie Egg Plant ...	Do. ...	1·95	1·95	2·05	1·95	...	2·05	1·99
J. H. Madrers ...	R. I. Reds ...	2·00	2·10	1·90	2·30	2·05	2·35	2·12
A. E. Walters ...	W. Leghorns	2·05	2·00	2·20	1·95	1·95	2·05	2·03
W. H. Knowles ...	Do. ...	2·05	1·90	2·05	2·00	1·85	2·15	2·00
Mrs. Jobling ...	B. Orpingtons	1·90	1·95	2·15	2·00	1·75	1·85	1·93
C. Knoblauch ...	W. Leghorns	2·10	1·95	2·05	1·90	1·90	1·95	1·98
J. F. Dalrymple ...	R. I. Reds ...	2·00	2·20	2·00	2·25	2·25	2·25	2·16
J. M. Manson ...	W. Leghorns	2·10	2·20	2·30	2·25	2·25	2·00	2·18
Miss Hinze	Do. ...	2·05	2·30	2·25	2·00	2·10	2·05	2·13
E. F. Dennis ...	Do. ...	2·15	2·10	2·35	1·90	2·10	2·25	2·14
Kelvin Poultry Farm	Do. ...	2·00	1·80	2·05	2·20	1·90	2·10	2·01
E. A. Smith	Do. ...	2·00	2·05	2·25	2·15	2·30	2·05	2·13
J. W. Macrae ...	B. Orpingtons	2·05	1·60	1·95	2 10	2 00	2·00	1·95
T. Fanning	W. Leghorns	2·05	2·10	2·05	2·05	2·00	1·95	2 05
J. H. Gill	Do. ...	2·05	1·90	2·10	1·95	1·80	2·00	1·97
J. Anderson	R. Sussex ...	1·95	2·05	2·00	2·00	1·60	2·00	1·93
A. T. Coomber ...	W. Leghorns	2·05	2·10	1·95	1·95	2·20	2·05	2·05
E. West	Do. ...	2·00	2·25	2·20	2·00	2·00	2·40	2·14
W. L. Forrest ...	Do. ...	2·05	2·10	2·35	1·95	2·15	1·95	2·09

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
Miss Hinze	266	223	289	241	270	253	1,542
T. Fanning	275	266	272	261	227	229	1,530
J. Zahl	258	270	216	262	259	251	1,516
J. M. Manson	224	276	239	242	276	243	1,500
A. T. Coomber	263	271	243	231	231	236	1,475
E. A. Smith	255	269	239	265	199	183	1,410
J. H. Gill	214	237	238	267	212	227	1,395
W. H. Knowles, junr.	201	233	238	202	261	245	1,380
Dixie Egg Plant	291	269	265	269	...	260	1,354
J. F. Dalrymple	198	236	236	196	265	213	1,344
A. E. Walters	241	275	229	203	239	200	1,387
E. F. Dennis	200	237	184	265	233	200	1,319
Mrs. Jobling	211	276	197	202	194	208	1,288
E. West	234	235	206	205	189	201	1,270
C. Knoblauch	191	235	223	189	205	224	1,267
W. L. Forrest	240	237	62	185	255	234	1,213
Kelvin Poultry Farm	193	167	159	194	266	174	1,153
J. H. Madrers	150	223	224	215	165	176	1,153
J. W. Macrae	157	232	214	222	148	170	1,143
J. Anderson	202	166	232	114	196	167	1,077

In these weighings every care was taken to secure at least six eggs from each pen when the birds were in full lay. Because of possible errors, a 5 per cent. margin was allowed. Hence eggs ranging on the average from 1·90 oz. and upwards were allowed. It is significant that some of the breeds, notably the Black Orpingtons, were generally low. Excessive size of eggs is not required, but the standard of 24 oz. per dozen is in no way excessive, and breeders should aim at this. Another point to be noted is that many competitors sent their birds forward in full lay. This generally results in the birds getting a distinct setback owing to altered conditions. Another point to be noted is that, in the endeavour to breed a strictly utility type, the general good points of many of the breeds are being ruined. Perhaps in no case is this more evident than with Black Orpingtons. In order to prevent this the 1917-18 competition has been divided into two sections, A and B; A for light breeds and B for heavy breeds. Also, special prizes are to be given for pens which have been declared true to type. Following this, and in imitation of the practice followed in New South Wales, it is our intention to institute certain weight conditions for the pullets of each breed in the 1918-19 competition. This warning is given because we want Queensland breeders to be prepared. Weight, size, and type are not foolish notions. They are indications of stamina, health, and breed which cannot long be neglected without disastrous results to the poultry industry.

ALLOTMENT OF PRIZE MONEY.

	£ s. d.	£ s. d.
Miss M. Hinze—		
First, highest aggregate	7 7 0	
Second, single-hen test	3 3 0	
Monthly prize, September (½)	0 5 0	
		10 15 0
T. Fanning—		
First, winter test	3 3 0	
Second, highest aggregate	4 4 0	
Monthly prize, April	0 10 0	
		7 17 0
Dixie Egg Plant—First, single-hen test		5 0 0
J. Zahl—		
Second, winter test	2 2 0	
Third, highest aggregate	2 2 0	
Monthly prizes, May, September (½)	0 15 0	
		4 19 0
J. M. Manson—		
Third, single-hen test (⅔)	1 8 0	
Monthly prizes, October, March	1 0 0	
		2 8 0
Mrs. J. H. Jobling—		
Third, winter test	1 1 0	
Third, single-hen test (⅓)	0 14 0	
Monthly prize, June	0 10 0	
		2 5 0
Cowan Bros.—Monthly prizes, July and August		1 0 0
J. R. Wilson—Monthly prizes, November and February		1 0 0
C. Tomlinson—Monthly prize, January		0 10 0
E. Pocock—Monthly Prize, December (½)		0 5 0
F. Meneely—Monthly prize, December (½)		0 5 0
Total prize money		£36 9 0

Competitors.	Breed.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Totals.
*Miss M. Hinze, Milton road, Milton	White Leghorns	19	122	122	139	152	160	158	140	146	124	135	125	1,542
*T. Fanning, Ashgrove, Brisbane	Do.	104	124	101	141	133	149	157	122	131	115	140	113	1,530
*J. Zahl, Boonah	Do.	61	132	104	147	143	160	155	133	148	118	105	110	1,516
*J. Manson, Milton road, Milton	Do.	28	96	120	133	151	158	167	141	148	124	102	132	1,500
*A. T. Coomber, Brown's Estate, Bundaberg	Do.	64	122	90	126	146	157	159	132	146	128	117	88	1,475
J. R. Wilson, Eudlo	Do.	3	73	122	146	150	155	165	144	153	134	147	70	1,462
Geo. Tomlinson, Boonah	Do.	36	76	113	129	143	149	162	133	152	154	129	64	1,440
G. H. Turner, Aratula	Do.	53	88	113	135	146	151	159	137	142	126	120	68	1,438
W. Meneely, Warwick	Do.	30	100	122	119	145	148	159	137	157	143	124	34	1,418
*E. A. Smith, Paddington, Brisbane	Do.	48	73	93	123	141	149	155	132	146	139	123	88	1,410
*J. H. Gill, Cheltenham, Victoria	Do.	45	51	77	123	140	134	154	132	151	140	122	126	1,395
*A. E. Walters, Bank street, South Brisbane	Do.	56	67	93	118	145	148	160	128	141	138	120	23	1,387
A. Howe, Wickham, N.S.W.	Do.	64	90	123	134	149	152	152	111	134	105	103	69	1,386
*W. H. Knowles, junr., Taringa	Do.	26	45	69	130	141	152	154	137	144	137	141	104	1,380
Mrs. J. R. D. Munro, Warwick	Do.	44	86	101	86	137	154	158	130	142	136	115	83	1,372
J. M. Manson, Milton	Black Orpingtons	39	66	103	129	145	156	151	128	142	116	104	87	1,366
Dr. E. C. Jennings, Ipswich	White Leghorns	29	94	117	136	149	144	148	123	140	124	113	45	1,362
*Dixie Egg Plant, Newmarket	Do.	55	115	100	124	130	135	132	117	129	123	88	106	1,354
*J. F. Dalrymple, Rochdale, N.S.W.	Rhode Island Reds	24	83	102	117	150	154	136	111	127	124	112	104	1,344
A. W. Bailey, Red Hill, Brisbane	White Leghorns	33	71	110	113	130	145	150	126	144	136	120	64	1,342
Geo. Prince, Grove Estate, Brisbane	Do.	14	71	123	125	134	150	141	129	136	128	110	76	1,337
*E. F. Dennis, Brisbane	Do.	38	90	92	110	141	145	163	135	141	132	83	49	1,319
A. H. Padman, Adelaide, S.A.	Do.	65	52	66	100	133	146	135	127	151	152	118	66	1,314
H. W. Broad, Corinda	Do.	45	54	103	101	147	146	145	128	135	134	113	62	1,313
Cowan Bros., Burwood, N.S.W.	Do.	0	23	85	104	144	147	166	142	152	145	139	57	1,304
Mrs. W. D. Bradburne, Kagarah, N.S.W.	Do.	75	50	67	117	147	151	150	137	140	132	100	31	1,297
R. Burns, Sladevale, Warwick	S. L. Wyandottes	3	39	104	143	147	148	143	118	129	124	109	84	1,291
*Mrs. J. H. Jobling, Plattsburg, N.S.W.	Black Orpingtons	64	106	125	131	140	155	127	107	85	87	97	64	1,288
E. Pocock, Windsor, Brisbane	White Leghorns	42	20	75	119	129	155	152	136	157	143	103	55	1,286
W. Purvis, Glanville Blocks, S.A.	Do.	6	48	57	126	146	157	164	132	150	128	98	72	1,284
F. Clayton, Blacktown, N.S.W.	Do.	27	58	88	119	132	141	142	127	145	139	116	47	1,281
E. F. Dennis, Brisbane	Black Orpingtons	0	3	97	126	155	160	151	126	136	134	121	71	1,280
T. Taylor, Thompson Estate, South Brisbane	White Leghorns	55	41	98	116	140	146	151	139	133	127	101	28	1,275
W. Lyell, Graceville	Do.	49	86	92	111	134	147	145	122	126	133	84	45	1,274
*E. West, Grove Estate, Brisbane	Do.	25	59	100	111	126	148	154	123	128	116	107	73	1,270
*C. Knoblauch, South Brisbane	Do.	41	52	89	121	133	144	144	121	133	126	110	53	1,267
T. E. Jarman, Eastwood, N.S.W.	Do.	62	58	83	114	137	139	148	125	136	127	95	37	1,261
T. Fanning, Ashgrove, Brisbane	Black Orpingtons	13	49	74	121	128	134	154	130	147	130	113	65	1,258
T. B. Hawkins, Redbank	White Leghorns	77	81	82	119	137	141	141	112	119	112	103	37	1,261
King and Watson, St. Mary's, N.S.W.	Do.	40	37	71	109	141	143	149	126	130	130	119	61	1,256
P. Brodie, Greenmount	Do.	62	57	86	88	124	141	150	135	142	128	97	45	1,255

Competitors.	Breed.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Totals.
A. F. Camkin, Canley Vale, N.S.W.	White Leghorns	16	61	101	130	133	134	139	119	130	137	96	55	1,251
Cowan Bros., Burwood, N.S.W.	Black Orpingtons	19	19	104	153	157	135	140	116	108	117	99	75	1,242
G. W. Holland, Paddington, Brisbane	White Leghorns	48	33	46	75	117	143	159	136	151	150	125	57	1,240
H. Jobling, Cessnock, N.S.W.	Black Orpingtons	54	49	101	108	137	138	137	117	125	115	104	47	1,232
Mars Poultry Farm, Sunnybank	Do.	3	0	65	114	148	151	146	131	140	128	125	74	1,225
Kelvin Poultry Farm, Kelvin Grove	White Leghorns	30	73	87	102	147	154	152	124	145	116	72	23	1,225
Mars Poultry Farm, Sunnybank	Do.	20	55	92	111	132	142	149	129	139	135	81	36	1,221
J. Anderson, Mordialloc, Victoria	Do.	34	23	66	128	132	145	153	131	144	138	77	44	1,215
*W. L. Forrest, Marrickville, N.S.W.	Do.	38	38	107	120	128	145	138	109	115	106	101	68	1,213
W. Becker, Toowoomba	Do.	22	29	55	105	146	149	159	125	136	135	99	43	1,203
H. Hammill, Kogarah, N.S.W.	Do.	25	0	20	85	127	143	151	129	144	143	139	96	1,202
W. Hirst, Blacktown, N.S.W.	Do.	30	29	74	108	142	139	147	116	136	126	105	34	1,186
Mrs. C. Davis, Engelsburg	Do.	30	50	98	119	128	139	138	127	133	113	78	21	1,174
Moritz Bros., Kalangadoo, S.A.	Do.	5	0	8	91	136	146	159	142	150	131	124	71	1,163
J. G. Richter, Aratula	Do.	6	22	78	112	141	137	149	127	138	121	101	27	1,159
*Kelvin Poultry Farm, Brisbane	Do.	51	91	65	94	126	140	144	121	121	90	64	46	1,153
*J. H. Madrers, Kogarah, N.S.W.	Rhode Island Reds	44	50	53	117	132	139	128	106	114	100	117	53	1,153
*J. W. Macrae, Mareeba	Black Orpingtons	0	33	74	124	144	151	134	95	122	100	98	68	1,143
F. Clayton, Blacktown, N.S W.	Rhode Island Reds	30	19	66	116	132	146	137	120	127	109	89	50	1,141
C. P. Buchanan, Brisbane	White Leghorns	42	67	89	113	119	140	133	98	117	105	70	45	1,138
Harveston Poultry Farm, Rockhampton	Do.	18	0	30	109	133	142	143	121	135	129	102	53	1,115
R. Burns, Sladevale, Warwick	Black Orpingtons	10	29	70	139	132	142	134	108	113	119	85	34	1,115
S. B. Tutin, Kalkie, Bundaberg	White Leghorns	66	74	88	107	134	144	121	89	94	92	67	14	1,090
J. Gosley, Childers	Do.	22	64	71	128	122	128	114	97	108	97	74	62	1,087
W. Lindus, Cessnock, N.S.W.	Do.	34	0	17	95	115	130	149	128	144	124	95	54	1,085
*J. Anderson, Mordialloc, Victoria	Red Sussex	86	71	53	93	119	112	121	88	101	80	96	57	1,077
F. W. Leney, Warwick	White Leghorns	23	2	32	84	136	141	147	130	124	118	89	37	1,063
A. T. Coomber, Bundaberg	Sicily Buttercups	20	47	31	43	112	134	135	112	120	107	124	74	1,059
L. K. Pettit, Eastwood, N.S.W.	White Leghorns	11	14	65	96	114	136	131	107	119	113	89	44	1,039
W. H. Forsyth, Willoughby, N.S.W.	Black Orpingtons	28	21	18	119	117	116	122	103	91	84	69	51	999
E. F. Dennis, Kelvin Grove, Brisbane	White Wyandottes	0	0	35	71	104	132	124	95	94	115	101	77	948
F. W. Leney, Warwick	Rhode Island Reds	19	20	0	53	131	138	135	110	113	110	67	19	915
	Totals	2,548	3,991	5,971	8,341	9,934	10,545	10,674	8,977	9,708	8,994	7,638	4,540	91,861

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

BALANCE-SHEET.

EXPENDITURE.	£ s. d.	£ s. d.
Prize money	..	36 9 0
Feed—		
Wheat, 327 bushels	79 14 6	
Maize, 18 bushels	3 19 8	
Pollard, 391 bushels	25 18 8	
Bran, 190 bushels	11 15 2	
Oilcake, 5 cwt.	3 6 9	
Desiccated meat, 4 cwt.	3 8 6	
Bonemeal, 4 cwt.	3 16 0	
Green lucerne, value	2 0 0	
Soup meat, value	3 0 0	
		136 19 3
Balance	..	296 13 7
Total	..	£470 1 10

RECEIPTS.		
Entry fees (9 withdrawals)	..	61 0 0
Sales of eggs—		
Orient S.S. Co., 490 dozen	26 3 10	
Barnes and Co. (net), 3,983 dozen ..	190 1 10	
Defence Department, 880¾ dozen ..	48 8 2	
Dining hall, 2,342⅓ dozen	144 8 0	
		409 1 10
Total	..	£470 1 10

BANANA BEETLE TRAP.

Mr. A. H. Benson, Director of Fruit Culture, paid a visit lately to Redland Bay to investigate the Banana Beetle Borer trouble, and to discuss with the fruitgrowers of the district some method of combating the pest. The extent of damage done to the banana groves may be estimated by the statement of one grower that during the previous three weeks he had trapped 4,380 beetles. Mr. Benson, on inspecting the traps, found 200 beetles in one of them. The trap consists merely of a banana bulb cut in half. The cut surface lies on the ground and the beetles are attracted to it from the plants in numbers, when they are easily destroyed. The traps or, rather, the cut surface of the half-bulb, if freshened now and then, will last for a considerable time. The beetles appear to prefer the cut bulb to the plant itself, as was shown by the fact that when the trap was placed beside young growing plants, the latter were not touched, although numerous beetles were around the trap. At the meeting of fruitgrowers, a motion was made to the effect that the trapping be made compulsory wherever the beetles exist, and it was carried by 35 votes to 6. Mr. Benson stated that the idea that the fruit was affected by the beetles' work was erroneous, because unless the beetle actually destroys the plant on which the bunch is growing, there is no sign of deterioration of the fruit.

Viticulture.

DRYING GRAPES.

A very instructive paper on Fruit Drying, by Mr. J. Allen, appeared in the January issue of the "Agricultural Gazette" of New South Wales. From it we extract the chapter on Drying Grapes, which will prove of much interest to vignerons in Queensland.

"Grapes of all classes," writes Mr. Allen, "are usually dried in the open air rather than in the evaporator. The former gives a more uniform and better sample, while the latter process is both slow and costly. In wet seasons, however, the evaporator may be requisitioned even for grapes, though, by using covered racks, this difficulty may be largely overcome. There are times, chiefly late in the season, when owing to damp nights and cold days, it is impossible to finish the drying properly in the open air, and it is then that even the grapegrower will find the evaporator almost an essential.

"Of recent years, drying racks have to a large extent superseded trays for drying currants, sultanas, and even lexias. They are more economical and turn out a superior article to that dried on trays in the sun. In the case of currants, however, the method that eclipses all others as far as the quality of the product is concerned, is to stack the trays containing the fruit on top of one another, and by this means to allow the fruit to dry slowly without direct exposure to the sun. The drawback to this method is that the cost is considerably increased by reason of the large number of trays required.

"TABLE RAISINS.

"It will be found that the best raisin grapes are grown on the lighter and richer soils, and I have never yet in Australia seen a first-class raisin made from grapes grown on a stiff soil.

"To make a good table raisin, the grapes must be grown to perfection—that is, the grape when ripe should be large, thin-skinned, fleshy, and containing plenty of sugar, and the bunches must be well filled. The larger the berries and clusters, the better the appearance of the dried article will be.

"Picking grapes for either pudding or table raisins should be delayed until the fruit is perfectly ripe. For the latter purpose especially, an unripe grape is most unsuitable. When exposed to the sun they will turn red, will take longer to dry than ripe grapes, and the finished product will be sour and of inferior quality. My experience with regard to picking is that in nine cases out of ten the inexperienced grower imagines that as soon as the grapes are sweet enough for eating they are ready to pick for raisin making, and, contrary to all advice, he will start picking only to find at the end of the first week that the grapes are not turning a good colour.

"The grapes which have so far produced a good commercial raisin in Australia are Gordo Blanco, Muscat of Alexandria and Waltham Cross (sometimes known as Eleme). I have had samples of raisins sent to me made from other kinds of grapes, which presented a fair appearance, but if the grower placed these on the market to compete with the raisins made from the above-mentioned varieties, he would find that they would not sell, so long as the latter were obtainable.

"The process of curing the table raisin is as follows:—Pick the very best clusters—that is, only such as are well filled with large, fine grapes—cut out all damaged or hard grapes, and lay the bunches carefully on trays, which should be then placed in the sun. By the end of the first week one side should be fairly well dried, and the bunches should be turned. This may be done by placing an empty tray on top of the full one. Two men can then take hold of the sides and invert the two, thus exposing to the sun the side of the fruit which has been lying next to the tray. After this turning it usually requires about another week to finish the drying process, if the weather is favourable. If the weather is damp or cool, it will, of course, take longer, and it is better to stack up the trays at night, covering the stacks with empty trays. If a table raisin gets wet during the curing process, the stem gets dark and the bloom spoiled, and the grade is lowered and the value of the fruit depreciated.

"Table raisins require to be dried slowly, and it is doubtful whether the evaporator will ever prove satisfactory for curing them. Even when dried in the sun, a higher temperature than 96 degrees will cause them to burn and will spoil the sample. At the very most, they should not be exposed to a higher temperature than 110 degrees in the evaporator, and it is probable that green fruit would be damaged by even that degree of heat. Consequently the cultivation of raisin grapes cannot be recommended in districts where the evaporator would have to be resorted to for curing them.

"PUDDING RAISINS OR LEXIAS.

"Grapes intended for this purpose should also be picked when fully ripe. All partially ripe and dried fruit should be removed, and the grapes then immersed for about three seconds in a lye made in the proportion of 1 lb. of Greenbank's caustic soda to 20 gallons of water. To turn out a raisin of good quality and appearance, the dipping solution should be kept at almost boiling point; if allowed to cool much below this, the fruit, instead of being a nice golden colour, will be brown.

"Other factors than the heat of the dipping solution may cause raisins to turn brown. For instance, it is impossible to make a good bright lexia, or a good quality of raisin of any sort, from grapes grown on some of the heavier or stiffer soils.

"It is a good plan to dip the fruit in the morning, or early afternoon, in order that it may have time to dry off before evening. Drying usually occupies from five to eight days, according to the weather. If dried on trays, it will be necessary on about the fourth day after dipping to turn the fruit, and care will have to be exercised to see that it does not become too dry before it is taken in. A nice pliable fruit is always the best. Should there be any uncertainty as to whether the fruit is sufficiently dry or not, it can be tested by squeezing a few of the raisins between the thumb and finger; if no moisture exudes, then the fruit is quite dry enough. Lexias should be stemmed and graded as soon as possible after they are sufficiently dry to be removed from the tray to the sweat-box. If allowed to stand any length of time the stem becomes toughened and difficult to separate from the raisin.

