

QUEENSLAND AGRICULTURAL JOURNAL

VOL. I.

JUNE, 1914.

PART 6.

Agriculture.

AN AMERICAN COTTON-GROWER ON QUEENSLAND AS A COTTON PRODUCER.

Last month we had several interesting interviews with an American cotton-grower and ginnery owner from Texas, U.S.A., Mr. E. E. Wood, who came to Queensland with the object of ascertaining the capabilities of Queensland as a stock-raising country, and particularly as a field for the cotton-growing industry. As far as the cotton industry is concerned, Mr. Wood has an experience in the United States of twenty-six years both as a grower and proprietor of a ginnery turning out 2,000 bales of cotton annually. During his stay in Queensland he has visited much of the country on the Western line as far as Dalby, Roma, Chinchilla, Mitchell, Dulacca, southwards to Texas and Goondiwindi, and along the Central line as far as Barcardine. He also visited Springsure. His opinion of the Western country may be summed up in his own words to the effect that it cannot be surpassed by any cotton belt in the world, both as regards soil, climate, and rainfall. Queenslanders do not know what a magnificent asset they would have if this country were placed under cotton. In America the people do not know that such magnificent cotton can be produced here. He showed us several splendid bolls of Upland cotton which he gathered from bushes growing at the State school garden at Capella, and also at a farm near Dulacca. He has taken these back with him to America, and, as he said: "It will make the people in the States open their eyes when they see the finest samples of cotton which can be produced anywhere in the world. What is required to establish a vast industry is co-operative effort, and if the business were conducted by properly organised effort, Queensland within

ten years could be producing 10,000 bales per annum." Mr. Wood was, however, rather surprised when we showed him that, according to the Government Statistician's figures, Queensland, in 1871, exported 2,500,000 lb. of ginned cotton, equal to 6,505 bales, and that crops had frequently been produced of from 1,200 to 2,000 lb. of seed cotton per acre, produced entirely by white labour on small farming areas. Should cotton-growing be once more established on proper lines, the output at the end of ten years would probably exceed 20,000 bales.

Mr. Wood explained that proper lines meant the introduction, first of all, of experienced American cotton-growers, to educate Queensland growers, then, such assistance as is given to sugar-growers to enable them to establish co-operative cotton and oil mills. He considered that it would be a paying business if the Queensland Government would set apart certain areas in the Central and in some southern districts on which to settle groups of cotton-growers, who he felt assured would not hesitate to come over when they heard what he had to tell them of the finest cotton-growing country on God's earth. Personally, he intended to return to Queensland bringing with him his family and most probably several experienced cotton-growers. It would take him about twelve months to settle up his affairs in the States. As far as labour was concerned, his opinion was, judging by the cost of white labour in Texas, where no coloured men are employed, the cotton could stand high wages far better than any other dry-land crop which could be mentioned. Sugar was not in it with cotton. The cost of picking need be no bugbear, and he mentioned an instance, which we have drawn attention to more than once in this Journal, of an American grower at Capella who picked 500 lb. of cotton in one day, thus earning, at $\frac{1}{2}$ d. per lb., over £1. No coloured men would do half as much.

One thing which struck Mr. Wood as being enormously in favour of Queensland as a cotton producer, was that there are scarcely any pests of the plant to contend with. The boll worm he did not consider would give any trouble, as it is easy to keep them away from the cotton plants by planting trap-crops of maize. The boll weevil, he said, is the great drawback to the American cotton industry. Over 50,000,000 dollars have been spent by the United States Government in endeavours to eradicate the weevil, but in vain, as the whole cotton belt is now ravaged by it, and this was where Queensland had its grand opportunity. As pointed out in an article in last month's issue of the "Queensland Agricultural Journal," the whole of the American sources of Sea Island cotton are threatened with extinction, and there can be no increase in the output of American cotton, the result being that many cotton-growers in that country are going out of the business and taking up other lines of agricultural industries. The ultimate effect, as stated by the American writer of the article above mentioned, will be that the future cotton supplies will be derived from British Dominions and colonies. On the subject of emigration from the States, Mr. Wood was emphatic in his statement that if equal facilities were granted by the Queensland Government to American farmers and farm hands as to those from European countries, there would be no possible doubt that while, within the last

ten years, half a million of settlers went from the States to Canada, and many thousands to Mexico and the South American States, most of them, especially the latter, would infinitely prefer to come to a white man's country like Australia. Summarising Mr. Wood's remarks, they amount to this:—That Queensland offers unbounded inducements to the right class of immigrants. The soils, the climate, the rainfall, the liberal land laws, the assistance to new settlers by means of the Agricultural Bank, the wonderful salubrity of the climate, are all that could be desired, and if the Government took the matter energetically in hand, Queensland would be a great cotton producer, and a sort of paradise on earth for both farmers and farm hands.

VARIETIES OF KANSAS CORN.

We have received from Mr. R. S. Neville, now residing in Kansas City, U.S.A., who, for several years, laboured successfully to educate tobacco growers in Queensland in proper methods of cultivation of the plant, and who placed the tobacco industry on a firm basis, during his many years in the capacity of Tobacco Expert to the Department of Agriculture, the following interesting note on a seven-year corn test at the Kansas Agricultural College:—

“ Kansas Sunflower, a variety of yellow corn, carried off first honours in a seven-year corn test at the Kansas Agricultural College. It gave an average yield of 58 bushels an acre every year. In the seven years' work 226 varieties and strains of corn were tried out. The results of this work, published this week in a college bulletin, “ Corn,” written by A. M. Ten-Eyck, formerly of the Agricultural College, show Kansas farmers what varieties may be depended upon to give the best yields in this State. Though the variety, Kansas Sunflower, is placed first in the list of the ten best varieties, it is only slightly superior to other good producing types, inasmuch as the best varieties vary in productiveness. No one variety of corn is best under all conditions, the test shows. Here are the other nine varieties which showed superiority over the many types tested, given in the order of their average yields for the seven years: Hogue's yellow dent, medium early; McAuley, white dent, medium late; Forsythe's Favourite, white dent, medium to medium late; Hammett, white dent, medium early; Leaming, yellow dent, medium early; Hildreth, yellow dent, late; Boone County White, white dent, medium to medium early; Reid's Yellow Dent, yellow dent, medium early; Legal Tender, yellow dent, medium to medium early.”

FLAX AND LINSEED.

Amongst the diversified crops—tropical, sub-tropical, and temperate—which may be profitably grown in the different parts of the State of Queensland, one may be mentioned which hitherto has received little attention from farmers, and which yet will return larger profits, and at less outlay, than many which at present are the mainstay of the

agriculturists. This crop is flax, not New Zealand flax, but the linseed producing and fibre producing plant which is largely grown in European countries, and to a considerable extent in Victoria.

There is a very large demand in the world's markets for linseed for oil-making and medicinal purposes, and seeing that the soils and climate of many portions of the State are eminently adapted to the production of this crop, not only for the seed but also for the valuable fibre, there appears to be no reason why the cultivation of the flax plant should not be entered upon in conjunction with other crops. The cultivation, the harvesting, the separation of the seed, and the extraction of the fibre are all very simple and inexpensive operations, and the profits of a flax farm, as has been long ago proved in Victoria, are larger than those of many other crops which at present engage the attention of our farmers. In Victoria, Messrs. Wolff Bros., of Traralgon, have been engaged in the flax industry for many years, and have conclusively shown that the net profit from an acre of flax averages from £8 to £8 10s. Their method of production, summarised from an article which we published in the "Queensland Agricultural Journal" in October, 1903, were as follows:—Returns from 120 acres of flax for seed and fibre, £2,000, or £16 16s. per acre, the profit, after paying all expenses of cultivation, harvesting, marketing, &c., being £8 to £8 10s. per acre. They stated that the seed could be left to ripen in the field, and that yet a good crop of fibre could be obtained, the price of the fibre as paid by Messrs. Miller and Co., Melbourne, being from £42 to £45 per ton. The average yield of seed was 14 bushels per acre, which readily sold at £14 per ton, or 7s. 6d. per bushel, the fibre averaging 5½ cwt. per acre, equal to £11 11s. Sown broad-cast, 1¼ bushels of seed is sufficient. The most profitable seed is the "Riga."