"SULTANAS.

"For drying purposes sultanas should not be picked until fully ripe. A very common error, and one that greatly lowers the quality and the value of the dried product, is to pick the fruit too soon. Grapes that are apparently quite ripe and ready to pick for eating purposes should usually be left for at least another fortnight if they are to be dried. When they are of a clear amber colour, and perfectly sweet, without a trace of acidity in any of the berries, they should be about ready to pick. The last fortnight, before the fruit has attained this stage, adds considerably to the sugar content, and as this means increased weight and a better quality product, it is best not to pick until the fruit is dead ripe. As soon as possible after picking, the fruit should be dipped in a caustic solution.

"For sultanas, this should be made at a strength of 1 lb. of Greenbank's caustic soda to from 15 to 20 gallons of water—the exact quantity of water depending upon the toughness of the skin.

"The fruit should be dipped while the lye is almost at boiling point, but should not be immersed for longer than two seconds, or long enough to slightly crack the skin. The grapes should then be spread out thinly on drying racks, or on ordinary drying trays, and exposed to the sun. When trays are used, the fruit should always be turned the day after dipping. If the nights are cool, or rain threatens, the trays should be stacked up, and the stacks covered with empty trays, so that the fruit cannot be damaged. If the weather is very hot, the trays may be stacked up and allowed to remain thus until the sultanas are dry. Drying racks, where used, are usually provided with side curtains, which may be drawn to shelter the fruit from the direct rays of the sun.

"Under no circumstances should sultanas be exposed to too great a heat, as this will spoil the colour of the dried article and lower its value on the market.

"To realise the best prices, it is essential to produce a dried fruit of bright colour and high quality, and this may only be done by picking the fruit when dead ripe, dipping it carefully, and allowing it to dry slowly.

"ZANTE CURRANTS.

"The Zante currant is very easily cured. In this case also, the fruit should be allowed to hang until it is well coloured, and thoroughly ripe —that is until some of the currants on the bunches have begun to shrivel.

It may then be picked and placed on drying racks or trays as the case may be. Four or five days' exposure to the sun will usually dry the fruit so that it may be bagged, but should the temperature exceed 90 degrees in the shade, the trays should be stacked until the weather is cooler. In the case of drying racks, the curtains should be drawn to shade the fruit from the direct rays of the sun. As this fruit is liable to become moth-infested if exposed too long, it is advisable to bag it immediately it is sufficiently dry, and it is wise to leave it in these bags until it is stemmed and properly packed."

VITICULTURE AND THE WINE INDUSTRY AFTER THE WAR.

By G. A. GATTINO.

A reputable enologist, writing from the French trenches, expressed these two sentences:—

"(1) The victory of the allied Italians, French, English, and Russians is an absolute necessity to viticulture.

"(2) The victory of the aforesaid Allies cannot be doubted by anybody."

His letter brought to me a lot of reflections and considerations, and gave me the subject for writing this article, addressing same to all viticulturists of Australia in general, and Queensland in particular.

I do not think it is too early for speaking of what will happen after the war, but on the contrary, I believe that it is indispensable that the viticulturists and wine merchants study now the problems which will crop up, so as to prepare for the best and most advantageous solutions possible.

Producers and merchants must become organised for the purpose of surmounting the post-war difficulties.

As you know, the future of all industries depends on the contents of the future treaty of peace, and, therefore, only by organisation will the wine growers and merchants be able to warn the competent authorities, that the latter may not neglect their interests at the opportune moment.

Now, we will just see what is likely to happen at the end of the war. Certainly it cannot be admitted that things will revert in the *status quo ante*. The crises are too radical and the changes will be very marked.

As far as viticulture is concerned, I foresee, after the war, an important extension of grape plantations and a sensible increase in the consumption of wine.

An increase in the consumption of wine is a very certain thing, and using the phrase adopted by the abovementioned enologist, I could say that wine will come out from the war absolutely triumphant. Wine is to-day a real necessity to all fighters, who implicitly, and without any exact consideration, are recognising and proclaiming its high moral and energetic virtues.

Anybody who approaches soldiers coming back from the French, Italian, or Balkan war zones will hear them speaking of wine in enthusiastic and affectionate terms.

Wine raises the morale of the fighters, dissipates their sad thoughts, and comforts the soul. Wine is necessary to recoup their enormous loss of energy when the nervous system is under such tension that it can only be imagined by those in the firing line. That is the reason why there are no teetotal soldiers in the trenches. [There is a very large number of abstainers in the trenches.—Ed., "Q.A.J."] That is the reason why that enologist says also that the war will be for wine a most gigantic advertisement.

You must admit, therefore, that all these brave soldiers returning home cannot forget their wine, and in accordance with their means, they will often substitute wine for their tea.

The Italians, French, and Spaniards drink wine plentifully, and it is indisputable that drunkenness in those nations has the lowest percentage in Europe.

Besides the increased consumption of wine in the aforesaid countries, other facts will confirm the opinion that the increase in the consumption will be general.

The great English armies which are fighting in France, the Belgian army, and the Russian troops gone to France and Macedonia, have all learned to drink wine daily, as a rule, and it is also proved that many of the traditional drinkers of tea, cider, or whisky, deplore having to go back to their national drink when wine is not available.

The conversion of the Anglo-Saxons to the cult of Bacchus will not be one of the smallest results of the great European war.

Several Governments have taken advantage of war conditions to pass prohibitive provisions against spirits. This action was really necessary, but, owing to political weakness, it could not be submitted until now. That which all the wine associations of the old country have declared and repeated: "Wine chases out alcohol," has at last been demonstrated.

From a circular dated 28th March ulto., from Caldwell's Wines Company, Limited, Sydney, one can already see the beginning of that consequence. The said Australian wine growers write as follows:—"Owing to the enormous increase in the prices of whiskies and brandies, Australian wines are in greater demand than ever before."

For the same reason wine is meeting with such favourable preference by the soldiers.

The sale to them of any alcohol or other beverage of high alcoholic title is strictly prohibited.

What will also bring about an increase in wine consumption is the higher wages to the workers, who will thus be able to afford to introduce wine in their families. I conclude by saying that the future of viticulture looks full of the best hopes, but it will depend on the terms and stipulations fixed by the peace and commercial treaties, and by the conventions constituting the base of the future relations between the nations. The questions relating to the admission of wine in this country, in the British Empire, in the Allies', neutral, and enemy's countries, will be carefully regulated.

Agriculture in general is one of the most important branches of our national economy, and therefore, if the wine growers and merchants would organise, they could formulate and present in time to the Government the indispensable measures for the encouragement and amendments of the tariff as are wanted for the protection of our national trade and the development of the Australian production in the wine industry. By organising the wine industry we would obtain from the Government such internal laws and Acts as a means of encouraging the increase in the plantations of grapes, and the increase in the consumption of wine.

The Government could attain this end by encouraging the formation of co-operative wine cellars as per my articles which appeared in the September, October, and November, 1916, issues of the *Queensland Agricultural Journal,* by instituting experimental grape farms with annexed cellar, distillery and enological college; subsidising new plantations and facilitating the supply of vine cuttings; issuing money and medal prizes for the best up-to-date farm or cellar; for the best production of grapes or wine; for the best and lightest table wine produced. This would induce the growers to experiment in new methods of plantation, cultivation, and pruning, and would cause the winemaker to apply the most appropriate system and process of manipulation, fermenting, &c.,* increasing the duty on imported wines and spirits; regulating the use of the alcoholisation (fortifying) of the wines; maintaining a high price for alcohol by making its sale a State monopoly, which has been in vigorous existence in Italy for a number of years, and with great profit to the State and appreciable advantage to public health; facilitating the granting of wine licenses to the growers, the export of wines, &c.

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* Will the wine growers of Roma or other localities awaken and give a start with the formation of co-operative wine cellars as per the articles on the subject which appeared in the issues of this Journal for September, October, and November, 1916. If only a few growers would decide on the formation of such an Association, I would draw up for them the "Articles of Association of the Co-operative," and give them my advisory assistance for the technical and business management of the new company. The Government would also encourage its formation by paying a subsidy loan of £1 for each £1 of capital possessed by the company. I am certain also, that besides encouraging the increase in the numbers of grape plantations, the formation of these co-operative wine cellars will necessarily induce the Government to also institute experimental grape farms, and formulate such measures, acts, and amendments of the tariff as they are wanted for the development and protection of a great industry. The Co-operative Wine Cellars would give birth to a form of commercial organisation which appears to be really necessary for the small and medium producer. Even if not immediately producing great quantities of wine, the Co-operative Cellars will attain the constitution of determined, constant types of wines in the localities where the cellars are operating, and by establishing a reputation for good, natural, and well-made wines, we would realise a consequent increase in the daily consumption of same, to the benefit of the public health and wealth.

In such a great State as Queensland, where immense areas of hilly, stony land of dry, calcareous loam soil are not utilised and unadapted for the extensive cultivation of other crops, this great agricultural wine industry would bring in its train new life, new prosperity, and a new source of wealth. With the protection of the Government, the returned soldiers also would find greater attraction and more glorious promise in the future of a vineyard than in anything else.

Once wine becomes a popular beverage you would see that anyone in this country having some available ground at his residence would grow his own grapes, for the use of his family at least, and none will be too poor to enjoy the purest and most wholesome of all stimulants—good, cheap, native wine.

As I previously stated, drunkenness also would be minimised, and the abstinence societies would have no more reason for existence. It is therefore indispensable that harmony should reign amongst all sons of this country, and wine growers and the wine merchants, who have more common interest than is actually believed.

The war taught us all that individual interest is a very small thing compared with general interest. We must not forget that the prosperity of the individual is strongly bound to that of collectivity. With the protection of the State and Federal authorities, beneath the glorious flag, with a strong commercial organisation, with the intelligent initiative of the individual, it can be foreseen with certainty that viticulture will have, after the war, a future full of prosperity.

The man on the land should give a good start, and I will give all my modest assistance for the success of this great wine industry. Let us take this glorious task in hand; let us work with all our heart and energy, for truly the object is worthy of our best endeavours.

The "Journal of Agriculture of Victoria" for 10th January, 1916, contains a very valuable and instructive paper by the Government Viticulturist of that State, Mr. F. de Castella, which we republish in the interest of Queensland vignerons. The paper is entitled—

THE SUMMER BUD OR "YEMA" GRAFT OF THE VINE.

Mr. Castella writes as follows on the subject:—

To plant a vineyard liable to destruction by phylloxera would be, to say the least, illogical, even in districts into which the insect has not yet found its way. It is already firmly established in several widely separated portions of the State, and the time will inevitably come when the whole of Victoria will be infested. In already phylloxerated areas, the resistant stock is, of course, indispensable, and the plantation of vines with vulnerable roots is quite out of the question.

A vineyard on resistant stocks may be established in two ways:—

1. Plantation of already grafted vines raised in a nursery, or, as they are usually called, "bench grafts."

2. Field grafting—in other words, the plantation of the vineyard with ungrafted resistant vines or stocks, which will subsequently be grafted to the European or "Vinifera" variety, from which it is desired to obtain fruit.

Field grafting, though the older method, has been gradually and very generally superseded in France by the planting of nursery-raised bench grafts, which renders possible the immediate establishment of an absolutely homogeneous vineyard, since it permits the weeding out, when lifting from the nursery, of all faulty grafts; only those being planted in which the union between stock and scion is flawless, thus insuring absolute evenness of the plantation, or what is called in California, "a good stand."

The chief objection to field grafting, especially in the colder climate of Northern Europe, is that a completely even stand can rarely be relied upon. Unless the spring be exceptionally favourable for the operation of grafting, gaps occur where vines have failed, as well as a certain proportion of faulty grafts which scarcely ever develop into thrifty vines. In our warmer Australian climate, weather conditions in spring are more favourable for grafting, and except in such an unusual season as the present one, results are generally far more satisfactory. Our climate is more similar to that of Spain and Portugal, where field grafting is held in higher esteem than in France. Nevertheless, even with us, anything which can insure a higher percentage of perfect unions will be a distinct boon to those reconstituting by means of field grafting, and the graft about to be described undoubtedly contributes to this result, both by the perfection of the union, and by the second chance it provides, of re-grafting the following spring, any of the summer grafts which have failed, or which are unsatisfactory.

THE YEMA GRAFT IN SPAIN.

"Yema" means, in Spanish, a bud or eye—the germ of anything in fact, since it also signifies the yolk of an egg. It is the name generally given to this graft in southern Spain. Though often referred to as "budding" in northern Victoria, the operation is distinct from budding in the usual sense of the term, and as currently practised on citrus, roses, &c. It is real graft—a summer bud graft—for the wood of the vine is rather deeply cut into, and the woody core of the scion-bud is not removed as is usual in ordinary budding. The main differences to be found between it and ordinary grafting are the season when it is carried out, and the very small dimensions to which the scion is reduced. Like ordinary grafting, it is performed on the portion of the stock beneath the surface of the soil.* Budding is practised above ground, and usually on green herbaceous canes.

It was at Jerez de la Frontera, in Southern Spain, the home of sherry, that the writer first made the acquaintance of this graft which, since its introduction into Victoria, has been so successful that it bids

* Though the graft is made two or three inches above the surface level it is invariably covered by a protecting mound of earth, so that, during the knitting period, it is several inches below the surface of the mound. (See Fig. 3.)

fair to become the favourite field grafting method. On his return to Victoria, the Spanish graft was described in the "Journal of Agriculture of Victoria," in the issue of June, 1908. This description is here reproduced. It will be followed by some further details in the light of practical experience gained since its introduction into Victoria.

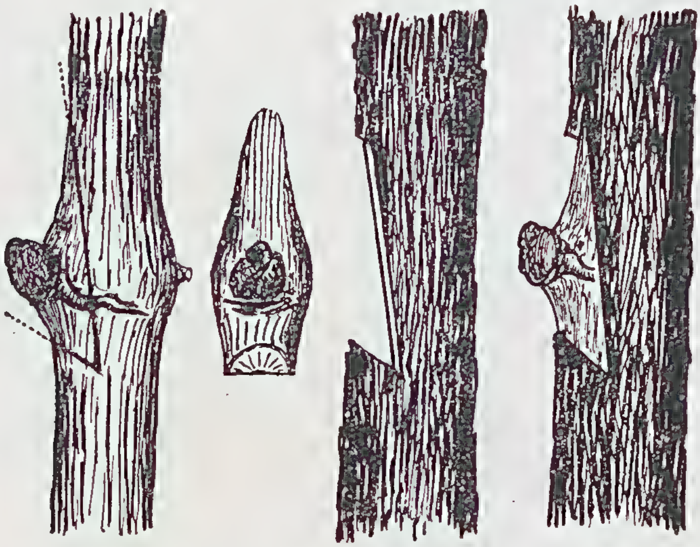

FIG. 1.

A and B.—Removal of bud for *Yema* graft.
C.—Stock ready to receive bud of *Yema* graft.
D.—*Yema* graft completed and ready for binding with raffia.

The other method is known as *Yema*. It is a summer bud graft and was quite new to me both as regards method and season for execution. It is a true graft, and not a form of budding in the sense in which we usually understand it, for the bud is removed together with a fair sized fragment of the already woody shoot of the current year's growth. The stock is prepared to receive it by the removal of a similar shaped piece of wood by means of four cuts of the grafting knife; into the gap thus made, which reaches nearly to the centre of the cane,* the properly cut eye is carefully fitted and securely bound with raffia. Care must be taken in fitting the bud into its place that the cambium layers of stock and scion correspond as accurately as possible. When tying, the raffia must first be placed over the bud and bound round and below it so as to insure thorough contact at the base of the graft.

This graft is best suited for cases where there is but slight difference in diameter between stock and scion, as in the case when a one or two year old rooted vine is grafted in the vineyard. *The upper part of the stock is not cut off but continues its growth,* the flow of sap which is thus maintained enables the union to take place under most favourable conditions. The graft knits, but *the bud remains dormant* until the following spring, when, after the upper part of the stock has been cut back, it makes very vigorous growth.

* According to later experience this would be too deep, as will be seen later.

August is the best month for the execution of this graft in Spain. This corresponds to February in Victoria; a convenient time, falling, as it does, between harvest and vintage. As soon as the young shoots of the current year are sufficiently lignified to provide a properly ripened but the operation may be performed. The bud is grafted on at about the level of the ground which is then heaped up around it into a high mound to protect it from changes of temperature and desiccation. (See Fig. 3.)

This graft practically gives the vigneron " two strings to his bow." When the time for ordinary spring grafting comes round it is possible to see if the bud has taken or if it is dead; in the latter case the stock is cut off half an inch below the bud graft which has failed and re-grafted in the ordinary way.

The unions obtained by means of this graft in southern Spain are really magnificient. . . . At the well-known Tula vineyard of

Fig. 2.—The Spanish *Yema* graft—second style.
A, the scion bud; B, incision in stock; C, same, bent to facilitate insertion of scion; D, graft completed and ready for tying.

Messrs. Gonzalez, Byass, and Coy., this style of grafting is in great favour. " *Espiga ne vale nada*" (The *espiga** graft is no good) said the *Capataz* (overseer) of Tula to me. He assured me that with the *Yema* a larger percentage succeeded and that the unions were more perfect. I have collected full information concerning this interesting graft and feel sure that it is at least worth a careful trial in the warmer parts of Victoria where climatic conditions are so similar to those of Andalusia, and where the perfect union it gives will no doubt render it popular.

In Spain, the graft is performed in two distinct ways. In addition to that illustrated in Fig. 1, it is sometimes executed as shown in Fig. 2. As will be seen, the fragment of cane which constitutes the scion is of practically the same thickness throughout. The socket or incision into

* Espiga is the Spanish name for the ordinary cleft graft.

which it will be fitted on the stock is also of different shape, being cut at the same angle above and below. It might be called a dovetail graft. When fitting the scion, the stock can conveniently be bent, as shown at C, Fig. 2, thus slightly elongating the socket, and facilitating the insertion of the scion, which is firmly held in place on the stock being allowed to straighten out again. A very neat graft can thus be executed, provided the scion has been judiciously chosen as to size, and it, as well as the stock, accurately and cleanly cut. It is, perhaps, a little more difficult than the first method, for which reason it was not described in the report quoted from above.

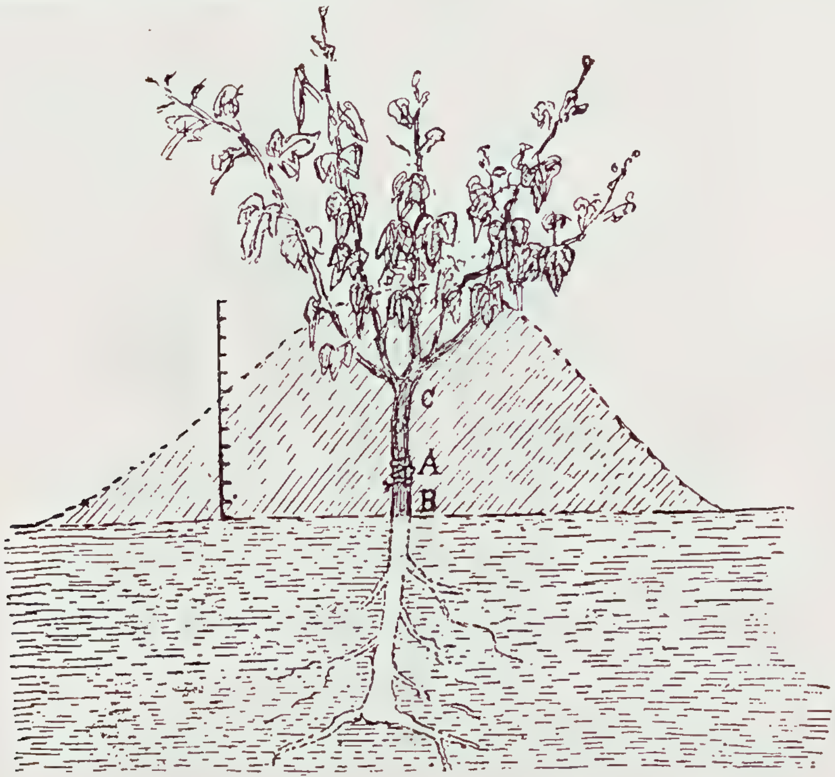

Fig. 3.—Young resistant vine in February, six months after plantation as an "engrafted rootling." The *Yema* graft has just been inserted at A, and protected by a mound of loose soil about 12 in. high—scale of inches to the left.

A general idea of the graft may be formed from Fig. 3, which shows a young resistant vine, planted as an ungrafted rootling in, say, August, 1915; the scion bud having been grafted in at " A" in February, 1916. As will be seen, immediately after grafting, the whole stem of the vine is mounded up with loose soil; the height of the mound is usually about 1 foot, the base of the young canes, and a good many leaves, being often covered with soil. It will be noted that the top of the stock is not cut off at the time of grafting,* but is allowed to continue its growth. This is, no doubt, one of the factors contributing to

* According to M. Maïs, severe topping is recommended immediately after grafting (see page 46). That is not usually done in Victoria. If the vine has not made very strong growth, it is probably better not to top, though in the case of very vigorous vines it might be an improvement; it would, at any rate, reduce the power of the wind, which, on a very strong vine, tends to break down the mound.

the excellence of the unions; the sap circulating freely in the tissues immediately adjacent to the graft, callusing is very thorough and complete.

Towards the end of winter the mound should be removed; it is, in fact, usually broken down before this by the ordinary cultural operations. It is then possible to see if the graft has succeeded, in which case the bud will be found to be large and healthy, and firmly united to the stock by the callus which has formed. If the graft has failed, the scion bud, now considerably shrivelled, can easily be rubbed out with the finger. If the graft has satisfactorily taken, the stock is now cut off with the secateur at "C," Fig. 3. On no account should it be cut any closer to the bud, as the stock would be liable to die back on the opposite side to the bud. A stub or butt of the old stock 5 or 6 inches long should be left above the graft, which will be finally removed a year later. Should the graft have failed, the vine is allowed to remain until September or October (in Victoria), when it can be cut back at "B," Fig. 3, and cleft grafted in the usual way. The *Yema* graft should be placed about 3 inches above the level of the soil, so that, in case of its failure, the cleft graft will not be so deep as to entail trouble with scion roots.

SIMILAR GRAFTS IN FRANCE.