HARVESTING.

This is done with the reaper and binder with the knives as sharp as razors. The bundles are then placed in stooks for a fortnight and then threshed or stacked to be threshed at leisure. The threshing machine used by the Messrs. Wolff consisted of two wooden rollers, each 2 ft. in diameter, set one above the other, with a perpendicular play of about 2 in. This machine is driven by a 5 b.h.p. oil engine, at the rate of 140 revolutions per minute. The sheaves are fed into it without untying. The seed, when threshed, is passed through an ordinary grain winnowing. Two men can thresh 2 to 3 acres a day. On contract, the price for threshing is 6d. per bushel of 56 lb., and 2d. a bushel for winnowing.

MANUFACTURING THE FIBRE (RETTING).

The sheaves, which have already been deprived of the seed and restacked, are carted out and spread thinly on grass land, 1 acre to 2 acres of flax, after untying the sheaves. With good rains and heavy dews, the flax should be ready for turning in about a fortnight. Then the swathes should be turned over and left out for another fortnight. Then gather into loose, thin stooks to dry for two or three days. When

the dew is off and the weather dry, tie into handy bundles. When well dry, the "Breaker" comes into play. This machine costs £35. Its function is to break off the woody fibre. Then the "Scutcher" (price £40) cleans off the broken particles left, and the fibre is ready for market put up in 14-lb. bundles in bales of 5 cwt.

COST.

Spreading out, 7s. 6d. per acre; turning over, 2s.; stooking, re-tying, and carting, 10s. per acre. In the factory men are paid 10d. per stone of 14 lb., and another 2d. per stone is allowed for wear and tear. All the work is light. Boys can do the breaking at 4s. 6d. a day. Scutching hands get 7s. a day, and spreaders 5s. a day.

The crop is not easily injured by weather, and can be handled at leisure.

HINTS TO NEW SETTLERS, No. 7.

By THE EDITOR.

The preliminary work of clearing, fencing, cropping, and house-building, as detailed in other parts of these notes, having been well advanced, the next need of the settler is live-stock of some description. A pair of good horses will now be found necessary, and, according to the class of country selected, a beginning may be made with a few head of good dairy cows, or sheep, if on Downs country, or on the coast under certain conditions, and a good strain of pigs. As far as cows are concerned, the best for milk production are Ayrshires, Holsteins, Illawarra, and Jerseys. If the farm is situated on the coast, it will be necessary to grow fodder for sheep, the natural grasses being quite unsuitable for them. Sheep have often been tried on the coast lands, but in all cases unsuccessfully, the mistake having been made of treating them as sheep on Downs country are treated—*i.e.*, allowing them to run on the uncultivated land and live on the natural grasses. In the western country, sheep thrive on the succulent grasses, herbs, salt-bush, &c., which abound there, but, as stated, the coast grasses are quite unsuitable for grazing sheep, hence some crops must be grown for them, such as lucerne, Rhodes grass, and other artificial grasses. Again, coastal sheep suffered much from stomach worm, so that what with them, a wrong breed of sheep (merinos), and the poor unnutritious pasture, the losses were too great to make them profitable. Now, however, Mr. W. G. Brown, sheep and wool expert to the Department of Agriculture and Stock, has shown how sheep can be profitably raised on coast country, and he recommends the Romney Marsh and Leicester as being the most suitable, merinos being out of the question. Mr. Brown has, during the last twelve months, written several articles on the subject in the "Queensland Agricultural Journal," and in the April, 1914, number of the Journal, will be found an admirable lecture on "Sheep on the Coastal Areas," given by Mr. Brown, which deals exhaustively with the whole matter.

The advent of stock on the farm, whether horses, cattle, sheep, or pigs, will necessitate additional buildings and yards, and consequently a considerable outlay, but in timbered country, materials for yards,

fences, and buildings are all ready to hand in the shape of splitting timber. I have already described how posts, rails, slabs, shingles, and bark can be obtained, and the necessary buildings, &c., erected. In the case of dairy cattle more outlay is needed than with other stock, as the old rough-and-ready method of milking, setting the milk for cream, and churning have long since been abandoned. The farmer need no longer trouble himself to make butter. The numerous butter factories will do it for him. His business is to obtain as much cream as possible from his cows, and to enable him to do so he must have well-bred animals, feed them well, and provide them with shelter from cold winds and rain.

The necessary buildings will be the milking-shed with the usual bails, yards, gates, &c., a room at some distance from the yards, manure heaps, piggeries, &c., for the cream separator and milk cans. Later on, as the milking herd increases, hand-milking may be superseded by the use of the milking machine, which will necessitate a further but very profitable outlay.

I need not here describe any of the operations connected with the dairy, as these are all fully detailed in pamphlets and leaflets by the Government Dairy Expert, and which are issued free to dairy farmers. There is one building which no dairy farmer should be without—that is the silo. It is all very well to have good fodder crops, with plenty of grass in the paddocks, but experience has shown that there are regularly returning cycles of drought, or of exceptionally dry seasons, when the grass fails and the fodder crops refuse to grow. In such seasons, thousands of valuable cattle have been lost practically by starvation. In days not long gone by, there was no help for this disastrous state of affairs, but the advent of the silo enabled dairy farmers to keep their stock in fair order until the return of welcome rains. There were, and even still are, many farmers who still trust to luck and the seasons for the well-being of the stock which gives them a comfortable income. They cannot be made to see the enormous value of a silo, which can be filled during the good times, and in which the silage will retain its good qualities for many seasons. The result of this neglect has been to bring disaster on the unbelievers, whilst the wise men who made the provision in time suffered no losses when the inevitable drought found them unprepared. It is just the story of the wise and foolish virgins. The wise men would not and could not afford to sell silage to the improvident, who suffered accordingly. Silos can be built either very cheaply or very expensively, according to the needs of the stockowner, but a cheap silo, well constructed, is better than none at all. Even a silage stack is of very great value, and entails but small expense in its creation. Details of all kinds of silos and silage stacks can be obtained from the Department of Agriculture and Stock.

Closely connected with the dairying business is pig-breeding, which is very profitable, provided the most suitable breeds are kept. There is a very great demand for pigs by the bacon factories and butchers—so great, indeed, that the factories have the greatest difficulty in getting all they require. Pigs on a farm are not very expensive animals, and at

six months old they are ready to sell. They are as good as cash in the bank, and the annual pig cheques, together with the cream cheques, make a good show in the farm returns.

Next we come to fowls. They are a source of considerable profit, as the principal part of their food is found on the farm. If fowls are bred for egg-laying purposes, a beginning should be made with the very best strains of Leghorns or Orpingtons. It would be instructive to read the "General Report on the Egg-laying Competition" at the Gatton Agricultural College which ended in March last, in the May issue of this Journal. It is there shown that 240 hens, mostly White Leghorns, laid 52,420 eggs during the year's competition, an average of 1,310.5 per pen, or 218.4 eggs per bird, which constitutes a new world's record. Besides the eggs, there would be many birds for the market.

With all this, there is no need to neglect other farm crops besides fodder crops, such are maize, potatoes, onions, &c. Many fruits can also be grown which certainly require some attention at times in the way of pruning and spraying. Oranges, lemons, bananas, custard apples, papaws, grapes, mangoes, &c., all mean additions to the banking account.

AGRICULTURE AND FRUIT-GROWING IN THE GLADSTONE DISTRICT.

The following very interesting report on the progress of settlement, farming, dairying, fruit-growing, soils, &c., in the above district was lately furnished to the Under Secretary for Agriculture and Stock by Mr. G. B. Brooks, Instructor in Agriculture, who recently made an extended tour through the various districts here described:—

RAGLAN.

It was found that a large proportion of the recently selected areas had been taken up by members of families of local farmers and residents. Very little development has so far been done, beyond fencing.

Scrub land in the district is limited; most of that recently thrown open was secured by the Creed family (Langmorn Station). A good deal of the forest country is only suitable for grazing purposes. The better portions could, no doubt, be profitably utilised for dairying.

In regard to the older settled portions along Hourigan, Raglan, and Langmorn Creeks, dairying, together with maize and fruit-growing, is receiving some consideration. Unfortunately, no provision is made for feeding the dairy herds during winter or a dry period.

A few small paddocks have recently been put under Rhodes grass. This has done so exceedingly well that most of the farmers in the district are either sowing or making preparation to lay down an area of this excellent pasture, and many inquiries were made as to the best method of substituting Rhodes grass for the native varieties in forest country.

A number of farmers on Hourigan Creek combine fruit-growing with dairying. There are several citrus orchards, varying in size from

300 to 600 trees, looking exceptionally healthy, and giving promise of a good yield. Spraying and cultivation, so frequently neglected, are well attended to in this district. Soil and climatic conditions are evidently favourable for citrus culture; one grower informed me that from a single lemon-tree last season he obtained over £8 worth of fruit.

Maize is not extensively grown. This season's crop is, owing to dry conditions, likely to turn out a failure. There are a few small patches of lucerne. The method of raising and handling this crop could be considerably improved upon.

The soil along Hourigan and Raglan Creeks is a well-drained alluvial brown loam. Given a heavy rainfall, portions would be liable to flooding, but only for a short time. Large areas of rich alluvial creek flats are still available for cultivation. The indigenous grasses growing on these lands are of excellent variety and quality, and are said to carry, in ordinary seasons, a beast to the acre.

The district is, on the whole, well watered, there being several creeks with a permanent supply.

MOUNT LARCOM.

The portion of the Langmorn Goldfield adjacent to Mount Larcorn township which was recently made available for agricultural purposes is mostly occupied by a group of German settlers. This area is made up of gently sloping ridges covered with scrub, with an occasional patch of gum and box forest. In several localities the surface is very stony and broken. A limestone deposit extends over a considerable portion, and in many ridges it shows up to such an extent as to be a conspicuous feature of the landscape.

The soil is, on the whole, a comparatively shallow one, with a subsoil of a yellowish clayey nature.

A good deal of clearing has been done. Last year most of the settlers had a patch of maize, varying from 10 to 15 acres. This season a similar area has been cleared and put under the same crop. In almost every instance Rhodes grass has been planted along with the maize.

Unfortunately, this season's maize crop is likely to turn out a complete failure, owing to dry weather. Much of it is already beyond recovery, and even if rain falls soon the yield from the most promising fields will be light.

Several of the farmers have tried cane-growing, but although the yield last season was generally good, the expenses connected with handling the crop were too great. For example, the cost per ton was approximately: Cutting, 4s.; cartage to railway, 6s.; railage to mill, 7s. 6d. When the cost of planting and cultivating is taken into account, the margin left is exceedingly small. From a close study of the conditions obtaining in this portion of the Mount Larcorn Scrub, known as the German Settlement, I am of opinion that the best use to which it can be put is dairying. This could, in many instances, be supplemented by the growing of such crops as broom millet, cotton, onions, &c.

That dairying is the coming industry of this district is being realised by many of the settlers who are laying down large areas under introduced grasses for this end.

There is evidently only one obstacle that is likely to keep this district from immediately developing into an important dairying centre, and that is the lack of permanent water for stock. Unfortunately, a good deal of uncertainty is experienced in sinking for such, more especially in the limestone area. While a few have been successful in procuring water at a comparatively shallow depth, others have put down deep wells with negative results.

Nearly every settler, without exception, has already sufficient Rhodes grass to carry a herd of at least ten cows, but having no water within miles of his selection is a tremendous handicap to successful dairying. The water problem is therefore of the greatest importance, and much will depend upon its solution.

Undoubtedly some assistance may be looked for through the agency of the Agricultural Bank. Nevertheless, it is just possible that much valuable time and money may be wasted through sinking in unfavourable situations. If it were possible to locate water near the surface with any degree of certainty, the value of such, to both settler and the State, would be inestimable. Very many instances could be given where the location of water, by means of "divining," has been proved beyond doubt: such as the finding of a copious supply within a few yards of where a dry well has been put down, &c.

When visiting districts where permanent water is scarce, I have very frequently been asked whether I could locate underground supplies by means of the divining rod. Although I have used it with apparently considerable success, still I don't advertise myself as an expert, for the simple reason that many people look upon this method of finding water as being a piece of tomfoolery, and the user as a crank.

It may be mentioned that the owners of some of the boring plants in the Western districts select sites for their operations by "divining," and also by the use of the mechanical water-finder, the one acting as a check on the other. That a mechanical water-finder form part of my equipment would, I think, be worthy of consideration.

In regard to noxious plants, it may be mentioned that the scrub lands are badly infested with poison peach (*Trewa aspera*). It is growing so luxuriantly on some of the roads as to almost render them impassable. One farmer reported losing three cows through eating this plant.

YARWUN.

The portion of country visited was that recently made available for selection on the south-western side of the township. The area occupied is mostly scrub, lying at the base of a rather high range of hills. The soil is light-brown in colour, of fair depth, good texture, and having a subsoil of a somewhat gritty yellow clay.

Maize, bananas, and citrus trees do well.

Large paddocks of Rhodes grass (30 to 90 acres) are to be found on most of the farms. This grass has made, in spite of the dry season, a most luxuriant growth. In several unstocked fields the fences were completely grown over. I measured the height in different places, the length of stalk being over 7 ft. Some of the farmers are saving the seed for market purposes. On some farms there has been difficulty in procuring water; hence the absence of stock.

Most of the settlers are actively engaged in dairying. The number of cows being milked by individual dairymen varies from 50 to 60. The only provision they make by way of winter feed is to plant Rhodes grass in a fresh area of scrub every season. On the farm of J. H. Holzheimer, it was observed that a disease had attacked his grape vines. Samples of the diseased roots were forwarded for examination.

BOYNE VALLEY.

It was found that very little development had so far taken place in the recently selected area along the Boyne Valley. A large number of the selections are at present used for grazing purposes, being held by teamsters and others deriving a portion of their living from outside sources. While many of the areas are only suitable for this purpose, others could be utilised for dairying and to some extent for crop-raising. Even by the older settlers the raising of crops is not practised to any great extent, while dairying is only emerging from its embryo stage. It is pleasing to note that one farmer in the district—Mr. S. J. Bull, Littlemere—is converting a maize crop into silage. I was able to point out to Mr. Bull a much more satisfactory and less laborious method of conserving this fodder than the one he had adopted.

A number of farmers have planted small areas of lucerne on the flats adjacent to the river, good cutting being obtained. One grower reported that dodder had appeared in the crop he planted last season from seed secured from a Brisbane seedsman. Very little maize is grown in the district; the crop at the time of my visit, 17th February, had reached the stage when rain is so necessary to ensure a crop.