Curiously enough, this graft does not seem to have found its way to France; at least not during the period of active reconstitution (1885-99), during which French ingenuity devised an extraordinary number of new methods for budding and grafting the vine. It is not described in "Grafting and Budding,"* though the grafts of Besson, Massabie, and of Clarac (No. 2) present some points in common with it. These, however, are buds rather than grafts. The form of grafting which most resembles it, especially as regards the season for its execution, is the well-known Cadillac graft—a side cleft summer graft which will be described later.

A graft was, however, described in the *Progres Agricole,* of 25th February, 1912, by M. J. B. Maïs, which is practically identical with the Spanish Yema, second style,† as will be seen by reference to Fig. 4.

The following extracts from Mr. Maïs' article will, no doubt, prove of interest:—

Stocks (ungrafted) should be planted from December to March (June to September in Australia). As soon as the shoots are about an inch long a bud is placed, as shown in Fig. 4 (scion A, stock B), and tied with raffia.

One-third of the thickness of the stock is removed, and in its place is fitted one-third of the scion cane bearing a bud. This bud rots and makes way for two or three smaller buds which develop around it, sending out canes of three and four yards long the following season.

After the 10th August (February in Australia) the work may be continued, the buds being taken from the current season's canes. After

* New Methods of Grafting and Budding, as applied to Reconstitution with American Vines, by Dubois and Wilkinson—published by the Department of Agriculture of Victoria in 1901.

† J. B. Maïs, President, Syndicat Agricole of Lectoure (Gers), France, in "Progres Agricole," Montpellier, 25th February, 1912.

the 10th September (March in Australia) cold rains are likely to render results uncertain. During the currency of the whole summer it is difficult, a month after grafting, to tell that there has been a graft at all so perfect is the union. Needless to say, scions for grafting until July should be preserved in nearly dry sand and in the dark if possible. Should the first graft fail, another can be placed in position in August (February in Australia) about an inch below it. Should this fail also, the ordinary cleft graft can still be practised the following spring, thus assuring thorough success throughout the whole vineyard.

The vigour of plantations thus established is much superior to those planted with grafted rootlings up to the fifth year; afterwards, the difference is less noticeable. This enhanced vigour is explained, first, by the suppression, so to speak, of the graft (the union being so perfect),

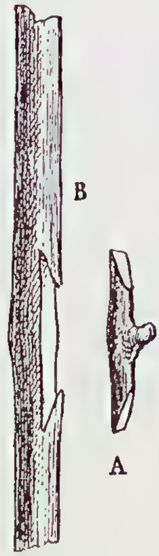

FIG. 4.

and second, by the fact that when wild vines (ungrafted resistant rootlings) are planted they have often ten or fifteen roots, whereas with grafted rootlings there are sometimes only one or two; furthermore, by leaving the wild vine to itself during the whole of the first season, it grows much more than its grafted neighbour, and as a result its roots penetrate more deeply and develop more vigorously, thus stimulating the growth of the scion much more during the second year.

If grafted in August-September (February-March here) all the canes of the stock should be severely topped in order to give a check to the sap, such as will bring about a rapid union (*soudure*).

One man can easily do 350 to 400 grafts a day. The scions should be cut beforehand and kept fresh in a piece of wet bag; in order to make rapid progress, it is necessary to have a choice of scions, owing to the difference in diameter of the stocks.

In spring it is well to drive in a small stake to each vine; owing to their vigour, the wind might break them out, thus causing blanks.

Fig. 4 is reproduced from Mr. Maïs' article.

Tropical Industries.

TOTAL PRODUCTION OF THE WORLD'S RUBBER.

A correspondent of the "Times Trade Supplement" writes:—

"The world's production of rubber for the year 1916, which will be on a greatly increased scale owing to the fact that much of the acreage planted at the time of the rubber boom five or six years ago will now be coming into the market, will probably not be far short of 170,000 tons. It is estimated on good authority that the total supply for 1915 was 107,000 tons from plantations, 37,000 tons from Brazil, and 13,600 tons from all other sources, and while the war lasts it appears likely that even this enormous output can be absorbed, notwithstanding the entire closure of the Middle European markets, which before the war took about 14,000 tons of rubber annually. During the present year it is probable that some 25,000 tons in excess of 1915 will be marketed, and we may assume that low prices will continue. The average price of rubber throughout 1914 was 2s. 3½d. per lb., while last year, in consequence of the considerable increase in value during the latter part of the time, the price worked out at 2s. 6d. per lb. Unless new calls for rubber, greatly exceeding present requirements, should arise, the existing value of 2s. 3d. to 2s. 6d. per lb. seems likely to hold good, and the 1916 average will probably be much the same as that of 1915.

"As to future prices, it must be remembered that for some time to come we are faced with an annual increment from planted rubber of not less than 30,000 tons, owing to the enormous new areas under cultivation coming forward each year. The acreage of rubber in the plantation of the Middle East probably now exceeds 800,000 acres, and taking the low estimate of 300 lb. per acre and the price of 2s. per lb., we may assume that when the whole of these trees are mature the annual value of the rubber crop may reach £24,000,000. If the cost of production is assumed to be 1s. per lb., which even now has been found practicable on many large estates, we obtain from rubber at 2s. per lb. a very handsome profit on the capital outlay, since £15 per acre profit would pay 10 per cent. on an outlay of £150 per acre. Although it is both difficult and hazardous to predict the future course of prices, we are of opinion that rubber will not be likely to fall below 2s. per lb. for many years to come."

On the yield of rubber per acre, the "Times" states:—

"Though it would not be prudent to base our estimates on what must be regarded as the phenomenal yields of certain estates, we think that it will be found in the long run that from 400 lb. to 450 lb. per acre will be a fair crop for mature plantations in the best parts of the Malay Peninsula. We are aware that the Seafield Estate last year gave an average of 682 lb. per acre from an area of 124 acres, planted in 1904, that is to say, from trees of ten or eleven years of age, and that from the entire area of 1,940 acres the average yield per acre was 439 lb. A very experienced planter, who bases his estimates on the tapping of the oldest trees, has stated with confidence regarding another property, that eventually all the trees may be expected to yield at the rate of 600 lb. per acre, but at present our knowledge of the effect on the life of the tree of tapping to this extent is very limited, and it may be that there is a point beyond which it will be found unwise to carry the process of extraction of latex. It will be seen that at 100 trees per acre a crop of 400 lb. is equivalent to a yield of 4 lb. per tree, which is in excess of the average of mature trees, even if widely planted. Mr. H. Wright tells us that a fair average from young and old trees would be 2 lb. per tree, but the yield depends upon many different factors, and is greatly influenced by the system of tapping adopted."

COIR AND ITS PREPARATION.

(From the "Fiji Planters' Journal," April, 1917.)

Coir, the fibre from the husk of the coconut, is best (finest, most lustrous, and most resilient) when taken from the immature nuts, eight to ten months old. The practice, however, of using green husks for fibre would reduce the output of copra, a much more valuable product. Unless extra prime articles are wanted, the husks from ripe nuts are very satisfactory. At present these husks are practically valueless except in places where they are used as fuel. This state of affairs is causing the waste of a commodity which has the world for its market, and a broad field of uses opens to its application. The partly-cleaned fibre is excellent for caulking boats to prevent the water from entering. The clean fibre is used, without further preparation, for upholstering and for stuffing cushions and mattresses. Mr. Wright, of the Wright Furniture Company, Manila, says that well-cleaned fibre at 6 centavos per kilo could be used by his company in great quantities. When twisted into ropes and cables, coir is used by ships where the waves jerk and pull incessantly and where resiliency as well as strength is needed. Coir is without a peer where sudden heavy strains are placed upon it. Doormats and hall matting of coconut fibre are in demand throughout Christendom.

For ropes and mats the fibre should be well cleaned. This may be done in any one of several ways, three of which are worthy of mention here. In most Oriental countries where coir articles are made, the husks undergo a long period of retting. They are buried in pits along the seashore where the constant change of tidal water keeps them wet without permitting decay. The husks are left in these pits for from eight to ten months, causing the corky pulp to soften and disintegrate to such an extent that the fibres may be separated from it and thoroughly cleaned with very little subsequent labour. The retting process is sometimes carried on in vats of fresh water; but this system is very unsatisfactory, since the husk decays and the fibre becomes weak and of diminished value.

Machines have been tried for cleaning coir, but they have thus far been only a partial success. The husk is soaked to soften the pulp somewhat and is then fed by hand, a small section at a time, to a series of comb-like wheels. As these wheels can shred only one end of a section at a time, the piece must be fed in, withdrawn, reversed, and fed in again, to each of the wheels. These clutch wheels, as they are called, are graded from coarse to fine, as are the cards which follow them for the purpose of further loosening the pulp and combing the fibre. The partly-cleaned fibre is then thrown into a drum, where it is beaten and shaken to remove the dust and impurities, after which it is carded again and is ready for use. Theoretically this is all right; but in practice fibres are broken and poorly cleaned; and the hand feed makes the process slow.*

In the third method the husks, after the outer glossy part is crushed to admit of the free permeation of water, are soaked for a period of twenty-four hours. (It may be found necessary to place a weight on the husks to keep them covered by the water.) They are then taken out, the glossy part peeled off, and the husk beaten on the concave side with a mallet until the fibres are finely separated and the pulp is thoroughly loosened. Rubbing and shaking before all the pulp is beaten loose only lengthens the process. Beating the convex side of the husk before the fibres are all separated causes the husk to split up into segments instead of being divided into its component fibres by the elimination of the pulp. After the fibres have been separated, the dust is shaken out and the material is ready for washing and picking apart still further to get rid of the last of the extraneous matter. Drying completes the process.—Charles F. Fraker, in the "Philippine Craftsman."

HOW TO MAKE A PERMANENT WHITEWASH.

A first-class whitewash which will not rub off is made by dissolving 2 lb. of ordinary glue in 7 pints of water, and when all is dissolved, adding 6 oz. of bichromate of potassium, dissolved in a pint of hot water. Stir the mixture up well, and then add sufficient whiting to make it up to the consistency of thick cream. Apply with a brush in the ordinary manner, as quickly as possible. This dries in a very short time, and, by the action of light, becomes converted into a perfectly insoluble waterproof substance, which does not wash off, even with hot water, and at the same time, does not give rise to mould growth, as whitewash made with size often does. It may be coloured to any desired shade by the use of a trace of any aniline dye.

Or 1 peck of lime slaked in boiling water, and kept just covered by the water while slaking. Strain through coarse cloth. Add 2 quarts of fine salt dissolved in warm water, 1 lb. of ricemeal boiled in water to a thin paste, ¼ lb. of whiting, and ½ lb. of glue dissolved in warm water. Mix all thoroughly, and let stand covered for two or three days; stir occasionally. Heat the mixture before using.

* *See* "Queensland Agricultural Journal," Sept., 1912, "The Coir Industry," Vol. XXIX. 4.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Acting Government Botanist.

No. 7.

"GRASS SEED" OR "MACKIE'S PEST" (*Chrysopogon aciculatus*, Trin.).

Description.—A shortly creeping grass, with erect stems about 1 ft. high. Leaves short. Inflorescence (seed-head) a narrow compact panicle, 3-4 in. long, with numerous slender branches. Spikelets narrow, 2½-3 lines long. Awn (bristle) short and fine.

A native of tropical Asia, Australia, and South Pacific Islands.

There are comparatively few grasses that can definitely be said to be noxious, but with the species under notice there can be but little doubt but what it must be placed under that category.

The grass is continuously being sent in for determination from the more tropical parts of the State, and has recently made its appearance in Southern Queensland.

Mr. E. Jarvis (Government Entomologist, Gordonvale) writes:—"We have a few exceedingly noxious weeds here, the worst of which is the so-called 'grass-seed,' perhaps not a weed in the strict sense of the word, but nevertheless a veritable scourge which takes most of the pleasure off collecting in the bush."

Mr. W. F. Bevington writes: "This grass is known as 'Mackie's Pest' here (Mulgrave River), and it is indeed a pest. It usually takes an hour to get the grass-seeds out of one's clothes."

C. S. Crosby, writing on the vegetation of Vavau, one of the Tonga Islands ("Journ. Linn. Soc. Bot. 35," p. 22) states: "The awns cleave to one's socks and are apt to produce irritating sores which may confine the sufferer to his couch for months."

Uses.—Its sharp pointed awned seeds militate against its use as a fodder. Mr. B. Jardine, of Somerset, in forwarding specimens for identification, stated that it had been brought over from Papua, and proved a suitable cover for cocoanut plantations in the Philippine Islands. According to Safford ("Useful Plants of the Island of Guam") the straw is used for making hats and mats.

Eradication.—In small areas hand-forking and burning. In paddocks ploughing out and planting with some strong-growing superior grass likely to smother it, as *Paspalum dilatatum*. The grass is scarcely a weed of cultivation, its greatest holds being in old deserted plantations and along road sides. In such localities spraying might prove successful.

PLATE 14.—"GRASS SEED" OR "MACKIE'S PEST" (*Chrysopogon aciculatus*).

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH MARCH TO 26TH APRIL, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Dorset	Ayrshire	14 Sept., 1916	697	4·8	39·45	
Sylvia II. ...	Shorthorn... ...	16 Jan., 1917	690	4·8	39·06	
Hedges Madge	Holstein	22 Mar. ,,	779	4·2	38·45	
Lady Melba	,, ...	14 Feb. ,,	902	3·4	35·84	
Iron Plate ...	Jersey	9 Dec., 1916	478	6·3	35·68	
Miss Edition	,, ...	25 Dec. ,,	705	4·3	35·67	
Violette's Peer's Girl	,, ...	13 Dec. ,,	484	6·2	35·55	
Glade ...	Shorthorn... ...	29 Mar., 1917	599	4·4	31·02	
Cocoatina ...	Jersey	6 Mar. ,,	647	3·9	29·60	
Comedienne	,, ...	24 Nov., 1916	442	5·6	29·27	
Thornton Fairetta	,, ...	26 May ,,	302	8·0	28·72	
Miss Betty	,, ...	27 Mar., 1917	637	4·1	28·68	
Lady Spec...	Ayrshire	17 Jan. ,,	640	3·8	28·51	
Lady Annette	,, ...	11 Nov., 1916	501	4·8	28·36	
Miss Bell ...	Jersey	1 Aug. ,,	396	6·0	28·13	
Constancy ...	Ayrshire	27 Dec. ,,	553	4·3	27·98	
Twylish's Maid	Jersey	2 Nov. ,,	390	6·0	27·71	
Belinda ...	Ayrshire	23 Feb., 1917	557	4·0	26·15	
Sweet Meadows	Jersey	18 Aug., 1916	242	8·2	23·59	
Glen ...	Shorthorn... ...	18 Jan., 1917	461	4·4	23·87	
Jeannie ...	Ayrshire	27 Oct., 1916	467	4·2	23·04	
Charity ...	Jersey	8 Jan., 1917	256	7·5	22·80	
Nina ...	Shorthorn... ...	23 June, 1916	436	4·4	22·58	
Glow 6th ...	Guernsey	?	358	5·1	21·55	
Mistress Bee	Jersey	11 Jan., 1917	336	5·3	21·04	
Hedges Dutchmaid	Holstein	22 Aug., 1916	405	4·4	20·97	
La Hurette Hope	Jersey	6 Oct. ,,	289	6·1	20·86	

The cows were grazed on natural pastures only.

PRACTICAL BACON-CURING.

The season is approaching when the farmer's pig for home consumption will be ready for slaughter. We have given several recipes for curing bacon and hams; still, we may always gain a good hint from our friends over the sea. Durban, South Africa, through the medium of the "Agricultural News," supplies the following recipe:—

"People often desire details of a simple method of curing bacon. The following practical hints will be found most useful for carrying out on the farm:—

"After killing, let the pig hang overnight and cure the next day. If the intention is to roll the bacon, saw or cut the carcass into two equal sides and remove the ribs, shoulder-blade, and ham bones; if the bacon is not to be rolled, and the pig should weigh over 100 lb., remove the ribs (which can be used fresh or salted), cut off the ham, which should be round, and cut off shoulders straight across. If the pig is a large one, say, 150 lb., remove the shoulder-blade, as it is somewhat difficult to cure.

"*Salting.*—For a pig of 120 lb. use about 8 lb. or 10 lb. of salt, 2½ oz. of saltpetre, 1½ lb. sugar, 2 oz. ground allspice; mix these well and thoroughly, and rub into the meat, for which purpose a trough made of 2 in. deal may be used—18 in. wide at the bottom, 2 ft. wide at top, 3 ft. 2 in. long, and 1 ft. 10 in. deep, inside measurement. This has proved excellent for long sides.

"Sprinkle a fair quantity of the salt mixture in the bottom of the trough, and place the sides in, skin downwards; seven days after placing in trough remove the sides, sprinkle a little of the salt mixture over them, and replace in the trough, but be careful to reverse the position by placing the side that was first on top now at the bottom of the trough, and the bottom one at the top. Repeat this process on the fourteenth day, and at the end of the third week remove from the trough.

"*Salting and Rolling.*—In a pan of water wash away all surplus salt from the sides, and hang up to dry for a day. Many are strong believers in the dry-salting, but allow the brine that accumulates in the trough to remain there until the bacon is cured. A day or two after the bacon is taken from the trough is the best time for rolling, and rolling of bacon must be regarded as anything but a success unless it is done thoroughly tight and solid.

"Only the best cord should be used. The smoking of bacon is most important. There is no necessity for the average farmer to build an elaborate smoke-house. A large drapery case, about 3 ft. 6 in. square, will answer the purpose very well, using the boards from the cover and bottom to make the sides, say, 5 ft. high. This can be easily done by using 2 in. by 3 in. deal battens, 5 ft. long, one for each corner, and nail securely. Never place the fire for smoking underneath the bacon, but dig a trench about 6 in. deep and 9 in. wide, running from under the smoke-house to about 6 ft. back.

"Farmers who have tried this formula have found it comparatively simple."

General Notes.

DENATURED ALCOHOL.

What does denatured alcohol mean? To the majority of persons alcohol means liquor—something to drink—but few know that beyond its use as a stimulant, and to some extent, in the arts and as a fuel, it is also a source of power as a substitute for gasolene, petroleum, and kindred hydrocarbons. When the Denaturing Act was passed by the American Congress, about the year 1907, alcohol leaped into fame, not as an intoxicant, or as the humble servant of the lamp, but as a new farm product for use in farm engines, motors, heating, lighting, &c.

In 1916 H. Hamel Smith, editor of "Tropical Life," wrote that the Russian Minister of Finance was organising an international competition, with prizes ranging up to £3,000, for methods of rendering methylated spirits and similar harmful liquids absolutely undrinkable, and a second competition was being arranged, with prizes up to £7,500, for new or improved methods of utilising alcohol for combustible or other purposes. The total awards would amount to nearly £68,000.

"Tropical planters," said Mr. Smith, "and others in all parts of the world, should take an interest in this contest, and try to induce their respective Governments to do the same, as the enormous amount of raw material that is made available every year from the waste products of manila fibre, banana, coconut, sugar, cacao, and other industries would allow an output of alcohol suitable for fuel and other purposes sufficient to enable the British Empire and her Allies to be independent of unfriendly nations for their supply of spirit for such purposes."

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

Mr. F. B. Wright, U.S.A., in a very interesting work on the subject, gives full details as to the various methods of producing the desired results, and mention is made of the uses to which denatured alcohol may be put. For instance, he says it is a safe fuel.

"Although it has only about half the heating power of kerosene or gasolene, gallon for gallon, yet it has many valuable properties which may enable it to compete successfully, in spite of its lower fuel value. In the first place, it is very much safer. Alcohol has a tendency to simply heat the surrounding vapours and produce currents of hot gases which are not usually brought to high enough temperature to inflame articles at a distance. It can be easily diluted with water, and when so diluted, no more than one-half, it ceases to be inflammable. Hence it may readily be extinguished, while burning gasolene, by floating on the water, simply spreads its flame when water is applied to it.

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

Mr. J. C. Brünnich, Agricultural Chemist, writing on Neglected Industries, dilated on the shortage of methylated spirit in Brisbane. The following notes on his article were published in our original article on Denatured Alcohol in the *Queensland Agricultural Journal* in July, 1916, but they are well worth repeating, as they have been in the "Journal of the Jamaica Agricultural Society" (vol. xxi., January, 1917):—

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

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

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

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

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

TO WATERPROOF CLOTHING.

Clothing of unbleached calico may be waterproofed by soaking the material in hot water and hanging it out to dry. Then take as much boiled oil as is necessary, and mix enough lampblack with it to blacken it. For yellow coats, use ground yellow ochre instead. Then lay the fabric on a smooth surface, and put the oil on with a paint brush. Let the first coat get dry before applying another. Lay the oil on as thin as possible. A little gold size will make it dry quicker, say half a pound to 1 gallon of oil. Three coats of oil are usually given. If the last coat remains sticky after it is dry, take 1 lb. shellac and simmer gently with 2 quarts water, and, when near boiling, add a little liquid ammonia. If for a black coat, add a little lampblack to it when cold, and apply it to the coat with a sponge.

PRICKLY-PEAR JELLY.

Rub off the spines very carefully with a thick cloth. Cut the fruit in half, and for every pound allow a pound of water. Boil till the fruit is almost a pulp. Strain away the liquid, and for every pint add the juice of a lemon and a pound of sugar. Simmer gently, removing any scum, until the syrup jellies. Cover down with parchment paper and store for future use. Jelly-making is more suitable for this fruit than jam-making, although the latter can be made by cutting the fruit in half, and then into small pieces, allowing pound for pound of sugar and fruit with very little water in the bottom of the pan, or the colour, like Rosella jam or jelly, would be easily spoiled.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL, 1917.

Article.		APRIL. Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	3s. to 4s.
Bran	ton	£5
Broom Millet	"	£22 to £24
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£3 10s. to £4
Chaff, Oaten	"	£3 5s.
Chaff, Lucerne	"	£3 10s.
Chaff, Wheaten	"	...
Cheese	lb.	9½d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£4 10s.
Hay, Lucerne	"	£2 10s.
Honey	lb.	4½d.
Maize	bush.	2s. 4½d.
Oats	"	3s. to 4s.
Onions	ton	£7 10s. to £10
Peanuts	lb.	2½d. to 3d.
Pollard	ton	£6 12s. 6d.
Potatoes	"	£7 15s. to £8 10s.
Potatoes (Sweet)	cwt.	2s. 3d. to 3s. 3d.
Pumpkins (Cattle)	ton	£3 to £3 5s.
Eggs	doz.	1s. 2d. to 2s. 3d.
Fowls	pair	4s. to 6s. 7d.
Ducks, English	"	3s. 6d. to 4s.
Ducks, Muscovy	"	4s. 4d. to 7s. 6d.
Geese	"	6s. 9d.
Turkeys (Hens)	"	7s. to 8s. 6d.
Turkeys (Gobblers)	"	13s. to 15s.
Wheat	bush.	3s. 9d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	...
Cabbages, per dozen	4s. 6d. to 10s.
Cauliflowers, per dozen	...
Celery, per bundle	...
Cucumbers, per dozen	9d. to 1s.
Beans, per sugar bag	3s. 6d. to 6s.
Peas, per sugar bag	4s. to 7s. 6d.
Carrots, per dozen bunches	10d. to 1s.
Chocos, per quarter-case	1s. 3d. to 2s.
Beetroot, per dozen bunches	...
Marrows, per dozen	2s. 6d. to 4s. 6d.
Lettuce, per dozen	1s. to 2s.
Parsnips, per bundle	6d. to 8d.
Sweet Potatoes, per sugar bag	1s. 3d. to 1s. 6d.
Table Pumpkins, per dozen	2s. to 4s.
Tomatoes, per quarter-case	4s. to 7s.
Vegetable Marrows, per dozen	...
Turnips, per dozen bunches	10d. to 1s.
Rhubarb, per dozen bundles	...

SOUTHERN FRUIT MARKETS.

Article.	APRIL. Prices.
Bananas (Queensland), per case	6s. to 12s.
Bananas (Fiji), per case	12s. to 14s.
Bananas (G.M.), per case	13s. 6d. to 16s.
Custard Apples, per 12 to 15 tray	3s. 6d. to 5s. 6d.
Lemons (Local), per bushel-case	2s. to 5s.
Mandarins, per case	5s. to 8s.
Oranges (Navel), per case	10s. to 15s.
Oranges (other), per case	5s. to 8s.
Papaw Apples, per half-bushel-case	7s. to 9s.
Passion Fruit, per half-case	1s. 6d. to 6s. 6d.
Persimmons, per half-case	1s. 6d. to 3s. 6d.
Pineapples (Queens), per double-case	6s. to 8s.
Pineapples (Ripleys), per double-case	5s. to 7s.
Pineapples (Common), per double-case	4s. to 6s.
Tomatoes (Queensland), per half-bushel-case	1s. 6d. to 3s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	APRIL. Prices.
Apples, Eating, per case	7s. 6d. to 10s.
Apples, Cooking, per case	6s. to 8s.
Bananas (Cavendish), per dozen	1½d. to 3d.
Bananas (Sugar), per dozen	2½d. to 3½d.
Citrons, per hundredweight	9s. to 10s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	3s. to 5s.
Granadillas, per quarter-case	...
Grapes, per lb.	5d. to 6d.
Lemons (Lisbon), per quarter-case	4s. to 7s. 6d.
Limes, per quarter-case	3s. to 4s. 6d.
Mandarins	4s. to 5s.
Nectarines, per quarter-case	1s. to 3s.
Oranges (Navel), per case	9s. to 10s.
Oranges (other), per case	4s. to 6s.
Papaw Apples, per case	2s. to 3s.
Passion Fruit, per quarter-case	3s. to 4s.
Peaches, per quarter-case	1s. 3d. to 3s. 6d.
Pears, per quarter-case	4s. 6d. to 5s. 6¼d.
Peanuts, per lb.	2d. to 4d.
Persimmons, per quarter-case	4s. to 5s.
Plums, per quarter-case	4s. to 5s.
Plums (prime eating), per case	...
Pineapples (Ripleys), per dozen	1s. 6d. to 3s. 6d.
Pineapples (Rough), per dozen	2s. 6d. to 5s.
Pineapples (Smooth), per dozen	1s. 9d. to 5s.
Quinces, per quarter-case	3s.
Rosellas, per sugar bag	2s. to 3s.
Tomatoes, per quarter-case	2s. 6d. to 5s. 3d.
Watermelons, per dozen	...

TOP PRICES, ENOGGERA YARDS, MARCH, 1917.

Animal.	MARCH. Prices.
Bullocks	£19 10s. to £25 5s.
Bullocks (Single)	...
Cows	£11 10s. to £14 17s. 6d.
Merino Wethers	42s. 6d.
Crossbred Wethers	44s. 6d.
Merino Ewes	30s. 9d.
Crossbred Ewes	44s. 6d.
Lambs	40s.
Pigs (Stores)	30s.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	Average Rainfall. Mar.	Average Rainfall. No. of Years' Records.	Total Rainfall. Mar., 1917.	Total Rainfall. Mar., 1916.
North Coast.	In.		In.	In.
Atherton	9·19	15	6·59	3·76
Cairns	19·25	34	11·66	5·74
Cardwell	16·98	44	12·35	6·34
Cooktown	15·39	40	11·13	16·11
Herberton	8·54	29	9·98	3·67
Ingham	16·69	24	13·44	13·81
Innisfail	26·58	35	16·34	15·33
Mossman	16·87	4	24·25	6·10
Townsville	8·36	45	9·31	7·06
Central Coast.				
Ayr	8·19	29	4·91	4·02
Bowen	6·27	45	6·27	0·58
Charters Towers	3·79	34	3·70	2·75
Mackay	12·88	45	16·91	4·64
Proserpine	13·90	13	13·10	3·77
St. Lawrence	6·43	45	8·90	1·87
South Coast.				
Biggenden	4·76	17	4·64	2·27
Bundaberg	5·73	33	10·71	3·26
Brisbane	5·97	66	2·79	1·38
Childers	5·61	21	6·63	2·19
Crohamhurst	12·30	25	8·71	3·06
Esk	5·16	29	4·02	3·27
Gayndah	3·37	45	2·22	1·40
Gympie	6·61	46	4·05	3·87
Glasshouse M'tains	10·19	8	8·64	2·00
Kilkivan	4·28	37	2·92	3·28
Maryborough	6·67	45	6·04	3·48
South Coast—continued:	In.		In.	In.
Nambour	10·15	20	9·12	5·21
Nanango	3·46	34	3·10	2·19
Rockhampton	5·35	29	8·57	3·25
Woodford	8·87	29	5·78	2·08
Darling Downs.				
Dalby	2·89	46	2·57	4·37
Emu Vale	2·95	20	0·96	1·30
Jimbour	2·79	28	2·35	3·43
Miles	2·85	31	5·09	4·54
Stanthorpe	2·88	43	1·04	1·28
Toowoomba	4·07	44	3·42	2·35
Warwick	3·11	29	0·88	1·18
Maranoa.				
Roma	3·00	42	3·57	2·80
State Farms, &c.				
Bungeworgorai	2·39	4	3·96	1·61
Gatton College	3·84	17	2·97	2·12
Gindie	2·98	17	10·65	1·34
Hermitage	3·16	10	0·80	1·56
Kairi	5·12	4	6·01	2·25
Kamerunga	18·00	26	8·31	5·15
Sugar Experiment Station, Mackay	12·95	19	11·25	3·48
Warren	3·16	4	5·49	2·84

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

1917.	May.		June.		July.		August.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·13	5·17	6·32	4·59	6·40	5·4	6·30	5·18
2	6·13	5·16	6·32	4·59	6·40	5·4	6·30	5·18
3	6·14	5·15	6·33	4·59	6·40	5·4	6·29	5·19
4	6·15	5·14	6·33	4·59	6·40	5·5	6·29	5·19
5	6·15	5·14	6·33	4·59	6·40	5·5	6·28	5·20
6	6·16	5·13	6·34	4·59	6·40	5·5	6·28	5·20
7	6·15	5·12	6·34	4·59	6·40	5·6	6·27	5·21
8	6·17	5·12	6·34	4·59	6·40	5·6	6·26	5·21
9	6·17	5·11	6·35	4·59	6·40	5·6	6·25	5·22
10	6·18	5·11	6·35	4·59	6·39	5·7	6·24	5·22
11	6·19	5·10	6·35	5·0	6·39	5·7	6·23	5·23
12	6·20	5·9	6·36	5·0	6·39	5·8	6·22	5·23
13	6·21	5·9	6·36	5·0	6·39	5·8	6·21	5·24
14	6·21	5·8	6·36	5·0	6·39	5·9	6·20	5·24
15	6·22	5·8	6·36	5·0	6·38	5·9	6·19	5·25
16	6·23	5·7	6·37	5·0	6·38	5·10	6·18	5·25
17	6·23	5·7	6·37	5·0	6·38	5·10	6·17	5·26
18	6·24	5·6	6·37	5·0	6·37	5·11	6·16	5·27
19	6·24	5·6	6·37	5·0	6·37	5·11	6·15	5·27
20	6·25	5·5	6·38	5·0	6·36	5·12	6·14	5·28
21	6·25	5·5	6·38	5·1	6·36	5·12	6·13	5·28
22	6·26	5·4	6·38	5·1	6·35	5·13	6·12	5·29
23	6·27	5·3	6·38	5·1	6·35	5·13	6·11	5·29
24	6·27	5·3	6·38	5·1	6·34	5·14	6·10	5·30
25	6·28	5·2	6·39	5·2	6·34	5·14	6·9	5·30
26	6·29	5·2	6·39	5·2	6·33	5·15	6·8	5·31
27	6·29	5·1	6·39	5·2	6·33	5·15	6·7	5·31
28	6·30	5·1	6·39	5·3	6·32	5·16	6·6	5·32
29	6·30	5·0	6·39	5·3	6·32	5·16	6·5	5·32
30	6·31	5·0	6·39	5·3	6·31	5·17	6·4	5·33
31	6·31	4·59	...	...	6·31	5·17	6·3	6·33

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

			H. M.
7 May	○	Full Moon	12 43 p.m.
14 „	☽	Last Quarter	11 48 a.m.
21 „	●	New Moon	10 47 „
29 „	☾	First Quarter	9 33 „

The Moon will be nearest the earth on the 14th, and at its farthest distance on the 28th.

5 June	○	Full Moon	11 7 p.m.
12 „	☽	Last Quarter	4 38 „
19 „	●	New Moon	11 2 „
28 „	☾	First Quarter	2 8 a.m.

The Moon will be nearest the earth on the 9th, and at its farthest distance on the 25th. It will cause a partial Eclipse of the Sun on the 19th, visible in the Arctic Regions but not in Australia.

5 July	○	Full Moon	7 40 a.m.
11 „	☽	Last Quarter	10 12 p.m.
19 „	●	New Moon	1 0 „
27 „	☾	First Quarter	4 40 „

The moon will be nearest the earth on the 7th, and at its greatest distance on the 22nd. There will be a *Total Eclipse* of the *Moon* from 6·51 to 8·27 a.m. on the 5th; but only the moon's entrance into the shadow of the earth will be seen in Eastern Australia.

3 Aug.	○	Full Moon	3 11 p.m.
10 „	☽	Last Quarter	5 56 a.m.
18 „	●	New Moon	4 21 „
26 „	☾	First Quarter	5 8 „

The moon will be nearest the earth on the 4th, and at its greatest distance on the 18th.

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

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

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 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.

* These notes will not again be published until September, as they apply to the series from May to August.

Farm and Garden Notes for June.

FIELD.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but obviously this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August or, at the earliest, in warm early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills, lay them on a thick layer of sand; then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them; then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola-nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will now be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas. Fibre may be produced from the old stems.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted; also, horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by well digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondi*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly, so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

Orchard Notes for June.

THE SOUTHERN COAST DISTRICTS.

The Notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when Spring comes and the trees start a fresh growth a certain percentage of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a Winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frost, as frost will strike dirty, weedy ground, and severely injure the pines growing thereon, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

THE TROPICAL COAST DISTRICTS.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the Spring Crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in Spring means good bunches of bananas and early-ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit; but where citrus trees are heavily loaded, the pruning should be put off till after the Spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

THE SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely—first, in the case of young trees, so as to get strong well-grown trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little growth, and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to over-produce fruit spurs, which become long and straggling, and bear a large quantity of small-size fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses of loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following Spring.

As soon as any part of the orchard is pruned, gather up the prunings and work the land, as a thorough winter weathering of the soil is very beneficial in its effects; and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of Winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine-pruning can be done at any time now in the Roma or Central districts. Tree-pruning can be continued during the month, and the orchard should be kept well worked. Citrus fruits can be marketed. Lemons should be gathered and cured.

SUGAR NOTES FROM CAIRNS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon the Cairns district from Mr. D. Macdonald, Field Assistant to the Bureau:—

HAMBLEDON AND MULGRAVE.

The plant cane is looking well, but ratoons are backward owing to late cutting.

Grubs are doing damage, especially at Greenhills.

In places leaf stripe disease is in evidence, and farmers were advised how to combat it.

Meatworks manure, at the rate of 6 cwt. per acre, is applied by machine—(1) in the seedbed; (1) when cane about 1 ft. high; and (3) on ratoons immediately after ploughing away. Nitrate of soda is used to a lesser extent, and almost entirely confined to ratoons.

Green manuring is observed, but there has been much dissatisfaction amongst growers on account of Mauritius Bean seed failing to germinate. For this reason, growers prefer the pea, but this is almost unobtainable.

The canes chiefly grown are Badila and D. 1135. The latter is drilled 4 ft. 6 in. apart, and Badila 5 ft. The area under D. 1135 is on the increase.

Lime, where used, has proved most beneficial, and at Gordonvale is quoted at 58s. 6d. per ton. On the Mulgrave there is an exceedingly fine crop of Badila, especially on the Munro Estate.

Mr. Bastin's farm is a striking example of what can be done by good methods of husbandry. The area is small and the land not of the best, yet the crops are good, clean, and healthy.

BABINDA.

The soils are varied in colour and quality, ranging from red volcanic to brown alluvial.

Much of the area now under cane, more particularly that adjacent to the mill, is of a granitic nature. This soil at present produces good crops, but if cane-growing on these lands is to be a commercial success it will be necessary for growers, as soon as the land is stumped, to go in extensively for green manuring.

The country contiguous to the Russell River is of excellent quality, and the crops thereon are truly magnificent.

As the land is almost entirely virgin, little manuring is done, but in some instances late-cut ratoons have had a dressing of nitrate of soda at the rate of 1 cwt. per acre.

On the older lands grubs are doing some damage.

The varieties grown are Badila and Goru, of which fully 95 per cent. is of the former cane. The average tonnage for last year, when there was 75 per cent. plant cane, was 40 tons per acre.

The cost of putting scrub land under cane varies considerably on account of the nature of the timber and the rains experienced subsequent to falling and prior to burning. The most expensive land to tackle is that timbered with Johnston hardwood, the least expensive being vine scrub.

In addition to clearing, there is the cost of plants, planting, and chipping. From the time of planting until the crop is out of hand, chipping costs amount to about £8 per acre. To facilitate the laying of tramline for harvesting, it is customary to clear strips of land sufficiently wide every 2 chains.

The mill is busily engaged in hauling firewood to meet the needs of the coming crushing. The overhaul of the machinery is proceeding apace, and the season will commence about the 23rd of May. There is plenty of labour offering.

The most persistent weeds are Natal grass and a grass known locally as "Johnstone River grass." The latter grass is particularly troublesome, as it roots from every joint. This grass forms the bulk of the pasturage, and apparently is nutritious and much relished by stock of all classes.

QUEENSLAND AGRICULTURAL JOURNAL

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Agriculture.

SOURCES OF POTASH.

For the past fifty years the potash supplies of the world have been obtained from Germany. Since the war this source of supply has been closed, but still the demand for it is very great and urgent, and various means have been suggested to obtain at least small quantities from wood and other ashes. It seems strange, however, that, considering the vast area of Australia (2,974,581 square miles), and the great variety of mineral deposits found in all the States of the Commonwealth, no potash yielding deposits have as yet been discovered.

In a Bulletin issued by the Utah Experiment Station, U.S.A., it is stated that " the fact that the German deposits have supplied the world with potassium for more than half a century does not mean that there are no potassium deposits in our country, for such is not the case. We have very large deposits of potash, feldspars, and micas, of leucite, alunite, &c., all containing potassium, but these substances are insoluble in water, and up to the present time the expense attached to converting the potassium contained in most of these substances into an available form has prohibited their use as a source of potassium. Due to the European war the quantity of potassium salts imported into the United States in 1915 was only about one-tenth of that imported in 1915, the last normal year. This has greatly increased the price, and this increased value has given a great impetus to the search for potassium salts in this country."

ALUNITE AND OTHER MINERAL SOURCES.

Alunite, which is a natural potassium aluminum sulphate, occurs extensively in Colorado, Arizona, Nevada, California, and Utah. At the present time the latter deposit seems to be the largest and best. In its natural state this mineral is insoluble in water, but by gentle heat it is rendered soluble, and after leaching with water the solution is evaporated to dryness and ordinary alum is obtained. At higher and long continued heating sulphur trioxide is evolved and lexivigation of the roasted mass then yields a very pure potassium sulphate. The Mineral Products Company, located at Marysvale, Utah, is turning out daily about one hundred tons of potassium sulphate extracted from this source.

Efforts are being made to discover a process whereby the potassium of leucite may be rendered commercially available. During the last year the brine of a salt lake in Nebraska has yielded a considerable amount of potassium salts. Cave deposits have been located in various places in the West—in Idaho, Utah, and Nevada. In the western part of Millard County, Utah, White Valley, an old alkaline lake bed is located, and efforts are being made to develop this region as a source of potassium. An analysis of a sample taken from the top 18 inches of this bed gave the following results:—" Soluble salts 11·84 per cent.: calcium (Ca) 0·46 per cent.; magnesium (Mg), 0·20 per cent.; carbon dioxide (CO_2), 2·10 per cent.; sulphates (SO_4), 1·34 per cent.; chlorine (Cl), 5·54 per cent.; potassium (K), 0·99 per cent.; and sodium (Na) (by difference), 1·21 per cent."

The result of other analyses and description of the area are as follows:—" The old lake bed, the receptable for untold ages of the washing and leaching from the potash ledges of the mountains near by, is in dimensions about 3 by 14 miles, and the assays show about 4 per cent. of potash in the clay and water menstruum at a depth of 20 feet. The underground permanent water is struck at about 17 feet, and above this point the potash content is slightly less; indeed, the clear underground menstruum, settled for 24 hours and then filtered, carried ·70 plus per cent. of potash in chemical solution itself. Estimated at 4 or 4½ per cent. with, perhaps, hundreds of feet in depth, there are here many thousands, nay millions, of tons of clay or mud deposit worth 10 dollars per ton in every quarter section, and hundreds of millions of potash in the aggregate deposit, a matter of vast concern as a resource to our State or Commonwealth.

" The material consists essentially of clay, silica, calcium carbonate and magnesium carbonate, together with 6 per cent. of soluble salts (in another report 7 per cent., and in another 4¼ per cent. soluble salts). These latter consist of sodium sulphate, sodium chloride, and potassium sulphate, together with a very small proportion of calcium sulphate, magnesium sulphate, and sodium carbonate."

Salt beds are being exploited in very many localities. It is likely that at some future time the salt deposits of the arid West will compete with Stassfurt in the production of salts of potassium.

The "Agricultural News" of Barbadoes has the following note on the possible new sources of potash:—"The scarcity of potash has stimulated inquiry into the possible new sources of this mineral. One of the latest suggestions is the production of potash salts from olive oil residue (the blackish turbid liquid deposited at the bottom of the sink under oil presses), which contains about 1·5 per cent. or slightly more. It is stated in the "Journal of the Department of Agriculture of Victoria" for October, 1916, that by evaporation and combustion of 100 gallons of this residue, 30 to 35 lb. of ash are recovered. Roughly, 10,000 gallons of this liquid would produce, on the figures given, approximately 1½ tons of ash, the potash content of which would make it worth £2 10s. per ton at the present high price of potash."

We publish the above brief notes on this important subject, in the hope that Australian geologists and chemists will take the matter up, as has been done in New Zealand. If success were to attend their researches, Australia need not depend on Germany for her supplies of potash.

SCHOOL OF INSTRUCTION FOR FARMERS' SONS AT GATTON COLLEGE.

Arrangements have been made by the Department of Agriculture and Stock for the holding of a School of Instruction for farmers' sons and young farmers under eighteen years of age from 25th June to 14th July, inclusive. The arrangements with regard to railway fares will be the same as for last year. The total cost of instruction and board will be £3 3s. This is a very reasonable cost, considering that the course includes all the different dairying and farming operations; and we hope to see a good muster of the sons of the backbone of the country—the farmers—take advantage of the good opportunity afforded them of getting valuable instruction and guidance in their future work.

MARKET GARDENING.

MANURE FOR THE VEGETABLE GARDEN.

Amateurs are often troubled about what fertilisers to use and how much. The most simple way out of the difficulty is to buy a good general garden manure, one that contains the three ingredients of phosphoric acid, potash, and nitrogen. Now as to quantity, in the first place we have to remember that ½ lb. to the square yard is 2,400 lb., or over a ton to the acre, which is such a very heavy dressing that it could only be afforded on small areas and with intense cultivation. Still, ½ lb. seems a small quantity to the novice, who wants to give that much to each plant. This is not only not necessary, but is an almost certain way to kill or check the plants. If the beds are in good order, moderate manuring only is required, and if they are not, two or three light dressings are far preferable to one heavy dosing; in fact, it is a standing rule that plants, like weak children and sick people, are injured and not strengthened by too much and too strong food. Many an amateur, in fact, kills his plants with too much strong manures. "I thought I would have a grand crop of lettuces," said a man recently; "I got fine plants and 1 cwt. of superphosphate, and I put a jam-tinful of super. for each plant, but nearly every one died, and the rest are miserable, stunted things." If he had used a small teaspoonful of the super. for each plant, and mixed this with the soil for 6 inches all round, he would probably have obtained the results he wished, especially if he had watered them once a week, as they grew, with weak extract of cowdung or fowl manure.

It is well to recall the fact that there are 2,240 lb. in a ton, and 4,840 square yards in an acre. Therefore, to apply a pound of manure to a yard is equal to over 2 tons 3 cwt. to the acre. A quarter of a pound to the square yard is over 10 cwt. to the acre, and an ounce to the square yard is over $1\frac{1}{2}$ cwt. to the acre. It may be roughly stated that it will not be wise to go beyond half a pound to the square yard of any artificial manure at one application, and an ounce to the square yard of sulphate of ammonia, nitrate of soda, or potash is as much as anyone ought to use.