The soil on the forest ridges varies in quality a good deal, according to locality, while a good deal of poor land is to be met with. There are areas of limestone formation which have good soil and are well grassed. There are no large areas of scrub along the valley. There is, however, a fairly extensive strip of alluvial flat on the east bank of the Boyne River; in fact, there are two distinct flats—an upper and a lower. The upper is evidently an old alluvial deposit composed of a poor quality grey clay soil, very close in texture. This is fairly heavily timbered with gum and patches of box.

Separating the upper from the lower flat, there is an old, well-defined river bank, some 25 ft. high, commencing near Many Peaks and practically extending the whole length of the river. This lower flat—without doubt an old river bed—varies in width from a few hundred yards to over a mile, the present course of the river being on the extreme western side. This area is heavily timbered with gum trees which have been ringbarked many years.

The soil is a brown, friable loam, of good depth and well drained. The subsoil is naturally a sandy one. Most of the river frontage is at present held on lease, which I believe expires in about seven years. This portion of country will cut up into a large number of valuable farms, giving each a portion of good alluvial soil. It will have the advantage of permanent water; in fact, it is probable that an unlimited supply of water, in addition to that in the river, could be obtained by sinking some 10 to 15 ft.

At present a 10-chain road runs along this flat from near Many Peaks, to a distance of some 24 miles, taking up a large area of valuable land. When cutting up for closer settlement, it would be highly desirable that the road be closed and another opened adjacent to the railway line, a few hundred yards off, and which runs parallel to the river. There are at least six small irrigation plants on the river—recently installed; and, as some doubt exists as to the suitability of the water for the raising of crops, I made arrangements with Mr. J. Henderson, Littlemere, to forward a sample for analysis. During my visit I was much indebted to Mr. J. Henderson (president, Port Curtis Agricultural, Pastoral, and Mining Association), who supplied a conveyance, and personally accompanied me over a large portion of the Upper Boyne Valley.

MOUNT LARCOM: MINING HOMESTEAD AREA.

In the information secured from the Lands Department, *re* Mount Larcom, no mention was made of the large settlement that had recently taken place in the mining homestead area. I am led to believe there are over 200 settlers in this locality, all on 80-acre blocks, and depending entirely upon the land for a living. Should this statement be correct, then this is probably the most closely settled agricultural district in the State.

I found it impossible to go through this portion, owing to having previously made arrangements to go to the Boyne Valley, on completing the German Settlement and Yarwun. This was unfortunate, as they were looking forward to my visiting them.

MARKET GARDENING.

WIRE WORMS.

For the past month or two many complaints have reached us about the ravages of the wire worm in the vegetable garden. Whole beds of lettuce, endive, cauliflower, &c., have been destroyed by them. The best way in which to get rid of the pests is to trap them in the following manner:—Cut up some carrots, beets, or sweet potatoes and stick them into the ground all over the beds to be protected. When these are taken up on the following day, it will be found that the worms have eaten their way into them. The traps should be lifted with a trowel, because many worms will be found in the soil around them. The only crop which the wire worm has an objection to is mustard; if, therefore, a crop of mustard be planted on land infested by the worm, it will perish from starvation.

THE GUADA BEAN.

This remarkable vegetable has, for some occult reason, received the name of bean, but it has nothing in common with that family of legumes, as it is really a gourd. For some time past it has been grown more as a curiosity than as an article of commerce. Botanically it is known as *Trichosanthes anguinea*, and was originally brought to Australia by a resident of New South Wales from the Solomon Islands, hence the name Solomon Islands Bean. It was fully described by Mr. H. Newport, Instructor in Tropical Agriculture, in the issue of this Journal for April, 1913. Mr. Newport says that it is by no means new to tropical Queensland, as it was growing at the Kamerunga State Nursery and in private gardens over twelve years ago. The fruit grows to a length of from 4 to 5 feet, and exceptional specimens have reached a length of 7 feet. It appears to thrive better in the South than in the North of Queensland, where both very wet and very dry weather hinder its full development. The bean is hollow, and when cut into lengths of 3 to 6 in., and stripped into slices about $\frac{1}{4}$ -in. wide, it has, when cooked, all the appearance and flavour of the finest French beans. A vine, Mr. Newport says, bears, on an average, five to seven good pods, but many have a lot of blossoms and numerous small pods which do not come to maturity. It may be grown on a trellis fence, or bough shed, in the same manner as the choko or granadilla. In proof of the plant doing better in the South than in the North, a vine grown at Wondai, on the Nanango line, by Mr. D. Crumbie, produced several dozens of gourds, and at Raglan, on the North Coast line, Mr. B. Tweed grew three vines which produced 100 or more pods at the first cropping, with hundreds more coming on. The number of seeds per pod is about 90, and they meet with a ready sale. From this it would appear to be a vegetable well adapted for those who have only a small patch of ground available for vegetable growing. The best time to sow the seed is towards the end of September in Southern and Central Queensland.

Writing on the same subject, in April last, the Editor of the "Rhodesia Agricultural Journal" (S.A.) doubts whether the bean is likely to prove of any great commercial value in Rhodesia. As a stock feed it may be disregarded, and its sole use seems likely to be as a vegetable.

LABOUR IN PORTO RICO.

In Porto Rico, as elsewhere (says the "Journal of the Jamaica Agricultural Society"), the labour difficulty is dominant, and various methods of meeting the trouble have been tried. On one plantation the labourers were paid in full each night, which drew so much labour for a time, that other mills complained. One of the planters devised a plan of giving a numbered lottery ticket to each man who had worked six consecutive days in the canefields. At the end of the season there was a drawing for cash prizes, the grand prize being 100 dollars. Out of 2,000 hands only 150 had worked the six days in the first week; but matters rapidly improved under the stimulus of the lottery tickets.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF APRIL, 1914.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Melba	Holstein	6 Mar., 1914	1,023	3·4	38·5	
Madame Melba	"	10 Nov., 1913	744	4·2	35·0	
Glen ...	Shorthorn... ..	27 Oct. "	644	4·7	34·08	
Nellie II. ...	"	5 June "	421	4·6	31·78	
Miss Lark ...	Ayrshire	27 Dec. "	564	4·8	30·50	
Butter ...	Shorthorn... ..	27 Sept. "	567	4·6	29·80	
Lady Loch...	Ayrshire	31 Aug. "	535	4·8	28·94	
Miss Bell ...	Jersey	25 Sept. "	521	5·4	28·13	
Queen Kate	Ayrshire	4 Jan., 1914	629	4	28·11	
Rosine ...	"	27 Nov. 1913	553	4·4	27·31	
Silver Nell...	Shorthorn... ..	26 Sept. "	472	5	26·64	
Miss Jean ...	Ayrshire	13 Jan. "	492	4·8	26·61	
Lavinia's	"	11 Dec. "	595	4	26·59	
Pride						
Burton's	Shorthorn... ..	29 Dec. "	513	4·6	26·54	
Lily						
Miss Melba	Holstein	22 Jan. "	543	4·2	25·54	
Lady Mand	Shorthorn... ..	17 Mar., 1914	650	3·4	24·46	First calf.
Conscience...	Ayrshire	30 Jan. 1913	493	4·2	23·19	
Countess of Brunswick	Shorthorn... ..	22 July "	348	6	23·7	
Lennie ...	Ayrshire	1 Sept. "	488	4·2	22·95	
Bella ...	"	16 Dec. "	406	5	22·91	
Honeycombe	Shorthorn... ..	7 June "	439	4·6	22·71	
Daisy ...	Holstein	14 Feb. "	514	3·9	22·36	
Pauline ...	Shorthorn... ..	8 Oct. "	506	3·9	21·96	
Nina ...	"	5 April 1914	538	3·6	21·52	
Bell ...	Jersey	7 July 1913	323	5·8	21·30	
Skylark ...	Ayrshire	2 Feb., 1914	477	3·9	20·75	

The cattle were fed on natural pasture only.