It must be remembered that the condition of the manure is a very important consideration in deciding how much may be applied. Thus, bonedust treated with sulphuric acid is bone superphosphate, or the "dissolved bone" of English writers, and the difference is that in the latter case the phosphate of lime is rendered soluble in water and there is free sulphuric acid present. Now, we might apply 10 tons of bonedust to the acre of cabbages without injuring them. We would simply be wasting the bonedust, but if we applied 10 tons of superphosphate our crop would in all probability suffer. So in the case of stable, cow, sheep, or fowl manures. Too heavy dressings of these substances applied fresh are injurious, but if they are thoroughly well rotted and rendered mellow with age, they can be applied in almost any practicable quantities. Then, again, some crops are gross feeders, and will thrive in manure which would kill more delicate plants.

PARSNIPS.

Frequently we hear of the failure of parsnip seed to germinate. This may be accounted for by the seed not retaining its vitality long. In the old country two-year-old seed is considered very unreliable. In this country care should be taken only to obtain fresh seed. Again, some amateur gardeners take very little trouble about preparing a seed bed, the necessary deep, fine tilth being neglected. On a rich, sandy soil, it is easy to fulfil the conditions necessary to ensure the germination of the seed. Deep forking prevents curving or "forking." Then, as to manuring: As a rule, no dung should be applied directly to the crop, or "forking" may result. If a soil is poor, 2 cwt. of farmyard manure per square rod ($30\frac{1}{4}$ square yards) dug, or ploughed in, will be advantageous. As parsnips take a long time to grow, the object of manuring is to supply a sufficiency of fertilising material available for the whole season of growth. A writer in the "Journal of the Board of Agriculture" says that during the working of the land the following artificials should be ploughed or dug in: 4½ lb. of superphosphate and 5½ lb. of basic slag per rod, or an equivalent in the form of a mixture of superphosphate and steamed bone flour, or superphosphate and ground mineral phosphate.

Just before sowing the seed, sulphate of ammonia, at the rate of ¾ lb. per rod, should be worked into the top soil, and after singling, a further dressing of sulphate of ammonia, at the same rate, should be applied between the rows.

Parsnips should be sown early in the season from March to May at the rate of 6 to 7 lb. of seed per acre (1 oz. per rod, or, say, 200 feet of drill), in rows 15 to 18 inches apart, about 1 inch deep and lightly covered. In about a month from sowing, when the plants show the "true" leaf, as well as the "seed" leaf, they should be thinned out to about 6 or 9 inches apart.

THE JERUSALEM ARTICHOKE.

Rarely is this excellent, delicate vegetable to be obtained in the markets or in the Brisbane shops. It appears to be little known to or appreciated by market gardeners, and although the tubers are greedily eaten by pigs, greatly to the latter's benefit, pig-breeders, unlike their American brethren, have not yet appreciated the value of this artichoke as pigfood. The only thing remarkable about the plant is its English name. It is not by any means an artichoke. The true artichoke is a chard or thistle, of which the bottoms of the flowers and the riblike sepals are used as food. The botanical name for this true artichoke is *Cynara scolymus*; the so-called Jerusalem artichoke is the *Helianthus tubersus.*

CYNARA SCOLYMUS.

The name of "Jerusalem" is simply a corruption of the word *Girasole*, which the Italians give to both the sunflower and the Jerusalem artichoke. Its original home is North America. The stems, leaves, and flowers bear a great likeness to the Japanese sunflower, and, in fact, is a tuber-bearing sunflower, whose value lies in its tubers, which grow clustered in large numbers around the roots, and resemble knotty English potatoes. The plant grows to a height of 5 or 6 feet. As to soil, it is not at all exacting,

HELIANTHUS TUBEROSUS.

and will do well in almost any soil provided it is not low-lying or ill-drained. In such soil, the tubers will quickly rot away.

It is essentially a drought-resisting plant. The cultivation is extremely simple and does not call for any extra care or skill. All that is needed is that the land be ploughed or dug deeply, and thoroughly pulverised. The tubers are then planted at a shallow depth 3 feet apart each way, but at 18 inches apart in the rows heavy crops may be obtained. It takes about three or four bags of seed to plant an acre, and the return are considerably superior to those of English potatoes. From 500 to 1,000 bushels per acre have been produced.

The best time to plant is early in the spring or in July and August. The tubers will lie uninjured in the ground until the soil is warm enough to cause them to sprout. In ordinary seasons the crop will be ready for digging in from five to six months. If not required for immediate use, they may be left in the ground and taken up at any time. If dug, they will not keep very long without shrivelling up and becoming soft. In the case of field cultivation on the farm, it is well not to gather more than are required for immediate consumption or for market. Plough two or three furrows across the rows and turn in the pigs. They will gather all they want. There will be quantities of small tubers left in the ground, even after the pigs have been pastured on the field. Consequently, in the early spring a bountiful crop of young plants will spring up. When these plants are a few inches high they should be ploughed out into rows 3½ feet apart, and then thinned out to a stand of one plant to every 18 inches. In this manner the artichokes will always be good, and a good supply of pigfood be obtained.

As a vegetable, boiled, steamed, fried in butter, they are a great delicacy, having an aromatic nutty flavour, and savour something of the asparagus. The tubers are irregularly shaped, being some long (3 inches), others oval or round.

ANOTHER GOOD WHITEWASH FOR OUTHOUSES.

Mr. A. E. Howling, Taringa, referring to a recipe for whitewash, which appeared in last month's Journal, sends us the following simpler preparation, as given in the "Gardeners' Monthly," which he has used on outside walls facing the east and the west, and finds it stands the weather splendidly:—

Take a half-bushel of lime, put it in a barrel and pour enough boiled water upon it to allow the lime to slack without burning; cover in the steam, and when the lime is dry run it through a medium-sized sieve. Take a bucket half-full of this powder, and pour as much sweet milk upon it as will fill the bucket three-fourths full. Either new or skimmed milk will do, but buttermilk must not be used. To every bucket of this mixture add 1 lb. of silicate of soda (water glass) and stir the whole thoroughly. If too thick, add more milk; if too thin, add the slacked lime until it is of suitable consistency. This can be applied outside or inside on smooth or rough surfaces with almost any kind of brush, and does not require skilled labour in its application. This produces a dull white colour. For a grey or black colour, add lampblack; for reddish-brown or pink, venetian red; Spanish brown gives another shade, and ultramarine any required shade of blue. The wash may be applied to wood, brick, stone, or plaster anywhere. If oil paint has previously been used, the slacked lime should be used with half-whiting.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towleston," Kingsthorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	2	6	Ayıshire Herd Book of Queensland
		2	3	Holstein-Friesian Herd Book of Australia
		3	13	Jersey Herd Book of Queensland
J W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	9	37	Holstein-Friesian Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
R. Conochie	Brooklands, Tingoora	9	21	Queensland Jersey Herd Book
W. J. Barnes	Cedar Grove ..	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine ..	6	31	Queensland Jersey Herd Book
A. J. McConnel ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
A. Pickels	Blackland's Stud Farm, Wondai	4	62	Illawarra Dairy Cattle Herd Book of Queensland
G. C. Clark	East Talgai, Ellinthorp	3	7	New Zealand Herd Book
H. D. B. Cox	Sydney (entered brother's name)	3	16	Commonwealth Standard Jersey Herd Book
J. T. Perrett and Son	Coolabunia	2	36	Illawarra Herd Book of Queensland
State Farm	Kairi	4	8	Ayrshire Herd Book of Queensland
		1	2	Holstein-Frisian Herd Book of Australia
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Australian Hereford Herd Book
W. F. Savage	Ramsay	1	12	Illawarra Herd Book of Queensland
Tindal and Son ..	Gunyan, Inglewood	50	400	Australian Hereford Herd Book
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Queensland Jersey Herd Book
J. H. Fairfax	Marinya, Cambooya (2)	9	55	Ayrshire Herd Book of Queensland
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
J. Holmes	"Longlands," Pittsworth	6	20	Ayrshire Herd Book of Queensland
P. Biddles	Home Park, Netherby	1	20	Illawarra Dairy Cattle Association
A. Rodgers	Torran's Vale, Lanefield	1	9	Milking Shorthorn Herd Book
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	..	Holstein-Frisian Herd Book of Queensland
State Farm	Warren	3	83	Ayrshire Herd Book of Queensland
S. H. Hosking.. ..	Toogooloowah ..	2	15	Holstein Cattle Club Herd Book

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1917.

The fourteenth egg-laying competition held at the Queensland Agricultural College commenced on 3rd April. The total number of eggs laid during the twenty-eight days was 3,239. Mr. E. Chester's white leghorns win the monthly prize in the light breeds with 118 eggs, while the black orpingtons owned by Mr. A. E. Walters score in the heavy section. The following are the individual scores:—

Competitors.	Breed.	April.
LIGHT BREEDS.		
J. Chester, Logan road, South Brisbane	White Leghorns ...	118
*J. R. Wilson, Eudlo	Do.	108
W. R. Crust, Alderley P.O. ...	Do.	104
G. Chester, St. George street, Woolloongabba ...	Do.	104
A. H. Padman, 47, Pirie street, Adelaide, S.A. ...	Do.	97
W. Becker, Bridge street, Toowoomba	Do.	91
T. B. Hawkins, Redbank	Do.	86
T. Taylor, Thompson Estate, South Brisbane ...	Do.	79
E. Cross, Harlin road, Ipswich	Do.	76
R. Holmes, Harlaxton, Toowoomba	Do.	76
*A. W. Bailey, Arthur terrace, Red Hill ...	Do.	75
Oaklands Poultry Farm, Banyo	Do.	75
*G. H. Turner, Aratula	Do.	73
Chris Porter, Moncure Estate, Wondai	Do.	72
*J. Zahl, Boonah	Do.	72
Mars Poultry Farm, Sunnybank	Do.	69
D. Fulton, E. Park Estate, East Brisbane ...	Do.	68
Mrs. W. D. Bradburne, Kogarah, N.S.W. ..	Do.	67
Mrs. S. J. Sear, Highgate Hill, South Brisbane	Do.	65
T. A. Pettigrove, Northcote, Victoria	Do.	64
J. G. Richter, Aratula	Do.	63
A. Schillig, Maryborough	Do.	60
Mrs. J. Carruthers, Booval	Do.	59
C. H. Singer, Taringa	Do.	59
Geo. Williams, Boundary street, Ipswich ...	Do.	58
*T. Fanning, Ashgrove	Do.	57
W. Thomas, 15-mile Siding, South Coast Line ...	Do.	54
*A. T. Coomber, Bundaberg	Do.	50
F. W. Leney, Warwick	Do.	44
*C. Knoblauch, Hawthorne street, South Brisbane	Do.	44
F. Clayton, Blacktown, N.S.W.	Do.	38
L. G. Innes, Kennedy terrace, South Brisbane ...	Do.	37
C. P. Buchanan, 258-260, Queen street, Brisbane	Do.	32
J. L. Newton, Doctor's Creek, Haden	Do.	30
*Mrs. J. R. D. Munro, Warwick	Do.	30
E. A. Smith, Paddington, Brisbane	Do.	23
J. Holmes, Frederick street, Toowoomba ...	Do.	19
Kelvin Poultry Farm, Scott road, Kelvin Grove	Do.	17
Moritz Bros., Kalangadoo, S.A.	Do.	16
S. C. Chapman, Murphy's Creek	Brown Leghorns ...	16

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	April.
LIGHT BREEDS—*continued.*		
Miss M. Hinze, Milton road, Milton	White Leghorns ...	13
*Dixie Egg Plant, Newmarket, Brisbane ...	Do.	12
*Dr. E. C. Jennings, Ipswich	Do.	12
J. Ferguson, Logan road, South Brisbane ...	Do.	9
G. J. White, Haden	Do.	6
*J. M. Manson, Milton road, Milton	Do.	5
*C. C. Dennis, Kelvin Grove, Brisbane	Do.	1
*A. E. Walters, West End, South Brisbane ...	Do.	0
G. Howard, Mount Morgan	Do.	0
HEAVY BREEDS.		
A. E. Walters, West End, South Brisbane ...	Black Orpingtons ...	81
W. Smith, Grove Estate, Brisbane	Do.	80
F. A. Claussen, Wattle street, Hendra	Rhode Island Reds ...	76
*R. Burns, Sladevale, *viâ* Warwick	Black Orpingtons ...	76
H. Jobling, Cessnock, N.S.W.	Do.	74
D. Kenway, West Pennant Hills, N.S.W. ...	Do.	64
*Mars Poultry Farm, Sunnybank	Do.	54
Cowan Bros., Burwood, N.S.W.	Do.	40
W. S. Hanson, Lake Macquarie, N.S.W. ...	Do.	39
P. C. McDonnell, Beecroft, N.S.W.	Do.	38
Mrs. Jobling, Plattsburg, N.S.W.	Do.	26
*G. W. Holland, Paddington, Brisbane	Do.	25
F. Clayton, Blacktown, N.S.W.	Rhode Island Reds ...	14
E. Morris, Paddington, Brisbane	Black Orpingtons ..	13
C. B. Bertelmeier, Kensington, S.A.	Do.	11
*F. W. Leney, Warwick	Rhode Island Reds ...	10
*Kelvin Poultry Farm, Kelvin Grove, Brisbane...	Plymouth Rocks ...	8
King and Watson, St. Mary's, N.S.W.	Black Orpingtons ...	6
*E. A. Smith, Paddington, Brisbane	Do.	1
R. Burns, Sladevale, Warwick	S.L. Wyandottes ...	0
*Miss M. Hinze, Milton road, Milton	Black Orpingtons ..	0
C. C. Dennis, Kelvin Grove, Brisbane	White Wyandottes ...	0
*E. F. Dennis, Kelvin Grove, Brisbane	Black Orpingtons ...	0
Total	...	3,239

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

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
J. R. Wilson	20	15	18	19	21	15	108
A. W. Bailey	17	7	12	13	10	16	75
G. H. Turner	0	18	16	14	10	15	73
J. Zahl	16	10	20	3	15	8	72
T. Fanning	6	10	7	13	4	17	57
A. F. Coomber	9	4	17	8	2	10	50
Mrs. Munro	19	5	5	0	0	1	30
Dixie Egg Plant	2	0	0	10	0	0	12
Dr. Jennings	0	0	1	1	9	1	12
J. M. Manson	0	0	0	0	0	5	5
C. C. Dennis	0	0	0	0	0	1	1
A. E. Walters	0	0	0	0	0	0	0

RESULTS OF SINGLE HEN TEST—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	9	0	19	0	22	26	76
Mars Poultry Farm	9	16	4	20	4	1	54
G. W. Holland	8	0	0	0	17	0	25
F. W. Leney	0	0	0	0	9	1	10
Kelvin Poultry Farm	0	0	0	8	0	0	8
E. A. Smith	1	0	0	0	0	0	1
Miss M. Hinze	0	0	0	0	0	0	0
E. F. Dennis	0	0	0	0	0	0	0

INCUBATORS AND THEIR MANAGEMENT.

By J. BEARD, Instructor in the Poultry Industry, Queensland.

In April last Mr. J. Beard, at Toowoomba, gave the following advice to poultry breeders concerning incubators. He said:—"In choosing an incubator be sure you get a machine of sufficient capacity to meet your requirements. It is much better to be obliged to set 50 eggs into a machine of 100-egg capacity than to have 100 eggs you want to hatch put into a machine of 50-egg capacity. In deciding what incubator to buy, try to get the fair and unbiased opinion of a man who is a successful incubator operator. Find out what kind of machines other successful breeders use. Study carefully the testimonials of people who have successfully used the machine. If you do this and are guided by your own best judgment, you cannot go wrong. When you receive your incubator, study carefully the printed instructions which come with it. Before you start the machine be sure that you have mastered the instructions and that you know thoroughly what the manufacturers consider best as to method of running and location of machine. The most important things to consider in selecting the location of machines are, freedom from excessive vibration, and freedom from coal gas or decaying vegetable matter and a solid level floor on which to set the machine. It is very important that the body of the incubator be level, otherwise the egg chambers will not heat evenly. After studying your instructions carefully and setting the machine in a well ventilated place, but not in the draft, run it empty for a day or so until you have it adjusted so as to maintain an even temperature of 102 or 103 degrees in the egg chambers. After you understand the operation of the machine and can maintain the desired temperature in the empty incubator, the eggs may be put in.

"Beginning on the second day, the eggs may be turned twice daily. These turnings should be as nearly twelve hours apart as possible. The trays should be turned from end to end each time you turn or cool the eggs. The time to allow for cooling the eggs should be five minutes on the first day, increasing the time as the hatch progresses towards the latter end of the hatch, and if mild weather prevails, thirty minutes would not harm the hatch. Eggs should be tested twice during the hatch, the first test being made on from the sixth to the tenth day, the second test on the fourteenth or eighteenth day. At the first test, remove from the tray all infertile eggs and dead germs. Mark those which are doubtful and let them remain in the machine until the second test. If they do not develop before that time, they should be removed, as well as all other dead germs. Stop turning the eggs as soon as the chicks begin to break the shells. Push the tray back as far as it will go, or if there are two trays, push one back and the other forward, leaving a space for the chicks to fall into the nursery below. Close the machine and let it alone until the hatch is over. If it has been regulated properly, it is perfectly safe to leave it, and it will do no harm if the temperature runs to 105 degrees when the chicks are hatching, but it should not go higher. When all the chicks have hatched, the ventilator should be thrown wide open, egg trays and shells removed from the machine, and the door left open a little, about one-eighth of an inch. Allow the chick to remain in the machine from 24 to 36 hours after hatching, then remove to the brooder, which should be running perfectly if artificial heat is used, before they are placed in it.

NATURAL INCUBATION.

"I prefer the nest in the ground filled up at the bottom with a little loose, moist loam. Pack the earth into the corners of the nest, and dish out the centre to make the nest a shallow concave, but do not dish out too much as the eggs are liable to roll to the centre and be broken by the hen. The corners of the nest should be just sufficient to keep the eggs from rolling out from under the hen. On the moist earth scatter a little tobacco dust or some tobacco stems, then add a thin layer of soft hay, not straw. Always set more than one hen at the one time, and at the end of seven days test out the infertile eggs under each hen. Say, if you had three hens sitting at the same time and the fertility should run low, you would be able to put the whole of the fertile eggs under two hens and start off again with the other. If you have two hens coming off at the same time, and the weather is favourable, you could run the two clutches together and reset the other hen along with the other, and after your next test you would be able to spell the one that had brought off the previous clutch of chicks.

CHICKS

require no food for the first thirty-six hours, but must be provided with fine sand to scratch about in. The first meal to be given should consist of coarse oatmeal or rolled oats for a couple of days, then add specially prepared chick food, which can be bought at most of the large stores in your town from the agents in Brisbane. After a couple of weeks, should you find this feed too expensive, you could wean them off on to crumbly mash. By this method they cannot select certain seeds in particles which they prefer, and waste the remainder as they will in dry feed. No matter how accurately we figure out our dry feed return, we cannot force them to eat the less palatable after they have filled up on the choice grain. Second, because a soft properly compounded food needs no accessories except green food, which is imperative in either case, and it saves much energy which would be expended by the chicks in grinding it. Bear in mind, we are raising these chicks for profit, not pets. We must therefore force them, to the limit of their ability, to eat, digest, assimilate, and grow. Above all things, never give your chickens hard boiled eggs for the first start off. This has already been supplied by the absorbed yolk before leaving the shell.

TIME FOR HATCHING.

"Hatch all your heavy breeds in July and August, light breeds in August and September. By adopting this principle you will avoid the warts or chicken-pox and other diseases that chickens are subject to.

FOR AUTUMN HATCHING.

"I would advise March only as the month to hatch in. If you go later, then the cold weather is on top of you and retards the growth of the chicks.

FOR BROODERS.

"I prefer the lampless ones to the ones artificially heated, especially for a mild climate like Queensland.

FEED FOR EGG PRODUCTION.

"Best results are obtained by feeding moist mash in the morning and grain in the evenings, with green stuff of some kind at midday. No set rule can be observed as regards the quantity of the constituents of the mash, as bran and pollard vary so much in quality. If the meals are of fair average quality, the usual proportion is one of the former and two of the latter, with 30 per cent. of finely chopped green stuff. If lucerne chaff is used it should be steamed overnight in a wooden cask. To this should be added a small handful of salt in proportion of, say, 1½ lb. to every 100 lb. of mash. Take care to use boiling water, as it greatly improves the chaff. Close the cask well with bags, so that the heat will be retained, and it will make a better mash and much easier to mix. Give oilcake, 2 lb. for each 100 birds, every second morning, and meat about 1 oz. per bird, each morning the oilcake is not used. The oilcake and meat should be soaked in boiling water over night. Mix in a big tub or trough. Put the green food in first, then bran and oilcake, and finish off with pollard and mix into a crumbly mass. The birds should be given as much as they will eat. The best plan is to go round a second time, and if they require more, give it to them. After a couple of weeks you will learn just what quantity they require. The food is given in a clean wooden trough with flat bottom, judging the size by what number of fowls you have in the pen, and about half an hour after feeding go round the pens and remove any food that may be left. During the cold weather and while the birds are moulting, meat and oilcake may be given every day as it will help to brace them up.

"It is not wise to give them too much during hot weather. Green food of some kinds should be given at midday. If none is available, soaked lucerne chaff, dried off with a little bran and pollard, is greatly relished by the fowls. Wheat should be the principal food in the evenings, but to change every few days to oats and cracked maize will be greatly relished by the birds, and will keep them in good health. No set rule can be given in feeding grain, as some birds eat fully twice as much as others, but they should have as much as they can eat. If you see grain lying about the pens, reduce the supply.

FEEDING STOCK BIRDS.

"Here a moderate supply of eggs is required as they are for hatching purposes and are wanted to produce strong hardy healthy chicks with sound constitutions. For these reasons discontinue the regular morning mash, and only give it by way of a change one or two mornings a week. The food, therefore, will be mostly grain. Take care, however, that the birds are not fed too often on the one kind of grain, and it will be quickly noticed which kind they prefer. Breeding birds must be supplied with plenty of green stuff, and they will produce strong, fertile eggs. No food of any kind should be left in the pen. Have the birds ever on the move. If the soil is of any other nature than sandy, you must provide scratchings for the birds.

EGGS FOR EXPORT.

"I feel certain that at the present time it is of little use considering this question at all until such times that we have a very large surplus to handle, and a surplus that will have the appearance of lasting for a definite period. It would be useless to think of at the present time, considering the ruling price of eggs for the last two years in Brisbane. The average for 1915 for extra special was 1s. 3½d. per dozen; 1916, 1s. 5½d. per dozen. With these prices ruling, export is almost, if not quite, out of the question."

The Orchard.

ORIGIN OF THE NAVEL ORANGE.

The following notes on the Navel Orange will doubtless be of interest to some of our correspondents who, of late, have been seeking information concerning this variety of the Citrus family. They appeared in the issue of the " Agricultural News" of Barbados for 27th January, 1917:—

ORIGIN OF THE NAVEL ORANGE.

In 1913-14, an agricultural expedition to Southern Brazil was organised by the United States Department of Agriculture, to collect all available information concerning the navel orange, particularly at Bahia, from which point the parent Washington navel trees were sent to the United States. The observations and conclusions of the expedition (briefly referred to in the " Agricultural News" for 4th November, 1916), which should not be without interest to persons concerned with citrus cultivation in the West Indies, are summarised in the " Monthly Bulletin," California State Commission of Horticulture, as follows:—

All available evidence proves that the navel orange of Bahia originated about 1820 as a bud sport from the *selecta* variety, and was first propagated by a Portuguese, the first man to use this method of plant propagation in Brazil.

The Washington navel orange was introduced into the United States by the United States Department of Agriculture in 1870 from Bahia, Brazil. The first trees sent to California by the department were planted on the L. C. Tibbets ranch at Riverside about 1875, and these two trees are still living, the property of the city.

The navel orange groves of trees of our west and of several foreign countries are directly descended from the Tibbets trees. The great commercial success of the navel orange industry in California is the foundation upon which the successful citrus industry of this State as a whole has been built.

The oldest navel orange trees found in Brazil were more than forty years of age. They are now producing the largest and best crops of any trees found in that district.

The method of tree renewal for treating diseased trees in Bahia is a success. The replacing of diseased trees by growing a new top is universally practised in that region.

The use of manure in maintaining the citrus trees in productive condition, and improving the quality of the fruit is an established and successful practice. The liberal use of manure is considered to be absolutely essential to profitable citrus production. The average annual production is about 100 navel oranges per tree.

Scale and other insect enemies of the citrus are evidently controlled by natural parasites.

The Bahian navel fruits are very different in appearance, quality, and other commercial characteristics from Californian fruit. For this reason we may safely conclude that no one can foretell exactly the behaviour of plants under new environmental conditions. Consequently all food-plants introduced should have a wide and careful trial, and in our opinion all foreign food-plants should be tried without too fixed ideas as to their probable behaviour in any particular region.

The shipment of bud wood or trees from Brazil is attended with both difficulty and danger. Great care must be used in packing and condition of storage and shipment in order to preserve the buds in living condition. The bud wood should be inspected with the greatest possible care in Brazil and in the United States in order to prevent the introduction of insect enemies, fungoid disease or other parasitic pests.

The discovery of the Bahia navel orange by a traveller in Brazil is a good illustration of the importance of careful observation of food-plants in foreign countries by all travellers. All information about new food-plants found in this way is likely to prove of value. Through the Office of Seed and Plant Introduction of the United States Department of Agriculture, such information can be followed up, and if desirable, supplies of bud wood or seed be obtained for trial in this country.

We found a total of about 76,000 navel orange trees near Bahia. The orchards are located on hilltops or hillsides. The orange growers are prosperous and an effort is being made by the local government to extend the culture of this variety.

A permanent cover crop of Para grass in connection with the liberal use of cow manure was the most successful method of culture observed, under the conditions of an average annual rainfall of about 50 inches.

Citrus bud sports are common in the orchards observed. The origin of the navel orange from this cause is proof of the importance of this condition in the improvement of citrus fruits.

Horticulture.

STRAWBERRY CULTURE.

LOCATION AND SOILS.

Hill lands are less liable to frosts than lowlands, but level land is especially desirable where irrigation can be practised. With regard to soil, it appears that in Europe and the United States of America, clay loams are more productive than sandy loams, whereas in Australia the largest crops are raised on rich, light, or sandy loams. The strawberry thrives best in a cool or temperate climate, such as is found in Southern Queensland on the Blackall Range, and on the coast lands, as at Wellington Point, Redland Bay, and other places on the sea-coast. Newly cleared forest and scrub soils give better results than old soils. Strawberries are not an exhausting crop on the land. Nevertheless, on account of the rapid growth of the plant, they require an abundance of fertilisers.

MANURES.

Well-rotted farmyard manure is one of the very best fertilisers for strawberries, as stated by Mr. W. French, Wellington Point. Unfortunately, this class of manure is now very scarce, and the same authority recommends the use of bonedust at the rate of 10 cwt. to the acre in field cultivation. By putting this 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 heat or drought half so much as when the roots are encouraged close to the surface. After the first crop is gathered a fertiliser consisting of superphosphate, sulphate of potash, and sulphate of ammonia is used in the following proportions:—Two parts superphosphate, 2 parts sulphate of potash, and 1 part sulphate of ammonia. This mixture is sown in a furrow about 2 inches deep run along the rows by a small hand plough, and is covered by running the plough the reverse way. In the present scarcity of potash, wood ashes at the rate of 50 to 100 bushels per acre should be applied in field culture. The fertiliser should be profitably supplemented by two or three top-dressings of nitrate of soda, each at the rate of 1 cwt. per acre when the first fruit is forming, and, thereafter, at intervals of about two weeks, or the nitrate of soda could be applied at frequent intervals dissolved in water.

PLANTING IN THE FIELD.

Draw out drills with the plough as deep as possible, 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 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 ft. apart in the rows. Planting close in the garden necessitates replanting every year, whereas, in field culture, more room is given.

PLANTING THE STRAWBERRY.

"While it is impossible," says Mr. French, "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 the ground is in good order, and the weather showery, start about the 1st of March, and, as a preference, with young runners. Some growers say they get the best results from old crowns split up, but that is not my experience. 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 room to work, so as to keep the soil always open, a matter of great importance. In transplanting, some recommend shortening the roots by one-half. This practice is 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 be beneficial. When planting, I 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."

SMALL GARDEN CULTURE.

Trench the beds 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, and set the plants about a foot apart. Planting close in the garden necessitates, as above stated, replanting every year, although several varieties can stand for two years, giving good results by keeping the soil between the rows constantly cultivated.

QUEENSLAND AGRICULTURAL JOURNAL.

Journals for February, 1916, have been received during the month of May from—

C. Ashton, Mundubbera.
H. Beelley, Sunnyside, Springsure.
H. J. Hobbs, Aspley.
W. J. Rolfe, Gargett.
Anonymous.

As the requirements for this issue of the Journal have been sufficient, we thank our subscribers for their prompt response to our request.

Viticulture.

THE SUMMER BUD OR "YEMA" GRAFT OF THE VINE—No. 2.

THE GRAFT IN VICTORIA.

From the description first reproduced above,* and acting on verbal advice, several Rutherglen growers tried the graft. Mr. P. A. Wyatt, at that time Travelling Viticultural Assistant of this Department, demonstrated it to numerous growers, with the result that a good many vines were thus grafted in February, 1909. The encouraging results of these first trials led to their renewal on an increasing scale each season with greater success. As was to be expected, each grafter applied such modifications and improvements as practical experience suggested to him, until a method was evolved, differing somewhat from either of those already described, and which is now very generally followed throughout the district.

Simultaneously with this the graft was being extensively practised at Mildura, with most encouraging results. To Mr. J. Rounce, now an officer of the New South Wales Agricultural Department, belongs the credit of its success in this district. He had experience of this graft in England before coming to Australia, as he informed the writer after a lecture delivered in 1908, at which the graft, as practised in Spain, was described and illustrated. He had seen it applied to roses and several other garden plants. Mr. Rounce practised it on the vine with remarkably successful results, and within the past few years he has reconstituted considerable areas on resistant stock by this method. The manner in which he executes the graft differs a good deal from that which has become so popular at Rutherglen, as will be seen presently.

The "Yema" graft is, in fact, remarkably elastic; it permits of a good deal of variation, according to the individual fancy of the grafter. The two methods about to be described and figured do not pretend to exhaust all the possibilities. The graft may yet be varied in other details.

As to which is the better of the two, it would be rash to attempt a definite statement. The writer has known percentages of 98 and 99 of completely successful unions by both methods. Both methods seem to give equally perfect unions. So far as the final result, there would seem to be little difference between the two, though Mr. Rounce's modification, permitting, as will be seen, the suppression of tying or binding the graft, should enable the grafter to operate more rapidly. These two typical modes of executing the graft will now be described in detail. Afterwards, a few points of importance in connection with summer grafts in general, irrespective of the style of graft, will be considered.

* *See* "Queensland Agricultural Journal" for May, 1917.

THE RUTHERGLEN METHOD.

This is illustrated in Fig. 5, which shows how the scion-bud is removed from the cane, and Fig. 6, where the preparation of the stock, the fitting in of the scion-bud, and the binding necessary to hold it in position, until knitted, are shown.

A suitable bud must first be selected. It should be situated on a cane of somewhat smaller diameter than the stock on which it is to be grafted. It must also fulfil the conditions specified under the heading "scion requirements." The scion-bud is removed, as shown in Fig. 5. An oblique cut, penetrating to about the middle of the cane, and rather more than half an inch below the bud, is first made (*a*, Fig. 5). Commencing at *b*, a curved cut is then made as shown by the dotted line (Fig. 5), which, junctioning with the first cut, removes the scion-bud. This cut should be fairly deep, so that, after removal, the piece bearing the bud shows the pith along the whole section. It is now rather thicker than is desirable, and requires paring down on the inner, or wood side, and shortening by the cut shown at *c* (Fig. 5), which is made at a more acute angle with the axis of the cane than that at *a*. The paring should be carefully done, so that the bud-scion, when finished, is cut to an absolutely plane surface, only showing two small spots of pith on the inner or wood side, above and below the transverse woody partition, which is to be found at every bud. The section should appear as shown (Fig. 5), C.

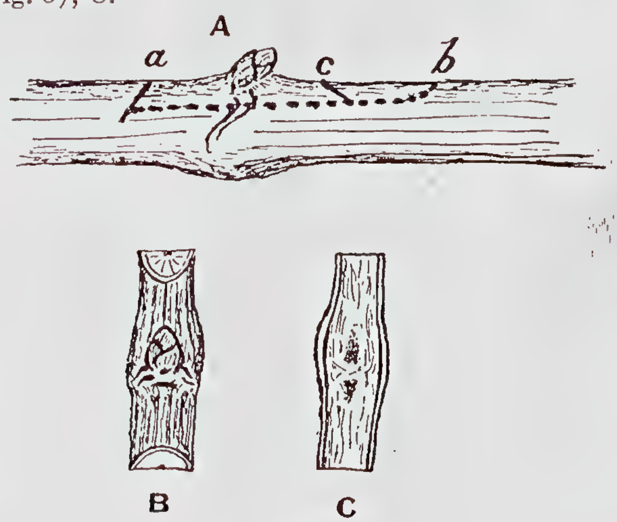

FIG. 5.

A, removal of scion-bud as practised at Rutherglen; B, outer view of bud immediately after removal; C, view of same from inner (wood) side, after trimming and when ready for insertion in stock.

Fig. 6 shows how the stock is prepared. Four cuts of the budding knife are required; A shows the stock after the first two have been executed, and B after the completion of the whole four. The stock is now ready to receive the scion.

The first cut should be exactly similar to that made at *a* (Fig. 5), when taking the scion. It is essential for an accurate fit that this cut should be made at the same angle, both on stock and scion; a way of insuring this is by cutting the scion, in the first place, a little longer (below the bud) than is really required. By holding it against the uncut stock in as nearly as possible the position it will ultimately occupy, it is easy, by a single cut of the budding knife, through the base of the scion-bud, and into the stock to the required depth, to obtain absolute identity of angle.

The remaining three cuts will be readily understood on reference to B (Fig. 6). It will be noted that cut No. 4 is continued for about a third of an inch, after junctioning with No. 3, so as to provide a sort of flap, under which the sharply bevelled apex or toe of the scion can be pushed whilst the heel is made to fit neatly in the niche or cavity prepared for it. The scion-bud, definitely placed in position, is shown in C (Fig. 6). A fifth cut can usually be made with advantage at *c* (Fig. 6), slightly shortening the flap which covers the toe of the scion-bud. This very small cut is made obliquely, but in reverse sense to that which completed the scion-bud *c* (Fig.5), and in such a way that the section of the cambium layer which it exposes is as near as possible to that made by the

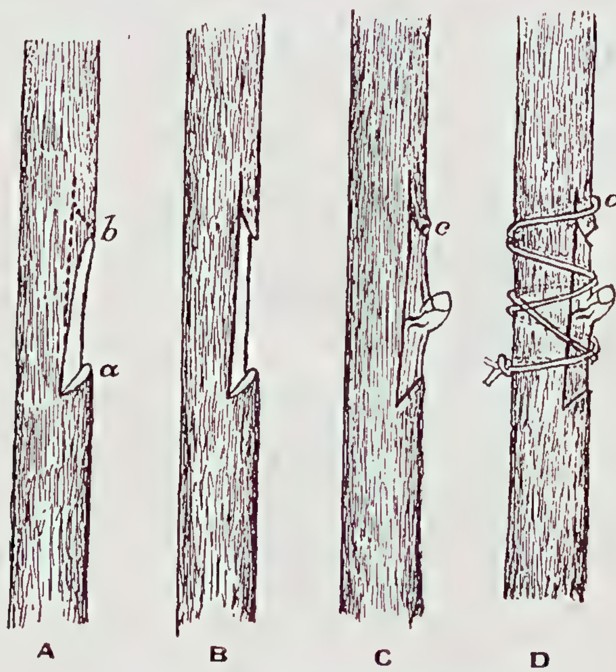

FIG. 6.—THE RUTHERGLEN METHOD.

A and B shows the four cuts which prepare the incision in the stock; C, scion bud placed in position; D, method of tying.

third cut in the lifting of the scion *c* (Fig. 5). Though these two cambium sections are not in absolute contact (as all the others should be), only a very small interval separates them. They are close enough for this small gap to be easily bridged over by callus, the formation of which is remarkably active under the very suitable conditions of warmth, moisture, and aeration prevailing in the interior of the mound.

The scion-bud should be of such a size that the cambium sections of stock and scion coincide in the greatest measure possible. The more completely this condition is realised, the better the chance of the graft taking. On no account should the scion be too large—overlapping is fatal to success, the rapid formation of callus tending to lift the scion-bud out of its proper position. If any departure from an accurate fit is permissible, the scion should be too small rather than too large; callus then forms outside and not inside the graft, holding the bud in, instead of forcing it out. An exact fit, however, is the ideal which should be aimed at. Another reason for avoiding too large a bud is that there is a tendency for the scion to be slightly flattened out by the pressure of the string used in tying; this may cause one, or even both sides of a large bud to overlap, with the undesirable result just described.

In a trellised vineyard, the bud should be placed in the direction of the wire, and not perpendicularly to it, which would result in the young vine growing out of the line the following spring. The bud should also be placed, as far as is possible, on the lee side of the stock as regards winds likely to cause damage in spring.

The graft having been properly fitted, it must be tied, so that stock and scion will be held firmly in position until knitted. Tying is indispensable in the case of the Rutherglen form of graft, with its rather long and thin scion-bud. Tying may be done in various ways—that shown at D (Fig. 6), is perhaps the most convenient. Bagging twine, preferably split up, so that two or three strands are used, instead of the whole twine, is a convenient tie. It is better than raffia, which, being flat, interferes rather more with callus formation. A common mistake with beginners is to plaster the graft with raffia, string, or other substances. The tie is really only needed to keep cut surfaces in contact until knitted—otherwise it hinders rather than promotes the formation of callus. Protection by waxing, &c., is no doubt necessary in the case of an apple, which is grafted above ground; not so with the vine, which is usually grafted underground. The mound of loose earth (Fig. 3) provides ample protection against drying out of the scion.

Opinions differ somewhat as to the best length to give the scion-bud —that shown in Figs. 5 and 6 is the most usual. Some experienced grafters favour a lesser length, their advice being to make the graft as short as is conveniently practicable.

MR. ROUNCE'S MODIFICATION.

This method, which has been so successful in the Mildura district, will be readily understood on reference to Fig. 7. The scion-bud is removed in practically the same manner as is shown in Fig. 1, two cuts sufficing—the first is exactly similar to the corresponding one in the Rutherglen graft. When making the second cut, an oscillatory movement should be given to the knife so as to cut without splitting when passing through the twisted fibres underlying the bud. If skilfully removed, the section will be a plane surface, and the scion-bud ready for immediate insertion in the cavity prepared to receive it, without any paring or trimming.

In preparing the stock, three cuts are all that are needed. The cavity is somewhat similar to that made in the last graft, but deeper. The graft is, in fact, very similar to the Spanish " Yema," as shown in Fig. 1, but deeper and shorter. If neatly executed, and with scions thoroughly suited to the size of the stock, the buds are so firmly held that no tie is necessary. The operation of grafting is thus considerably simplified, both by the suppression of several cuts, and by enabling tying to be dispensed with, so that a greater number of vines can be grafted in a given time than by the graft previously described. As regards the perfection of the unions, there does not seem to be much to choose between the two methods; with both they are remarkably perfect.

STOCK REQUIREMENTS.

When planting the vines, care should be taken to see that there is a straight portion of stem where the bud can conveniently be inserted, about 2 or 3 inches above the level of the soil. The most convenient size

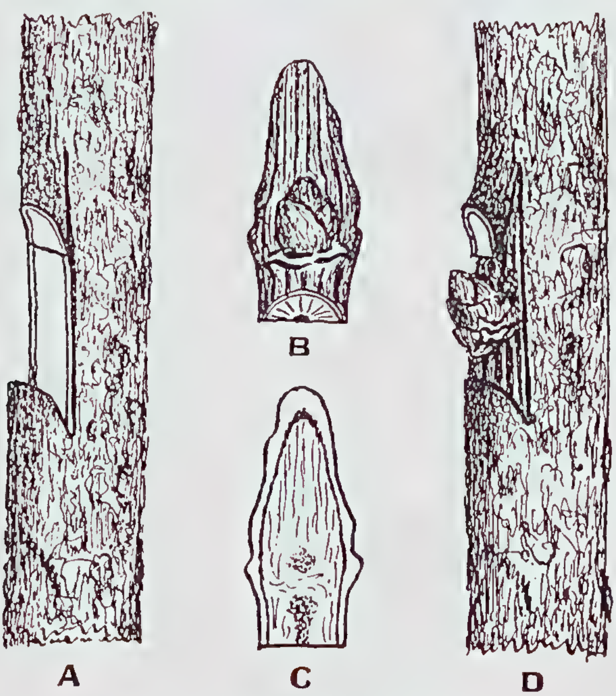

FIG. 7.—MR. ROUNCE'S MODIFICATION.
A, preparation of stock; B, outer view of scion bud; C, inner view of same; D, the completed graft.

is when the diameter of the stock is about half an inch. When larger, the operation is less convenient. Smaller stocks can, however, be successfully grafted. One very successful grafter remarked to the writer that he was not afraid how small the stock was, provided he could find scion-buds small enough. Vines planted in August are usually fit for grafting the following February, save in an exceptionally dry season.

In order to insure success, the stock must be well in sap. In other words, it must have plenty of life in it. Should there be a good fall of rain during January, conditions are usually ideal for this graft during the month of February, but even in the absence of summer rain, with vines planted on properly prepared land, and adequately cultivated during spring and early summer, there will be plenty of sap for success.

SCION REQUIREMENTS.

As has been shown, the scion should be taken from a cane of rather smaller diameter than the stock on which it is to be grafted. The question arises whether lateral shoots are eligible as scions, or whether main canes only should be used. Seeing that laterals are really quite as capable of producing fruit as main canes, there should be no objection to their use, provided they are well constituted and not too pithy. Needless to say, the same rigorous care is necessary in the selection of the scion buds as in the case of scions for ordinary spring grafting. They should, in the first place, be only taken from vines picked on account of the quality and quantity of the fruit they yield. In the second place, only fruit-producing canes must be used; water shoots and suckers should on no account be employed. Of course, laterals must only be those growing on fruit-bearing canes; any others are useless.

Buds should only be taken from canes which are properly ripened, the green or yellow colouration having changed to brown; unripe buds are, it is true, capable of uniting, but they are not nearly so sure; with them one cannot rely upon a high percentage of success. Buds should be free from laterals; in practice it is often found that a bud which has failed, or has taken in an unsatisfactory manner, shows the fragment of a small lateral alongside of it, which was cut back at the time of grafting. Where the Yema graft is to be practised on a large scale, it would be well to prepare the canes to be used as scions by breaking out the laterals in November-December, when they are still quite small and easily suppressed. Well-developed laterals are less liable to have secondary laterals in the axil of the leaf, for which reason they are very convenient to use. If the main canes of the vines used as scion bearers are stopped early in November, stout laterals will be thrown out, which will be well ripened by February.

Needless to say every precaution must be taken to avoid drying out of the scion canes. The season best suited for this graft being the hottest time of the year, only a few hours' requirements should be cut at a time, and these should be rolled in a piece of wet bag; they should not, however, be cut into short lengths and kept floating in a bucket of water as is sometimes done.

The graft is, in fact, more practical if scions are obtainable in the same vineyard where they are to be grafted than if they have to be brought a distance; in the latter case they must be packed in such a way as to guard against desiccation in transit, and before use the canes should be placed for a day with their butt ends in clean water.

NEGLECTED INDUSTRIES.

THE UTILISATION OF WASTE RAISIN SEEDS IN THE UNITED STATES.

An investigation has recently been made by the United States Government which has proved that the seeds removed from raisins yield technically useful products that fully justify the expense involved in separating them. In the raisin-seeding industry, which in recent years has grown to such proportions in California, vast quantities of seed accumulate annually. From 30,000 to 40,000 tons of raisins are seeded every year, and it is estimated that there should be approximately 3,000 to 4,000 tons of the seed available annually. The utilisation of this waste has received some attention by the producers in recent years, but thus far with little success. It appears that a brandy has been made by fermenting the sugary matter that adheres to the seeds, and that a high-proof alcohol has been distilled after the fermentation. It is also reported that some fixed oil has been obtained from the seeds. The investigation shows that four important products can be obtained from the waste seeds—namely, syrup, fixed oil, tannin extract, and meal.