CASSAVA FOR PIGS.

Considering how easily the cassava plant can be grown in many parts of Queensland, especially in the Northern and Central districts, and the heavy yields of tubers it produces, it is remarkable that no attempts have been made to utilise the latter for stock food. Doubtless the knowledge that both the bitter and the sweet cassava contain a certain amount of hydrocyanic acid poison accounts for the neglect of this crop, so valuable in many tropical countries. In reference to its value as food for swine, the "Journal d'Agriculture Tropicale," Paris, writes: "In 1909 we drew the attention of our readers to the experiments undertaken at the Agronomie Station of Loire-Inférieure by MM. Gouin and Andouard, in feeding young stock, and particularly calves, with manioc

(cassava) starch. Since then the process has become general, and a fairly large quantity of the cassava product is sold every year to French breeders. Following up their experiments MM. Gouin and Andouard have proved that cassava is a perfect substitute for the potato for feeding pigs, and this property makes it valuable in case of the potato season proving a failure, or when the quantity available finds a better market for human consumption.

The pig will eat the cassava either raw or cooked, digests it equally well in both cases, and utilises all the hydrocarbonic matter, amounting to about 80 to 90 per cent. of the total quantity consumed. All that is needed is soak the tubers for some hours in cold water, to obtain a food ready for immediate consumption, a food the nutritive value of which is equal to that of barley or rice meal. At the same time cassava must not be considered as a complete ration, as it is necessary to supplement it, for young animals at least, with food containing the phosphates and nitrates, which are wanting in cassava. The experimenters recommend for this purpose oil-cake and ground green bones, or, better still, degelatinised bones powdered.

The cassava for shipment should be as small as possible, the large coarse roots, which are too often exported, being not so saleable owing to the lengthened period required for soaking and the want of some instrument adapted for crushing the very hard pieces of root. One important grower in Madagascar has already taken up this matter, and sends regular consignments of cassava, reduced to the proper size, to many parts of Europe."

CASSAVA AS A FOODSTUFF.

The article republished above from the French Journal makes no mention of the poisonous properties of the cassava tuber, but, doubtless, the soaking in water for several hours is for the purpose of eliminating the hydrocyanic acid contained in the tuber.

At the Florida (U.S.A.) Experimental Farm cassava was proved to be the best and cheapest ration which can be used for fattening purposes. As to the comparative cost between cassava and maize, the difference was two-thirds in favour of the former.

Both varieties—sweet and bitter—contain hydrocyanic poison. In the sweet, the poison is in the skin; in the bitter, it is in the skin and juice. If fed to pigs as dug the animals will be poisoned; 1 gr. of prussic acid will kill a human being, 16 gr. will kill a horse; and some quantity between these two will kill a pig. On some lands sweet cassava will turn to bitter. The change results from planting on a free level soil cuttings from plants grown on hilly stony land. The very productive variety known as "Mexico" is very apt to change in this way. To be safe, the tubers should be peeled and boiled before being fed to stock.

To determine how the material can be treated to render it safe as a stock food, Professor Carmody made a number of experiments. Treated with cold water for twenty-four hours, the amount of hydrocyanic acid left in the sliced green roots was 1.134 gr. per lb. Treated with cold

water for twenty-four hours, water poured off, and treated with a second lot of water for another ten hours, the residue of poison was .301 gr. These were young roots. When old roots were treated with boiling water for nine hours, and the water poured off, no poison was left in the roots. It was thus shown that by treatment, as above shown, the roots can be rendered quite safe for food purposes.

Hydrocyanic acid is a very volatile poison, and if the roots are sliced and left for a time in the sun, then most of the poison is driven off.

In an article published in the "Queensland Agricultural Journal," in January, 1903, by Mr. J. C. Brünnich and Dr. W. Maxwell, the following note on the poisonous properties of the tuber occurs:—

"The value of crops as feedstuffs can be very seriously interfered with by the presence of chemical bodies which are actually injurious to animal life. This applies, and also very seriously, to the cassava plant now under consideration. Already in 1877, Prof. Francis, the Government Chemist at Trinidad, reported on analyses of sweet cassava, and showed them to contain considerable amounts of hydrocyanic or prussic acid. Prof. Francis's work has been continued by his successor, Prof. Carmody, who shows in his yearly report (1901) that the sweet cassava contains nearly as much hydrocyanic acid as bitter cassava, with this difference: That in sweet cassava the poisonous principle is located in larger proportion in the outer skin and rind.

"It has, therefore, been necessary to study the cassava grown in Queensland also from the standpoint of its possibly being, in its natural state, a crop unfit for animal use. Most careful examinations have been made in order to determine the amounts of hydrocyanic acid in the Mackay samples. In the first place, an analysis was made of an average sample of the cassava roots, when so high a content of hydrocyanic acid was found that it was necessary to repeat the examination. Further samples were obtained, including portions of the very youngest roots and also of roots which were not less than three years old. The roots of these samples were divided into two parts—namely, the outside or rind and the inside, the really edible portion of the root. The amounts of hydrocyanic acid were determined in these samples respectively, and were found to be as follows:—

		HYDROCYANIC ACID IN—			
		Natural Material.		Dried Material Calculated.	
		Per cent.	Grains per lb.	Per cent.	Grains per lb.
Young Cassava	Rind ... ..	.0434	3.04	.159	1.13
	Inside ... ..	.0227	1.59	.054	3.78
	Whole root ... ..	.0275	1.92	.071	4.97
Old Cassava	Rind ... ..	.0329	2.30	.110	7.70
	Inside ... ..	.0237	1.96	.060	4.20
	Whole root ... ..	.0256	1.79	.068	4.76
Average sample	Cassava, whole root ...	.0292	2.04	.077	5.39

"To make the meaning of these percentages amounts more clear, the results are expressed in the form of a number of grains of hydrocyanic

acid contained in 1 lb. of several samples of the green and also calculated on the dried material.

“ So far as information is to hand, it is understood that 16 grains of hydrocyanic acid is a fatal dose for a horse, and again that 1 grain of the pure acid is fatal to a human adult. Data are not to hand to prove the doses which would be fatal to pigs, sheep, or cattle, yet from what is known of the power of these respective animals to resist the action of other known poisons it is reasonably concluded that doses ranging between that which is fatal to a human adult on the one hand and to the horse on the other hand would be fatal to animals with powers of resistance ranging between these extremes. Then, as is seen from the above table, a horse would only need to consume 3 lb. of the dry material, corresponding to about 8 lb. of the green roots, to obtain its fatal dose, whereas 3 oz. of the dry or 8 oz. of the green roots could contain sufficient of the poison to be fatal to a man. It is, therefore, quite necessary to warn farmers and any others producing cassava roots against its use either as a human food or as a feedstuff for animals in its natural state.

“ The question is: How can the material be treated to render it safe as a food for either men or animals? Work along these lines has already been done by Professor Carmody. This laboratory considered the matter of importance enough to determine how the poison can be removed by such means as are possible to farmers and others who may wish to make use of cassava as a feedstuff. The material was, therefore, treated first in several cases with cold water, and, secondly, with boiling water. The amount of poison being left in the roots after the various treatments is shown in the following table:—

Mode of Treatment of the Sliced Green Roots.	Hydrocyanic Acid left in the Green Roots.	
	Per cent.	Grain per lb.
1. Treated with cold water for 24 hours, and water poured off (young roots)	·0162	1·134
2. Treated with cold water for 24 hours, and water poured off (young roots)	·0076	·532
3. Treated with cold water for 24 hours, water poured off, and treated with second lot of water for another 10 hours (young roots)	·0043	·301
4. Treated with boiling water for 9 hours, and water poured off (old roots)	Nil	Nil

“ It is thus shown that while the cassava root in its natural state contains a highly dangerous amount of hydrocyanic acid, yet by treatment of the cut-up material with water, as shown above, it can be rendered quite safe for food purposes. As a practical suggestion, it is advised that the cassava roots, if used at all, should be cut up into pieces and boiled in the same maner as potatoes are boiled for pig feed, the greatest care being taken that the water shall be completely removed, and the material further washed out with additional water.

“ Concerning the actual amount of hydrocyanic acid found in cassava root by different scientists and in different countries, the indications are very strong that the controlling factors will be found to be the nature of the soil and climatic conditions.

“ The data furnished by Dr. Wiley—covering the analysis of Florida cassava and the analysis contained in this statement of Mackay cassava—show very clearly that the amount of hydrocyanic acid in cassava root is relative to the amount of nitrogen contained in the roots. Again, the amount of nitrogen is determined by the nature of the soil in which the roots are grown; the Florida cassava was grown in almost pure sand and contained a minimum of nitrogen, whereas the Mackay roots were grown in a loam and contained double the amount of nitrogen. The action of the nitrogen content of the soil and of the nitrogen contained in manures applied to the soil, upon the formation of hydrocyanic acid, will be subject of further investigations, these investigations being made to cover not only cassava root, but also several other feed crops, including sorghum, maize, sugar-cane, teosinte, &c. Preparations are now being made for the continuation of these investigations, with the purpose of being able to inform our farmers what forage plants and at what age in their growth they may or may not be used with safety as feedstuffs.”

FEATURES OF THE CHEESE INDUSTRY.

By E. GRAHAM, Dairy Expert.

[Paper read before the members of the Cheese Manufacturers' Association, at their meeting held in Toowoomba on the 23rd April, 1914.]

The increase in the quantity of cheese manufactured during the season now terminating materially adds to the importance of this branch of the dairying industry.

A comparison of the quantities of cheese exported during the seasons 1912-1913 and 1913-1914 shows the marked expansion that has taken place in the volume of the oversea trade. The respective amounts and values being:—

	Quantities Exported.		Value.	
1912-13	25,622 lb.	.. ..	£640
1913-14	1,643,664 lb.	.. ..	£43,000

Despite the praiseworthy efforts exerted on the part of those directly concerned to place the industry on a sound basis, there still remain further avenues for improvement, both in the methods under which the milk is handled on the dairy farms and treated by the manufacturing factories.

The production of milk suitable for cheese-making purposes, especially in the height of a Queensland summer, demands the observance of exacting care and cleanliness on the dairy farm, and as lucerne and other fodders with slightly tainting influences are utilised as food for dairy stock, it follows that the aeration of the milk on the farm becomes a necessity, while the warm nights require that the milk should be artificially cooled, and its temperature reduced to as near 50 deg. Fahr. as possible.

Fortunately, these processes can be effectually carried out in conjunction, and at the expense of little labour, by passing the freshly drawn milk over a combined milk cooling and aerating apparatus; an essential

being that the work is performed in the purest of atmospheres. However, the cooling and aerating of milk is not generally adopted, although its usefulness seems to be fully recognised.

The grading of milk at factories, and the payments based in accordance with its quality, would do much towards establishing this necessary reform.

In deciding the quality of milk and discerning the dairy farm responsible for the delivery of milk of indifferent quality to the factory, I fear the reliable and accurate "fermentation" test has not been fully availed of by the managers of factories. The test is simple and decisive, and possesses the advantage that the dairyman can view the result, and see the abnormal behaviour of any milk of irregular character that he may be found guilty of supplying.

The whey from the factory is on occasions conveyed to the farms in the milk cans, and this practice is only to be accepted as one that positively detracts from the purity of the milk supply.

Colostrum or beastings are sometimes mixed with wholesome milk, and, if accepted at the factory, the result is the standard of quality of the cheeses made from the entire vat of milk is lowered.

Possibly the truest indication of the irregularities occurring in the production of milk and its subsequent manufacture into cheese is to be gathered from a study of the dominant faults exhibited by the cheeses submitted for export during the season.

Acid, bitter, and fruity flavours have been somewhat prevalent throughout the year, and signify in the first case that the milk was over-ripe at the moment the rennet was added (a defect readily overcome by cooling the milk on the farm) while in the latter instances bacteria and yeasts had gained access to the milk, probably being carried on dust particles from the yards, bails, &c., or fallen into the milk pail from the unwashed flanks, udders, and teats of the cows, or that an infection of the milk had taken place in the milk cans, previously used for the storage of whey, and the vessels not thoroughly cleansed. Defects in the body and texture of the cheeses, such as crumbly, rubbery, loose, open, and fisheye, were of frequent occurrence.

Maturing the cheeses in too high temperatures and in atmospheres containing insufficient humidity, together with exposure of the cheeses to hot temperatures in transit from factory to cold stores, are amongst the principal causes responsible for these imperfections.

In the examination of cheese prior to exportation, the strongest evidence of the hardship the cheese had suffered from abnormally high temperatures was provided by the fact that in innumerable instances the cavities in the body of the cheese were filled with melted butter-fat.

The isolated butter-fat soon becomes rancid, or assumes other equally disagreeable flavours, and the quality of the cheese is permanently destroyed.

As regards colour of the cheeses, mottled and unevenness were the most conspicuous features, the fault no doubt being due to an uneven development of acidity, and an irregular distribution of moisture in the

curd. This trouble will assuredly continue until such time as manufacturers utilise the curd-draining racks, and entirely abandon the practice of allowing the slabs of curd to drain upon the bottom of the milk vats, where the curd becomes more or less whey-logged by the partially imprisoned whey.

DETAILED PARTICULARS AND QUANTITIES, AND CLASSIFICATIONS, OF THE CHEESES EXPORTED FROM QUEENSLAND DURING THE SEASON 1913-14.

Date of Sailing.	Name of Vessel.	Number Crates of Cheese.	Classification Grade.			Percentage.		
			1st.	2nd.	3rd.	1st.	2nd.	3rd.
23 Sept., 1913 ...	"Wiltshire" ...	1,021	829	192	0	81	19	0
10 Oct., 1913 ...	"Shropshire" ...	1,456	1,252	204	0	86	14	0
20 Nov., 1913 ...	"Paparoa" ...	3,008	2,246	760	2	75	25	0
7 Jan., 1914 ...	"Waipara" ...	2,891	2,073	898	0	72	28	0
30 Jan., 1914 ...	"Argyllshire" ...	1,189	399	767	23	34	64	2
24 Feb., 1914 ...	"Limerick" ...	1,321	881	381	51	67	29	4
			1st Grade.	2nd Grade.	3rd Grade.			
	Mean average quality of consignments ...		69 per cent.	30 per cent.	1 per cent.			
	Mean average quality of consignments for former 3 months of season		80 per cent.	20 per cent.	...			
	Mean average quality of consignments for latter 3 months of the season		58 per cent.	40 per cent.	2 per cent.			

From the figures quoted it is significant to note that cheeses produced during the earlier and cooler months of the season were vastly superior in quality to those manufactured in the warmer portion of the year. The consignment despatched by the "Argyllshire" at the time the heat was at its zenith appears in quality the least satisfactory of the season's shipments.

In discussing the influences at work in bringing about this rapid reduction in the quality of the cheeses, it is to be remembered that generally many of the factors to be accepted as controlling the quality of the cheeses were identical during the whole period under review.

Generally the milk was produced upon the same farms, and for the greater part yielded by the same animals, delivered by similar method to the factories, and there made into cheese by the same individuals, and finally the cheeses were classified by the same officers at the cold stores, prior to exportation.