If the entire annual output of 3,000 to 4,000 tons of seed were used, there would be obtained 550 to 750 tons of syrup, 340 to 450 tons of fixed oil, 330 to 440 tons of tannin extract, and 1,600 to 2,200 tons of meal. Commercially, the manufacture of syrup can be accomplished with comparative ease and readiness. Owing to the solubility of the sugars in water, the process of preparation resolves itself into simple extraction and concentration. Comparatively small quantities of water are necessary completely to dissolve the sugary matter from the seeds. The washing could possibly be most readily accomplished in large centrifuges, while the saturated solution requires only to be evaporated to produce the syrup. As the most convenient form of concentrating, vacuum pans are considered to be the most efficient and expedient. A clear transparent syrup with the characteristic taste and flavour of the raisin can be produced from the seeds. Its uses are many, and should justify its production from this waste material. The fixed oil has been mentioned as found in considerable quantities in the seeds of raisins, and also in the seeds of grapes which occur as by-products in the manufacture of wine and grape juice. After washing off the sugary matter and drying and screening the seeds, they need only to be ground for the production of the fixed oil. Two methods of extraction are feasible—by pressure and by solvents. Hot extraction by means of hydraulic presses would possibly yield, it is said, the maximum of fixed oil. Cold pressure having a tendency to extract the oil incompletely would leave more fat in the press cake. Extraction by means of solvents such as benzine, carbon bisulphide or low-boiling gasoline, or preferably carbon tetrachloride, is practised commercially because of the more complete exhaustion than by pressure, especially of materials with low oil content. The use of carbon tetrachloride has been recommended because of the non-inflammable, non-explosive properties of these solvents. The clear amber-coloured fixed oil, useful in paint and soap manufacture, and possibly in other industries, is capable of being produced in large quantities from the waste seeds.

The important application of the oil in commerce, coupled with the large output available annually, should justify its production. After the preparation of the syrup and the extraction of the oil from the seeds, the extraction of tannin has been recommended. The production of tannin extract is practicable only in the case of raisin seeds, since wine residues are probably largely depleted of their tannin content. The tannin, being soluble in water, can be extracted in a practical way by boiling the meal in large vats, the solution being transferred to vacuum pans for concentration to a moist extract. If a dry extract is preferred, it can be obtained by simply allowing the moist extract to dry in the air. The large quantity of tannin extract which can be produced from raisin-seed meal, and which is well adapted for the tanning of leather, becomes the third important commercial product capable of being made from raisin seeds. The final residue, the meal, seemingly already exhausted of all its constituents of value, still possesses useful qualities. On account of its high protein content its usefulness as part, at least, of a cattle food is undoubted.—"Journal of the Royal Society of Arts."

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

BY C. T. WHITE, Acting Government Botanist.

No. 8.

"GIANT PIG WEED" (*Trianthema portulacastrum*, Linn.)

Description.—A spreading rather succulent herb. Stems much branched, glabrous or slightly pubescent. Leaves opposite or nearly so, one smaller than the other, tapering at the base, rounded, and often with a small point at the apex. Leaf-stalk dilated and connate at the base, forming a deeply triangular membraneous pouch in which are situated the solitary flowers. Capsule small, almost concealed in the stipular pouch, and containing about eight seeds. A weed of the tropics. Has recently made its appearance in Queensland.

Mr. D. Macpherson (Instructor in Agriculture, Bowen) writes: "The weed is a most troublesome one in Bowen farms. For want of a better name, I call it Giant Pig Weed. Stock are said to be very fond of it." As I know of no other local name given to the plant and as it is closely allied to and similar in appearance to the common Pig Weed, I would suggest the use of Mr. Macpherson's name as a vernacular.

Distribution.—E. D. Merrill speaks of it as a common weed of cultivation and of open waste places about towns in the Philippine Islands. Dr. S. H. Koorders says that except on the highlands it is a common roadside weed over the whole of Java. It is a common weed in the West Indies, subtropical United States, and Tropical America generally. In India it is spoken of as a troublesome weed that springs up everywhere.

Uses.—"The young leaves are used as Spinach; when somewhat old mixed with others and used as greens. The root is considered cathartic and given in powder to the extent of two teaspoonfuls twice daily with a little ginger; the fresh root also is given as a cathartic mixed with ginger." Balfour—"Cyclopaedia of India," 3, p. 931. Its palatability for stock has already been referred to.

Eradication.—Like Pig Weed and plants of similar habit, it can only be kept in check by constant hoeing and cultivation, which should be done before seeding.

Botany of the Species.—The plant is to be met with in botanical literature under several different names. The following are those it has received at different times:—

1753. *Trianthema portulacastrum,* Linn. Sp. Pl. 223.
1767. *Trianthema monogyna,* Linn. Mant. Pl. 1: 69.
1813. *Trianthema obcordata,* Roxb. Hort. Beng. 34.
1828. *Trianthema decandra,* L. *var. obcordata,* DC. Prod. 3: 352.

PLATE 15.—"GIANT PIG WEED." (*Trianthema portulacastrum*, Linn.)

Tropical Industries.

QUEENSLAND SUGAR MILLS.

CRUSHING DATES.

The following is a list of crushing dates as given in the "Australian Sugar Journal" of 10th May, 1917:—

Mossman Mill	31st May
Mulgrave Mill	About 30th May
Goondi Mill	Early in June
Macknade Mill	Early in June
Victoria Mill	Early in June
Pioneer Mill	15th May
Inkerman Mill	4th June
Cattle Creek Mill	6th June
Marian Mill	30th May
Plane Creek	About 11th June
Pleystowe Mill	6th June
Racecourse Mill	6th June
Doolbi Mill	1st week in June
Invicta Mill	5th June
Qunaba Mill	1st week in June
Waterloo Mill	5th June
Baffle Creek	Middle of July
Isis Central Mill	1st week in June
Maryborough Sugar Factory	Early in July
Millaquin	2nd week in June

THE COMING HARVEST.

For the present season cutting will commence early this year, about May, and will end about December. Queensland growers will receive, provided the crop anticipations of 260,000 tons prove correct, £5,811,000 for their output instead of £4,680,000, or £1,131,000 more than they would have received under former conditions. And the consumer will not be called upon to pay a fraction more than the prevailing price of 3½d. per lb.

Some of the Queensland estimates place the season's output as high a figure as 300,000 tons, but this may be an exaggeration. There is, however, every reason to expect that the supply will equal the consumption, and if the growers obtain, as they anticipate they will, relief, on appeal, from some of the more onerous conditions of the Dickson award, the result of the year's operations will probably lead to further acreage being placed under cultivation.

Entomology.

PARASITES OF THE CANE BEETLE.

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

"With reference to the question of insect enemies attacking the imago or beetle stage of our cane beetle, it may be of interest to record the occurrence of a new tachinid fly bred at Gordonvale Laboratory last January from a specimen of the grey-back cockchafer.

"This parasite, which strongly resembles a large house-fly, is nearly three-eighths of an inch long and of strikingly handsome appearance; the head and thorax being dull golden, the latter striped longitudinally with two broad blackish bands, which on the prothorax are ornamented by a central streak of the same rich hue.

"The basal half of the scutellum is blackish, while the dark reddish-brown abdomen is barred transversely with three silvery-white bands, and bears towards its extremity a number of stout bristles.

"It was found that a female of *Lepidiota albohirta* infested by a single maggot of this tachinid was able, notwithstanding, to mature and deposit fourteen eggs before succumbing to its injuries.

"This beetle, however, was collected from forest land, so, although living for a fortnight in confinement, may, of course, have been parasitised just prior to its capture. The eggs of such parasitic diptera are deposited externally, being firmly glued to the body of the host in such position as to render removal difficult, and enable the tiny larvæ when hatched to bore at once through the skin of their victim preparatory to feeding on its internal tissues.

"In the present instance, judging by the size of albohirta, we may reasonably assume that the parasite in question normally lays two or more eggs on a single beetle, in which case the resultant maggots would probably soon inflict serious injuries, and by entirely destroying the ovaries of their unfortunate host, effectually prevent it from ovipositing.

"In view of the fact that the cockchafer caught last January harboured only one dipterous larva, it appears likely that the eggs of this useful fly are subject to attack from hymenopterous parasites belonging to the family Proctotrypidæ, which operate as a natural check on its increase.

"Our grey-back cane-beetle is, I think, very liable to victimisation by dipterous parasites, owing to its habit of remaining on the feeding trees all day in a motionless or semi-torpid state, and fully exposed to the assaults of such insect enemies.

" The only other dipteron obtained at Gordonvale from the adult form of albohirta is a small fly measuring five-sixteenths of an inch in length, with dull yellow thorax and legs, dark reddish-brown abdomen, and blackish head. This insect, which was first noticed in 1914 but has not yet been identified, appears to belong to the *Tachinidæ,* and is evidently an abundant species. Numerous specimens were bred here last season, the number of maggots found in a single beetle varying from three to a dozen.

" It no doubt helps to thin the ranks of our notorious cane-beetle very materially, although, unfortunately, like the preceding, this fly probably suffers from the attacks of hyperparasites.

" Both these diptera, however, are of considerable scientific interest, since they infest the perfect insect, which, in our case, happens to be peculiarly susceptible to injuries from foes of this kind.

"Alluding very briefly to other dipterous parasites bred by us during the past two years from various species of root-eating scarabæid larvæ affecting cane. I may mention that these include no less than eight different kinds of Dexidæ, and four of Asilidæ, the former resembling in general shape gigantic blowflies, and being frequently adorned with brilliant metallic tints of greenish-gold, blue, or deep crimson, while the latter (Asilidæ), familiarly known as 'robber flies,' are predaceous insects possessing stoutish moderately long bodies, which for the most part are hairy and of obscure colouration.

"These dexids and asilids infest the grubs of about eight species of our cane beetles, but apparently are too rigorously controlled by insect and other enemies to be of much economic value in Queensland.

" In addition to the foregoing, our scarabæid grubs frequenting cane fields are preyed upon by at least one species of elaterid larvæ; and by three kinds of 'digger wasps' (Scoliidæ), which in their turn are kept in check by hyperparasites belonging to the families Bombylidæ and Mordellidæ."

General Notes.

MOUSE PLAGUES.

BY HEBER A. LONGMAN, Queensland Museum.

The periodical occurrence of mouse plagues has engaged the attention of investigators in various parts of the world. The problem is of the greatest importance in countries like Australia and America, where there are wide stretches of agricultural land controlled by a comparatively small number of settlers. In America such plagues have proved a serious scourge, and publications dealing with the matter have been issued by the United States Departments of Agriculture. In one of these, issued in 1908, and written by Stanley E. Piper, particulars are given of the measures taken to check the plague in Nevada. The outbreaks there are exceptionally severe because they occur in rich lands, more or less restricted by surrounding desert conditions. The trouble has even lasted

PLATE 16.—ALFALFA FIELD DESTROYED BY FIELD MICE. GENERAL CONDITION OF FIELDS IN HUMBOLDT VALLEY, NEVADA, IN NOVEMBER, 1907.

for three or four years, and it was found necessary to take very stringent measures. The mice which occasionally increase in Australia are not, of course, the same species as run riot in America. Particulars of the more common native and introduced species of rodents found in Australia are given in a booklet by the writer which was recently issued by the Commonwealth Quarantine Service.

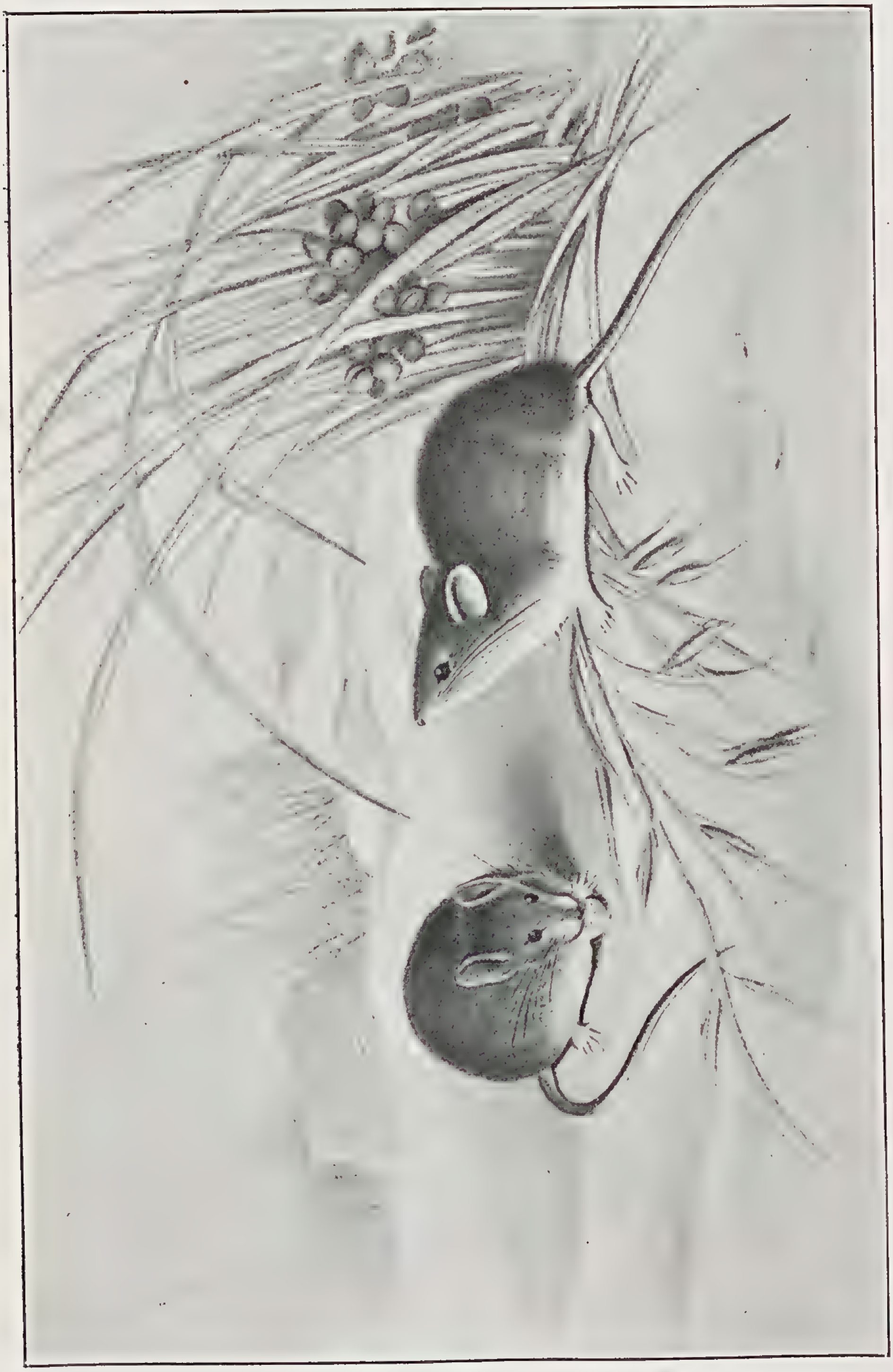

PLATE 17.—A COMMON FIELD MOUSE (*Pseudomys novæ-hollandiæ*, Waterhouse). [*After Gould.*

The following particulars of the methods adopted in Nevada to control their mouse plagues are summarised from Mr. Piper's paper. He states that such methods as rolling the land with heavy cylinders, trampling it with droves of sheep, or injecting water or steam into burrows, are inadequate for the suppression of large plagues. Digging trenches or pits wider at the bottom than the top, into which the mice fall, and other methods of trapping, only account for a small proportion. In France and Russia and the States attempts have been made to establish bacterial disease, but these have not proved a marked success.

Poison is claimed to be the cheapest and most certain means at present known of controlling mouse plagues. Phosphorus is condemned on account of its dangerous character and its destructiveness to birds and mammals. As the result of extensive experiments and practice, strychnia sulphate was found to be the most satisfactory poison. Strychnia sulphate, when prepared in the following ways, was found to be the cheapest poison available:—

1. *Poisoned Alfalfa Hay.*—Chop 30 lb. of good, fresh alfalfa (lucerne) hay into about 2-in. lengths with a feed cutter. Then place the hay in a large metal receptacle and sprinkle with 3 gallons of fresh water. Thoroughly dissolve 1 oz. of strychnia sulphate in 2 gallons of water by heating in a closed vessel; sprinkle over the dampened hay and mix well.

2. *Poisoned Green Alfalfa (Lucerne).*—Heat 1 oz. of strychnia sulphate in half a gallon of water until thoroughly dissolved, add to 1 gallon of cold water, and sprinkle this solution slowly over 45 lb. of fresh green alfalfa, cut into lengths of 2 or 3 in. Mix until the free solution is taken up.

3. *Poisoned Crushed Wheat.*—Dissolve 1 oz. of strychnia sulphate in 2 gallons of water by heating. Sprinkle the solution over 60 lb. of rolled or crushed wheat in a metal receptacle and mix well. If the preparation is to be kept for several days, two tablespoonfuls of powdered borax may be added to prevent fermentation.

The poisoned hay was found of best use in the winter, when green food was absent. Men were employed to drop small quantities (about a teaspoonful) at the mouth of burrows. In some fields it was calculated that there were 10,000 to 24,000 mouse holes to the acre, and it is said that a systematic treatment of the land resulted in the destruction of 85 to 95 per cent. of the mice.

Poisoned green alfalfa proved very successful, as the mice had been in the habit of feeding on the lucerne. Poisoned crushed wheat was distinctly better than the whole grain, but this is *not to be recommended* for field use, because a *large number of useful birds fell victims to the poisoned grain.* With the poisoned green alfalfa and alfalfa hay no accidents to birds or domestic animals were reported.

[From life.

PLATE 18.—THE BLACK RAT (*Epimys rattus*, Linn).
The full length of the tail is not shown.

PLATE 19.—THE BROWN RAT (*Epimys norvegicus*, Erlx).

[After Hossack.

In order to prevent plagues various measures are recommended. Winter burning, flooding, and pasturing off growth are aids. When land is being ploughed dogs should be encouraged to kill the mice turned up. Rank grasess and weeds along fences and ditches should be destroyed as far as possible, and then the mice will be exposed to the attacks of their natural enemies. Above all, the birds which prey upon mice should be encouraged.

Queensland to-day is losing many thousands of pounds because so many of our native birds, which would prey on these pests, have been destroyed. Owls, hawks, the kestrel, and the crow take an enormous toll of mice, and near the coast flocks of gulls have been known to destroy them. The wild turkey or Australian bustard, which is a valuable insect destroyer, feeds also on lizards and mice, and is probably worth more to the farmer alive and in the field than when cooked and on the table. The nankeen kestrel, the smaller eagles, and other members of the hawk family, and the owls are invaluable helpers during a plague of mice. Australia has no weasels or skunks to prey on mice. Although few people care to encourage snakes, yet it should be mentioned that the young of the harmless carpet snakes are great feeders on mice, just as the adults are useful in keeping a barn clear of rats.

[Mr. Longman's "Notes on Classification of Common Rodents," with list of Australian species, published under the authority of the Commonwealth Minister for Trade and Customs, is most informative and well illustrated. From it we select photographs of the Black Rat, which, although now rare in England, is quite as common as the Brown Rat in Australia, and the Common Field Mouse.]

INFECTION FROM RAW COTTON.

In April last we drew attention to the fact that there never has been an instance of any disease being contracted by the use of Queensland cotton either in upholstery or when made up into mattresses or pillows. On the other hand, we suggested that kapok, being a product of countries where coloured labour is employed in its preparation, under no medical supervision, might easily convey disease germs, although we certainly have not heard of any specific cases. In an article in the "Journal of the Royal Society of Arts" (19th June) on the "Development of the Textile Industries," we find the following notes on "Smallpox and Cotton":—

"An outbreak of smallpox in a Lancashire mill has been attributed, upon circumstantial evidence, to contagion carried by raw cotton, and the millowners have been prevailed on to destroy their stock of cotton-waste. Cotton has been accused in a similar way in at least one other instance, but there has been no proof absolute such as is obtainable in respect of anthrax from wool. English mills use well over 2,000,000,000 lb. of raw cotton annually, and import it from countries where smallpox is always more or less rife. It may, therefore, be held that were the transmission other than the rarest of occurrences the spread of the disease must have arrested attention long ago. The particular-cotton suspected is Mexican, and may actually be a portion of the produce seized by the insurgents, for which the rightful owners have not been paid. In view of the quantities of material involved, and their concentration upon certain centres, the impressive fact about the importation of textile materials is the extreme rarity of cases of infection with any zymotic disease. If one material more than another might be expected to carry disease that one should be rags, yet the advices from the rag centres are most reassuring. The last published report from the Medical Officer of Health in Batley disclaims any knowledge or suspicion of infectious diseases imparted from rags. Much the same thing has been said by the Health Officer for Dewsbury, and the registrars of these districts find that zymotic diseases are about the only ones of which rag sorters never die. It may be added that the workers of the woollen district are by no means well vaccinated."

SOCIETIES, SHOW DATES, ETC.

Gayndah Pastoral, Industrial, Agricultural, and Horticultural Society.—The show dates have been changed from 5th and 6th June to 26th and 27th June.

Proserpine.—Proserpine Agricultural, Pastoral, and Industrial Association. Arthur George Clarke. Show dates 17th and 18th August.

LONDON QUOTATIONS.

Copra: South Sea, £50 per ton.

Rubber: Fine, hard Para, 3s. per lb.; plantation, 2s. $11\frac{7}{8}$d. per lb.

Middling Uplands cotton, American, 12.36d. per lb.

Sisal hemp: British East African, £70 to £75 per ton; Mexican, £77 per ton.

Mauritius hemp, £49 to £53 per ton.

In the year 1912 sisal hemp was worth £24 per ton in Queensland, and the cost of production was £12 per ton, leaving a profit of £12 per ton. A sisal plantation to-day at war prices would prove a fortune, even if expenses were double what they were years ago.

Answers to Correspondents.

TREATMENT FOR WORMS IN FOWLS.

E. M. LEGGETT, Gayndah—

If the number of birds kept is few they may be treated individually by giving pills made of lard or butter to which add santonine, one grain, areca nut, seven grains, or equal quantities of oil of turpentine and olive oil, thirty drops of this mixture to be given at a dose. Either medicine to be followed in two hours with one tablespoonful of olive oil. Lesser quantities according to age.

If a large number of birds is to be treated it will take up too much time treating individually; therefore, the medicine should be given in the morning mash. This may be done by dividing the usual quantity of mash into two parts. To one part add one teaspoonful oil of turpentine, or one grain santonine and seven grains areca nut to each bird; and to the other part add one teaspoonful of castor oil to each bird. The mashes to be given at intervals of two hours, a lesser proportion of the medicine to be given to chickens according to age.