There are quite a number of factors in common, but a great disparity is to be found by a comparison of the relative climatic conditions ruling at the different periods, and the fluctuations in the quality of the cheeses occur with such persistence and accuracy in agreement with the heat of the summer that the harmony existing between the high temperatures of the cheese-maturing rooms and the reduction in the quality of the cheeses becomes definitely established.

Each year is attended by a similar seasonable damage to the quality of the cheeses, which to my mind affords convincing evidence that an improvement in the present methods of maturing and marketing of cheeses is essential to the best interests of the industry.

In the work of remodelling the existing premises in which the cheeses are matured, the expenditure of a considerable amount of capital

will be involved, but I think it may be shown that the outlay of the money requisite for the purpose is fully warranted.

The exposure of cheeses to high temperatures results alike in deterioration in its quality, and excessive loss in weight, the latter being due to the consequent heavy evaporation of the moisture of the cheese. Both factors have a direct influence upon the net returns to the factory and producer, and the excessive loss of moisture caused by the association of cheese with too high atmospheres may be set down as ranging from 3 to 7 per cent. of the total weight of the cheeses.

Analysis has shown the moisture content of some makes of Queensland cheeses to be as low as 28 per cent., which is considerably less than that held to be necessary for the proper maturing of the cheese.

The loss of weight by the abnormal evaporation of moisture from the cheese is, in the case of many factories, quite sufficient of itself to provide both interest and redemption on the capital requisite for the construction of an efficient cheese maturing room.

The matter of the temperature most beneficial for the proper maturing of cheddar cheese has long ago been investigated and decided, and it now behoves manufacturers to take advantage of the information at command and accordingly erect curing rooms that have incorporated in their construction every item of benefit.

Amongst other essentials the ideal curing room is one wherein both the temperature and the humidity of the atmosphere are under absolute control.

The finest flavoured cheddar cheeses have been matured at temperatures of 50 deg. Fahr., and slightly lower, with a humidity ranging from 75 to 80 per cent., and it has been proven that, within reasonable limitations, the lower the temperature and the higher the humidity of the curing room, the less is the loss in weight of the cheeses on the drying shelves.

Although comparatively low temperatures are effectual in the maturing of cheese of good quality, it is also to be recognised that the period occupied by the maturing process is considerably extenuated by the storing of cheese in temperatures below 50 deg. Fahr. However, experiment has shown that cheddar cheese is to be matured satisfactorily in temperatures not higher than 60 deg. Fahr., but the temperature of the curing room should at no time exceed 65 deg. Fahr.

I do not attempt to establish that high temperature of the maturing room is solely responsible for all defects discoverable in our cheeses, but rather to lay claim that the quality of the cheese is detrimentally influenced by its association with high temperatures, and that the heat invariably incubates faults in the flavour and texture which would have remained undeveloped, had the cheeses been held under cooler and more favourable atmospheric conditions.

The matter of a decision as to the best course to be pursued in order to improve the efficiency of the present curing room facilities, rests entirely in the hands of the directorates of the various cheese manu-

facturing companies, and the following suggestions are advanced as perhaps being worthy of consideration:—

(a) The consideration of the erection of a central curing room capable of containing the whole of the cheeses manufactured by factories.

(b) In the case of companies with branch factories, the storage of all cheeses at a common centre.

(c) The remodelling of the structures now utilised as cheese-curing rooms.

(d) Obtaining the required temperature by aid of refrigerating machinery.

(e) Obtaining the required temperatures by the adoption of the principle advocated by Mr. Morry, Surveyor to the Department of Agriculture and Stock.

THE SUGAR SEASON OF 1914.

For the information of willing workers who at this time of the year, find remunerative employment in sugar mills and on plantations at cane-cutting, and the multifarious operations during the crushing season, we republish from the "Queensland Sugar Journal" the approximate dates on which the various mills will commence crushing, as follows:—

Kalamia	15th of June.
Pioneer	Middle of June.
Inkerman	About 1st August.
Mossman	On or about 30th June.
Pleystowe	About middle of July.
Proserpine	About end of July.
Moreton	About second week in July.
Junction	End of July.
Baffle Creek	About end of July.
Bingera	About middle or end of July.
Mount Bauple	8th of July.
Nerang	First week in August.
Miara Mill	1st of August.
Gin Gin	About middle of July.
Marburg Sugar Co.	About 18th August.
Millaquin	About first week in August.
Fairymead	Latter end of July or beginning of August.
Goondi	Between last week in May and first week in June.
Macknade	About fourth week in May.
Victoria	About 25th May.
Invicta	Middle of August.
Pemberton	Middle of August.
Bonna	Middle of August.
Mulgrave	First week in June.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1914.

The 1914-15 egg-laying competition started on 1st April, with forty pens of six birds each, making a total of 240 birds. Some of the competitors are very backward, whilst others look as if they had been laying for two or three months. The latter, as a rule, when sent on a journey to different surroundings and food, stop laying and frequently go into moult; some of them have done so this time. There has been a slight attack of chicken-pox amongst some of the birds, and this has had a tendency to check the laying, so that the number of eggs laid during the month is not up to that of the corresponding month last year. A. T. Coomber wins the monthly prize. The following are the individual records:—

Competitors.	Breed.	April.	Total.
A. T. Coomber, Bundaberg	White Leghorns	110	...
T. Fanning, Ashgrove, Brisbane	Do.	98	...
Kelvin Grove Poultry Farm, Brisbane	Do.	84	...
George E. Austin, Boonah	Do.	77	...
Mrs. Bieber, Childers	Brown Leghorns	75	...
J. Kilroe, care of Finney, Isles, Brisbane	White Leghorns (No. 2)	72	...
R. Jobling, Wallsend, N.S.W.	Do.	67	...
J. Gosley, Childers	Do.	60	...
Range Poultry Farm, Toowoomba	Do.	58	...
Moritz Bros., Kalangadoo, S.A.	Do.	58	...
Mrs. Munro, Sunnyside, Warwick	Do.	57	...
J. R. Wilson, Eudlo	Do.	55	...
J. Kilroe, care of Finney, Isles, Brisbane	Do. (No. 1)	54	...
Loloma Poultry Farm, Rockdale, N.S.W.	Do.	53	...
J. Zahl, Boonah	Do.	46	...
J. T. Coates, Rockhampton	Do.	45	...
A. H. Padman, Adelaide, S.A.	Do.	44	...
Cowan Bros., Burwood, N.S.W.	Do.	44	...
Mrs. W. D. Bradburne, Kogarah, N.S.W.	Do.	40	...
Loloma Poultry Farm, Rockdale, N.S.W.	R. I. Reds	40	...
F. McCauley, Clifton	White Leghorns	36	...
J. Murchie, Childers	Brown Leghorns	31	...
C. M. Jones, Rockhampton	White Leghorns	29	...
Derrylin Poultry Farm, Mutdapilly	Do.	29	...
J. D. Nicholson, Arneliffe, N.S.W.	Do.	29	...
Marville Poultry Farm, Moorabbin, Victoria	Do.	27	...
J. T. Coates, North Rockhampton	Black Orpingtons	23	...
E. Le Breton, Milton	White Leghorns	21	...
A. F. Camkin, Kogarah, N.S.W.	Do.	21	...
J. M. Manson, Brisbane	Do. (No. 1)	19	...
E. V. Bennett, Kalangadoo, S.A.	Do.	19	...
George Tomlinson, Boonah	Do.	19	...
J. Franklin, Coolabunia	Do.	18	...
R. Burns, Sladevale, Warwick	Black Orpingtons (No. 1)	17	...
R. Burns, Sladevale, Warwick	Do. (No. 2)	17	...
J. N. Waugh, Bankstown, N.S.W.	White Legeorns	17	...
Douglas Moreton, Coraki, N.S.W.	Do.	15	...
J. M. Manson, Brisbane	Do. (No. 2)	9	...
R. Burns, Sladevale, Warwick	S. L. Wyandottes	4	...
T. Fanning, Ashgrove, Brisbane	Black Orpingtons ... ..	...	...
Total ... ..	...	1,637	...