Preventive measures must be taken at the same time as the medical treatment, otherwise the birds will be immediately reinfested by eggs or embryos of worms, taken up with the food or water. It is, therefore, advisable after treating the birds to remove them on to fresh ground, and to thoroughly clean the houses and runs and disinfect same with some strong solution.

A little kerosine in their drinking water will also act as a good preventive.

LIME IN AGRICULTURE.

The Queensland Cement and Lime Company in Brisbane, and the Australian Co-operative Fertilisers, Limited, have communicated the following with reference to the prices of pulverised lime in connection with those companies, which we publish for general information:—

"Brisbane, 18th May, 1917.

"LIME IN AGRICULTURE.

"DEAR SIR,—In the May issue of the "Queensland Agricultural Journal," under the above heading, are tabulated prices which are represented as the retail rates of ground limestone, and the information is quoted as being supplied by the firms whose names are made use of.

"For your readers' correct information we would mention that the Under Secretary of the Department of Agriculture wrote to each of the undersigned on the 20th February, and asked for the retail prices of pulverised lime for publication in the 'Queensland Agricultural Journal.' The Queensland Cement and Lime Company replied that they were referring the matter to the Australian Co-operative Fertilisers, Limited, who were their sole distributing agents for this product. There were no prices of pulverised lime quoted to the Department by the Queensland Cement and Lime Company for publication.

"Apparently it is the figures quoted in a business way to the Department as a contract price for three years, and which were refused by the Department, were published as the retail price in truck loads. Further, although it was distinctly stated that the Department must supply the bags delivered at Gore, yet in the reference to this company in the Journal, the information is conveyed that the company will supply ground limestone at £1 per ton in bags and in truck loads, which is contrary to fact. The second firm whose figures are quoted in the list is the Australian Co-operative Fertilisers, Limited, who are credited with supplying pulverised lime at £2 5s. per ton. The letter of the 20th February from the Department was promptly replied to by this firm, under date of the 24th February, stating, in perfect definiteness, that the Q.C. and L. Company's product was marketed by the A.C.F., Limited, and that the retail price was for 6-ton truck lots, £2 5s. per ton, freight paid to any station in Southern Queensland, and as far north as Nambour; and that north from there to 40 miles north to Bundaberg the rate was the same—viz., £2 5s. per ton for 6-ton truck lots freight paid, and that the demand was supplied to those districts from the A.C.F., Limited, own works at Degilbo lime quarries.

"The omission of the mention of freight being prepaid is entirely misleading.

"The Department invited us to supply the information, and it was supplied unhesitatingly; but through the incorrect way that it has been set out to the readers of the "Agricultural Journal," a false impression has been created, which we trust will be removed by the above statement of facts.

"As far as we are aware, we are the only two companies in Queensland who are pulverising the limestone for agricultural uses, and the limestone that is being used for the purpose is the best that is available.

"The pulverising machinery, both at Gore and Degilbo, was installed solely for preparing an agricultural lime fertiliser, and the article that is available is exactly what the Department of Agriculture has been advocating the use of.

"Queensland Cement and Lime Company, Limited,
"A. C. ELPHINSTONE, General Manager.

"Australian Co-operative Fertilisers, Limited,
"B. SHEARER, Manager.

"To the Editor,
"Queensland Agricultural Journal, Brisbane."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY, 1917.

Article.		MAY. Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	2s. 3d. to 2s. 6d.
Bran	ton	£5
Broom Millet	„	£23 to £24
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£3 10s. to £4 5s.
Chaff, Oaten	„	£5 5s. to £6
Chaff, Lucerne	„	£4 10s. to £5 15s.
Chaff, Wheaten	„	...
Cheese	lb.	9d. to 9½d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£1 10s.
Hay, Lucerne	„	£3 5s. to £3 7s.
Honey	lb.	4½d. to 5d.
Maize	bush.	2s. 4d. to 2s. 6d.
Oats	„	3s. to 4s.
Onions	ton	£9 to £10
Peanuts	lb.	2d. to 3½d.
Pollard	ton	£6 12s. 6d.
Potatoes	„	£5 to £5 5s.
Potatoes (Sweet)	cwt.	2s. 6d. to 3s.
Pumpkins (Cattle)	ton	£2 10s. to £2 15s.
Eggs	doz.	1s. 8d. to 2s. 3d.
Fowls	pair	3s. to 4s. 6d.
Ducks, English	„	3s. to 3s. 6d.
Ducks, Muscovy	„	4s. to 5s. 3d.
Geese	„	7s. to 7s. 6d.
Turkeys (Hens)	„	7s. 6d. to 8s.
Turkeys (Gobblers)	„	13s. to 17s.
Wheat	bush.	3s. 6½d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	...
Cabbages, per dozen	4s. to 10s.
Cauliflowers, per dozen	...
Celery, per bundle	...
Cucumbers, per dozen	9d. to 1s. 6d.
Beans, per sugar bag	4s. to 7s.
Peas, per sugar bag	7s. to 11s.
Carrots, per dozen bunches	10d. to 1s.
Chocos, per quarter-case	1s. 3d. to 2s.
Beetroot, per dozen bunches	8d. to 9d.
Marrows, per sack	5s. 6d. to 6s.
Lettuce, per dozen	1s. to 2s.
Parsnips, per bundle	6d. to 9d.
Sweet Potatoes, per sugar bag	1s. 6d. to 1s. 9d.
Table Pumpkins, per sugar bag	3s. to 4s.
Tomatoes, per quarter-case	3s. to 6s.
Vegetable Marrows, per dozen	...
Turnips, per dozen bunches	10d. to 1s.
Rhubarb, per dozen bundles	...

SOUTHERN FRUIT MARKETS.

Article.	MAY. Prices.
Bananas (Queensland), per case	6s. to 12s.
Bananas (Fiji), per case	15s. to 16s. 6d.
Bananas (G.M.), per case	16s. 6d. to 18s.
Custard Apples, per 12 to 15 tray	5s. to 6s. 6d.
Lemons (Local), per bushel-case	2s. 6d. to 5s.
Mandarins, per case	10s. to 12s.
Oranges (Navel), per case	7s. 6d. to 10s.
Oranges (other), per case	3s. 6d. to 5s. 6d.
Papaw Apples, per half-bushel-case	7s. to 9s.
Passion Fruit, per half-case	1s. 6d. to 6s. 6d.
Persimmons, per half-case	1s. 6d. to 3s. 6d.
Pineapples (Queens), per case	10s. to 12s.
Pineapples (Ripleys), per case	8s. to 10s.
Pineapples (Common) per double-case	4s. to 6s.
Tomatoes (Queensland), per half-bushel-case	1s. 6d. to 3s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	MAY. Prices.
Apples, Eating, per case	11s. to 12s.
Apples, Cooking, per case	10s. to 11s.
Bananas (Cavendish), per dozen	1d. to $3\frac{1}{2}$d.
Bananas (Sugar), per dozen	$2\frac{1}{2}$d. to $3\frac{1}{2}$d.
Citrons, per hundredweight	10s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	...
Custard Apples, per tray	4s. to 5s. 6d.
Granadillas, per quarter-case	...
Grapes, per lb.	5d. to 6d.
Lemons (Lisbon), per quarter-case	5s. to 5s. 6d.
Limes, per quarter-case	3s. to 4s. 6d.
Mandarins, per quarter-case	6s. 6d. to 8s. 6d.
Nectarines, per quarter-case	...
Oranges (Navel), per case	9s. to 10s.
Oranges (other), per case	1s. 8d. to 4s. 6d.
Papaw Apples, per quarter-case	1s. 6d. to 2s. 6d.
Passion Fruit, per quarter-case	5s. to 7s. 6d.
Peaches, per quarter-case	...
Pears, per quarter-case	9s. to 10s. 6d.
Peanuts, per lb.	3d. to $3\frac{1}{2}$d.
Persimmons, per quarter-case	4s. to 5s.
Plums, per quarter-case	...
Plums (prime eating), per case	...
Pineapples (Ripleys), per dozen	5s. to 8s.
Pineapples (Rough), per dozen	5s. to 6s.
Pineapples (Smooth), per dozen	5s. to 7s.
Quinces, per quarter-case	3s.
Rosellas, per sugar bag	1s. 6d. to 2s.
Tomatoes, per quarter-case	3s. to 6s.
Watermelons, per dozen	...

TOP PRICES, ENOGGERA YARDS, APRIL, 1917.

Animal.	APRIL. Prices.
Bullocks	£20 to £24 5s.
Bullocks (Single)	..
Cows	£12 2s. 6d. to £16
Merino Wethers	43s.
Crossbred Wethers	46s.
Merino Ewes	36s.
Crossbred Ewes	42s. 6d.
Lambs	46s. 6d.
Pigs (Stores)	...

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING APRIL, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	April.	No. of Years' Records.	April, 1917.	April, 1916.
North Coast.	In.		In.	In.
Atherton	4·34	15	4·85	2·26
Cairns	11·99	34	8·95	6·36
Cardwell	10·05	44	6·04	4·65
Cooktown	9·48	40	6·42	9·36
Herberton	4·42	29	3·60	2·76
Ingham	8·86	24	7·98	4·22
Innisfail	22·15	35	13·70	19·83
Mossman	7·99	4	9·78	8·57
Townsville	3·81	45	3·25	0·05
Central Coast.				
Ayr	2·85	29	2·80	0·26
Bowen	3·12	45	1·58	0·96
Charters Towers	1·77	31	0·19	1·71
Mackay	6·90	45	3·27	5·98
Proserpine	6·56	13	9·44	4·11
St. Lawrence	2·83	45	2·17	3·05
South Coast.				
Biggenden	1·68	17	0·39	1·75
Bundaberg	2·78	33	1·99	3·96
Brisbane	3·62	64	0·75	8·95
Childers	2·33	21	1·71	3·56
Crohamhurst	5·42	25	2·63	16·63
Esk	2·60	29	1·73	6·91
Gayndah	1·29	45	0·84	2·79
Gympie	3·13	46	1·32	2·80
Glasshouse M'tains	3·89	8	2·15	13·77
Kilkivan	2·08	37	1·03	3·41
Maryborough	3·27	45	1·21	4·97

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	April.	No. of Years' Records.	April, 1917.	April, 1916.
South Coast—continued:	In.		In.	In.
Nambour	4·38	20	2·85	9·27
Nanango	1·80	34	0·42	6·36
Rockhampton	2·27	29	0·82	2·79
Woodford	3·90	29	1·13	14·45
Darling Downs.				
Dalby	1·29	46	1·94	1·81
Emu Vale	1·16	20	0·29	2·34
Jimbour	1·33	28	1·24	3·31
Miles	1·46	31	0·87	2·19
Stanthorpe	1·75	43	0·37	3·97
Toowoomba	2·44	44	1·74	7·92
Warwick	1·35	29	0·06	2·77
Maranoa.				
Roma	1·31	42	0·67	1·78
State Farms, &c.				
Bungeworgorai	0·79	4	0·28	0·65
Gatton College	1·73	17	0·53	4·83
Gindie	1·27	17	0·04	1·19
Hermitage	1·25	10	Nil.	3·25
Kairi	3·42	4	4·09	5·32
Kamerunga	11·91	28	9·46	7·48
Sugar Experiment Station, Mackay	4·97	19	5·24	8·03
Warren	1·30	4	0·51	1·03

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

1917.	May.		June.		July.		August.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·13	5·17	6·32	4·59	6·40	5·4	6·30	5·18
2	6·13	5·16	6·32	4·59	6·40	5·4	6·30	5·18
3	6·14	5·15	6·33	4·59	6·40	5·4	6·29	5·19
4	6·15	5·14	6·33	4·59	6·40	5·5	6·29	5·19
5	6·15	5·14	6·33	4·59	6·40	5·5	6·28	5·20
6	6·16	5·13	6·34	4·59	6·40	5·5	6·28	5·20
7	6·15	5·12	6·34	4·59	6·40	5·6	6·27	5·21
8	6·17	5·12	6·34	4·59	6·40	5·6	6·26	5·21
9	6·17	5·11	6·35	4·59	6·40	5·6	6·25	5·22
10	6·18	5·11	6·35	4·59	6·39	5·7	6·24	5·22
11	6·19	5·10	6·35	5·0	6·39	5·7	6·23	5·23
12	6·20	5·9	6·36	5·0	6·39	5·8	6·22	5·23
13	6·21	5·9	6·36	5·0	6·39	5·8	6·21	5·24
14	6·21	5·8	6·36	5·0	6·39	5·9	6·20	5·24
15	6·22	5·8	6·36	5·0	6·38	5·9	6·19	5·25
16	6·23	5·7	6·37	5·0	6·38	5·10	6·18	5·25
17	6·23	5·7	6·37	5·0	6·38	5·10	6·17	5·26
18	6·24	5·6	6·37	5·0	6·37	5·11	6·16	5·27
19	6·24	5·6	6·37	5·0	6·37	5·11	6·15	5·27
20	6·25	5·5	6·38	5·0	6·36	5·12	6·14	5·28
21	6·25	5·5	6·38	5·1	6·36	5·12	6·13	5·28
22	6·26	5·4	6·38	5·1	6·35	5·13	6·12	5·29
23	6·27	5·3	6·38	5·1	6·35	5·13	6·11	5·29
24	6·27	5·3	6·38	5·1	6·34	5·14	6·10	5·30
25	6·28	5·2	6·39	5·2	6·34	5·14	6·9	5·30
26	6·29	5·2	6·39	5·2	6·33	5·15	6·8	5·31
27	6·29	5·1	6·39	5·2	6·33	5·15	6·7	5·31
28	6·30	5·1	6·39	5·3	6·32	5·16	6·6	5·32
29	6·30	5·0	6·39	5·3	6·32	5·16	6·5	5·32
30	6·31	5·0	6·39	5·3	6·31	5·17	6·4	5·33
31	6·31	4·59	...	...	6·31	5·17	6·3	6·33

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

			H. M.
7 May	○	Full Moon	12 43 p.m.
14 „	☽	Last Quarter	11 48 a.m.
21 „	●	New Moon	10 47 „
29 „	☾	First Quarter	9 33 „

The Moon will be nearest the earth on the 14th, and at its farthest distance on the 28th.

5 June	○	Full Moon	11 7 p.m.
12 „	☽	Last Quarter	4 38 „
19 „	●	New Moon	11 2 „
28 „	☾	First Quarter	2 8 a.m.

The Moon will be nearest the earth on the 9th, and at its farthest distance on the 25th. It will cause a partial Eclipse of the Sun on the 19th, visible in the Arctic Regions but not in Australia.

5 July	○	Full Moon	7 40 a.m.
11 „	☽	Last Quarter	10 12 p.m.
19 „	●	New Moon	1 0 „
27 „	☾	First Quarter	4 40 „

The moon will be nearest the earth on the 7th, and at its greatest distance on the 22nd. There will be a *Total Eclipse* of the *Moon* from 6·51 to 8·27 a.m. on the 5th; but only the moon's entrance into the shadow of the earth will be seen in Eastern Australia.

3 Aug.	○	Full Moon	3 11 p.m.
10 „	☽	Last Quarter	5 56 a.m.
18 „	●	New Moon	4 21 „
26 „	☾	First Quarter	5 8 „

The moon will be nearest the earth on the 4th, and at its greatest distance on the 18th.

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

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

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 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.

* These notes will not again be published until September, as they apply to the series from May to August.

Farm and Garden Notes for July.

FIELD.—The month of July is generally considered the best time to sow lucerne, for the reason that the growth of weeds is then practically checked, and the young lucerne plants will, therefore, not be choked by them, as would be the case if planted later on in the spring. If the ground has been properly prepared by deep ploughing, cross-ploughing, and harrowing, and an occasional shower occurs to assist germination and growth, the lucerne will thrive so well that by the time weeds once more appear it will be well able to hold its own against them. From 10 to 12 lb. of seed will be sufficient for an acre. This is also the time to prepare the land for many field crops, such as potatoes, maize, oats, and barley for green fodder; also rye, vetches, tobacco, cotton, sugar-cane, field carrots, mangolds, swedes, canaigre, &c. Early potatoes, sugar-cane, and maize may be planted in very early districts, but it is risky to plant potatoes during this month in any districts liable to late frosts or in low-lying ground. Under such conditions it is far better to wait until well into the following month. The greatest loss in potatoes and sugar-cane has been, on more than one occasion, experienced in September, when heavy frosts occurred in low-lying districts in the Southern portion of the State. During suitable weather, rice may be sown in the North. The coffee crop should now be harvested, and yams and turmeric unearthed.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. Never walk over the land during wet weather with a view to sowing. The soil cakes and hardens, and good results cannot then be expected. This want of judgment is the usual cause of hard things being said about the seedsman. In fine weather, get the ground ploughed or dug, and let it lie in the rough till required. If harrowed and pulverised before that time, the growth of weeds will be encouraged, and the soil is deprived of the sweetening influences of the sun, rain, air, and frost. Where the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops.

Flower Garden.—Winter work ought to be in an advanced state. The roses will now want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolour, marigold, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. Put away dahlia roots in some warm, moist spot, where they will start gently and be ready for planting out in August and September.

Orchard Notes for July.

THE SOUTHERN COAST DISTRICTS.

The notes for the month of June apply to July as well. The first crop of strawberries will be ripening during the month, though extra early fruit is often obtained in June, and sometimes as early as May, under especially favourable conditions. Look out for leaf-blight, and spray for same with Bordeaux mixture, also watch for the first signs of the grey mould that attacks the fruit, and spray with the sulphied of soda wash. The larvæ of the cockchafer, that eats the roots of strawberries, should be looked for, and destroyed whenever found. Pruning of citrus and other fruit trees may be continued; also, the spraying with lime and sulphur. Where the ringing borer, that either attacks the main trunk or the branches at or near where they form the head of the tree is present, the main stems and trunks should either be painted or sprayed with the lime and sulphur wash during the month, as the mature beetles that lay the eggs that eventually turn to the borers sometimes make their appearance during the month, and unless the trees are protected by the wash they lay their eggs, which hatch out in due course and do a lot of damage. Keep the orchard clean, so that when the spring growth takes place the trees may be in good condition. There is usually a heavy winter crop of pineapples ripening during this and the following months, particularly of smooth leaves. See that any conspicuous fruits are protected by a wisp of grass, as they are injured not only by frost but by cold westerly winds.

THE TROPICAL COAST DISTRICTS.

See the instructions given for the month of June. Keep the orchards clean and well worked. Prune and spray where necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

Where pruning of deciduous trees has not been completed, do so this month. It is not advisable to leave this work too late in the season, as the earlier the pruning is done after the sap is down the better the buds develop—both fruit buds and wood buds; thus securing a good blossoming and a good growth of wood the following spring.

Planting can be continued during the month; if possible, it should be finished this month, for though trees can be set out during August, if a dry spell comes they will suffer, when the earlier planted trees, which have had a longer time to become established, will do all right—provided, of course, that the land has been properly prepared prior to planting, and that it is kept in good order by systematic cultivation subsequent to planting.

Do not neglect to cut back hard when planting, as the failure to do so will result in a weakly growth.

As soon as the pruning is completed, the orchards should get their winter spraying with the sulphur limewash, and either with or without salt, as may be wished. See that this spraying is thoroughly carried out, and that every part of the tree is reached, as it is the main treatment during the year for San José and other scale insects, as well as being the best time to spray for all kinds of canker, bark-rot, moss, lichens, &c.

Where the orchard has not been ploughed, get this done as soon as the pruning and spraying are through, so as to have the land in good order for the spring cultivations. See that the work is well done, and remember that the best way to provide against dry spells is to keep moisture in the soil once you have got it there and this can only be done by thorough and deep working of the soil.

When obtaining trees for planting, see that they are on good roots, and that they are free from all pests, as it is easier to prevent the introduction of pests of all sorts than to eradicate them once they have become established. Only select those varieties that are of proved merit in your district; do not plant every kind of tree that you see listed in a nurseryman's catalogue, as many of them are unsuited to our climate. The pruning of grape vines may be carried out in all parts of the tablelands other than the Stanthorpe district, where it is advisable to leave this work as long as possible, owing to the danger of spring frosts.

Where grape vines have been well started and properly pruned from year to year, this work is simple; but where the vines have become covered with long straggling spurs, and are generally very unsightly, the best plan is to cut them hard back, so as to cause them to throw out good strong shoots near the main stem. These shoots can be laid down in the place of the old wood in following seasons, and the whole bearing portion of the vine will be thus renewed.

Where vineyards have been pruned, the prunings should be gathered and burnt, and the land should receive a good ploughing.

Queensland Agricultural College.

FOR SALE.

Grass Roots, Rhodes and Paspalum, are obtainable at 2s. 6d. per sack, f.o.b. Gatton.

There are no farm seeds for disposal at the College.

POULTRY.

The following breeds are available:—Brown Leghorn, White Leghorn, Indian Game, Black Orpington, Silver-Laced Wyandotte, Rhode Island Reds. In last-named breed, no birds will be available this year, and only a limited number of eggs at 21s. per setting f.o.b.

Prices:

Cockerels—10s., 15s., and 21s.	f.o.b. Gatton.
Pairs—Cockerel and Pullet, 30s. and 42s.	
Trios—Cockerel and two Pullets, 42s. and 63s.	

Prices vary according to quality. Unless crates are returned promptly, an extra charge of 2s. for a single bird and 1s. for each additional bird will be incurred.

Settings of eggs of the above breeds are available from 1st July up to 30th November. Price, 10s. per setting, f.o.b. Gatton. Nine eggs in each setting guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle twenty-four hours before being placed under the hen.)

IMPORTED HOLSTEIN BULL—Froxfield Dairyman (12611). Calved 26th March, 1912. Sire, Froxfield Duke Bob (155). Dam, Froxfield Doris (1150). Bred by J. F. N. Baxendale.

Jersey Bulls.

All cattle sold accompanied by pedigree.

Young Ayrshire and Jersey Bulls will be available for disposal in the course of the next few months.

Pigs.

Orders will be received for Yorkshire boars and sows, from 2 to 3 months old, at £2 10s. each.

All prices—F.O.B. Gatton.

FOR SERVICE.

CLYDESDALE STALLION—**Lord Cellus** (imp.).
Service fee, £3 3s. per mare and 1s. 6d. per week agistment.

AYRSHIRE BULLS—**Netherton King George** (imp.).
Stewart of Wanora.

JERSEY BULLS—**Star Turn** (imp.).
Service fee, 10s. per cow; agistment, 1s. per week.

CUTHBERT POTTS, Principal.