EGG-LAYING COMPETITION.

At the Burnley (Victoria) egg-laying competition a new world's record has been established by six white leghorns, owned by Mr. J. H. Gill, they laying 1,668 eggs in twelve months, or an average of 244 eggs per hen in 365 days. The 139 dozen eggs of the winning birds were sold at an average of 1s. 2d. per dozen, realising £8 2s. 2d., or £1 7s., per bird. The actual cost of food was 5s. 8d. per head, so that there was a net return of £1 1s. 4d. for each hen.

It is interesting to compare these good results with those of the Queensland Agricultural College competitions, of which the following particulars have been kindly supplied to us by the secretary, Mr. P. M. Pitt:—

We put up what was then the world's record in the 1907-08 competition, but did not hold it long, as the Western Australian people, whose competition concluded a few months later, beat us. In the competition just closed, we beat our own previous record with 1,564 eggs, as against 1,538 in 1908. I think the 1,600 mark has been beaten in New Zealand as well. I believe that we hold the record for the greatest average number of eggs per pen and highest number per bird for a whole competition, viz.—52,420 eggs for 40 pens and 240 birds—1,310.5 per pen and 218.4 per bird, in the competition just closed.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1914.

Date.	MAY.		JUNE.		JULY.		AUGUST.		PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6:13	5:17	6:30	5:0	6:39	5:3	6:30	5:18	3 May ☾ First Quarter 4 29 p.m.
2	6:14	5:16	6:30	5:0	6:39	5:4	6:30	5:18	10 " ○ Full Moon 7 31 a.m.
3	6:14	5:15	6:31	5:0	6:39	5:4	6:29	5:19	17 " ☽ Last Quarter 8 12 "
4	6:15	5:14	6:31	5:0	6:39	5:4	6:28	5:19	25 " ● New Moon 12 35 p.m.
5	6:15	5:13	6:32	5:0	6:39	5:5	6:28	5:20	
6	6:16	5:13	6:32	5:0	6:39	5:5	6:27	5:21	
7	6:16	5:12	6:33	5:0	6:39	5:6	6:26	5:21	
8	6:17	5:11	6:33	5:0	6:39	5:6	6:26	5:22	2 June ☾ First Quarter 12 3 a.m.
9	6:17	5:11	6:34	5:0	6:39	5:6	6:25	5:22	8 " ○ Full Moon 3 18 p.m.
10	6:18	5:10	6:34	4:59	6:39	5:7	6:24	5:23	16 " ☽ Last Quarter 12 20 a.m.
11	6:19	5:9	6:34	4:59	6:39	5:7	6:23	5:23	24 " ● New Moon 1 33 "
12	6:19	5:9	6:35	4:59	6:39	5:8	6:22	5:24	
13	6:20	5:8	6:35	4:59	6:38	5:8	6:22	5:24	
14	6:20	5:8	6:36	4:59	6:38	5:9	6:21	5:25	
15	6:21	5:7	6:36	4:59	6:38	5:9	6:20	5:25	1 July ☾ First Quarter 5 24 a.m.
16	6:21	5:6	6:36	5:0	6:38	5:10	6:19	5:26	8 " ○ Full Moon 12 0 "
17	6:22	5:6	6:37	5:0	6:37	5:10	6:18	5:26	15 " ☽ Last Quarter 5 32 p.m.
18	6:23	5:5	6:37	5:0	6:37	5:11	6:17	5:27	23 " ● New Moon 12 38 "
19	6:23	5:5	6:37	5:0	6:37	5:11	6:16	5:27	30 " ☾ First Quarter 9 51 a.m.
20	6:24	5:4	6:37	5:0	6:36	5:12	6:15	5:28	
21	6:24	5:4	6:38	5:0	6:36	5:12	6:14	5:28	
22	6:25	5:3	6:38	5:1	6:36	5:13	6:14	5:29	
23	6:25	5:3	6:38	5:1	6:35	5:13	6:13	5:29	
24	6:26	5:3	6:38	5:1	6:35	5:14	6:12	5:30	
25	6:26	5:2	6:39	5:1	6:34	5:14	6:11	5:30	6 Aug. ○ Full Moon 10 41 a.m.
26	6:27	5:2	6:39	5:2	6:34	5:15	6:10	5:31	14 " ☽ Last Quarter 10 56 "
27	6:27	5:2	6:39	5:2	6:33	5:15	6:9	5:31	21 " ● New Moon 10 26 p.m.
28	6:28	5:1	6:39	5:2	6:33	5:16	6:8	5:31	
29	6:28	5:1	6:39	5:2	6:32	5:16	6:7	5:32	
30	6:29	5:1	6:39	5:3	6:32	5:17	6:5	5:32	28 " ☾ First Quarter 2 52 "
31	6:29	5:0	...	...	6:31	5:17	6:4	5:33	

State Farms.

KAMERUNGA STATE NURSERY.

Rainfall for the month 9.06 in., which fell during sixteen days. The first half of the month being dry, it was possible to get a good deal of watering done and also to make the nursery look more ship-shape after the wet season. Unfortunately, the dry weather did not last long enough, and, continual rain setting in, a good many of the legumes which were just ready for harvesting had their seed spoilt owing to sprouting in the pod.

An exhibit was taken to the show at Herberton, this being the first show of the season. The coffee, vanilla, coconuts, and rubber exhibits occasioned interest, as many questions were asked concerning same, while the samples of Gros Michel bananas were greatly admired. In connection with these latter, I may mention that while of fair size, much larger ones should be obtained on new scrub land, though I doubt if the quality could be improved upon. The plants were grown in a soil with a large proportion of sand which had shown itself anything but good; however, with continued cultivation and the application of one of Mr. Brünnich's formulas for manuring bananas, excellent results have been attained with this Gros Michel variety; but, as pointed out on previous occasions, it does not do to have the plants bearing to any extent during the cyclone season, as owing to its height and the weight of the bunches the plants are apt to snap off, unless in a very protected position. Fortunately, this is not, as a rule, the time of year for the best market, but by careful pruning out of suckers, plants can be brought along so as to come into bearing whenever required.

BUNGEWORGORAI.

The manager reports for the month of April:—

Meteorological.—Rather warm weather for the period of the year has been experienced, consequently vegetation has not only retained its summer appearance but has continued growing. Though in some respects not desirable, it has resulted in a plenteous food supply in the pastures for the stock during the winter.

The maximum temperature recorded was 88; average, 82.0.

The minimum temperature recorded was 44; average, 53.8.

Rainfall.—194 points, representing five wet days.

Vineyard.—This portion of the farm is assuming an autumnal appearance, some of the vines presenting a fine sight. The warm weather in conjunction with the showers experienced has necessitated keeping the hoe busy.

Orchard.—The oranges and mandarins have not ripened off as quickly as was thought at time of submitting last report, nevertheless,

a few will furnish fruit in a sufficiently forward condition for exhibiting at the Roma show next week.

Lemons.—The fruit have made fair growth, but a large percentage are worthless, due to the gumming disease mentioned in last month's issue of the "Queensland Agricultural Journal." Last year practically the whole of the crop was worthless.

Olives.—These trees are making splendid headway, and before next season, if not too costly, a small press for the extraction of oil should be secured. This season, with the exception of $3\frac{3}{4}$ cases sold, and a few ripe and green gathered for pickling for show purposes, the fruit was wasted.

Cultural Operations.—These have been proceeded with as the weather permitted, about 5 acres of the wheat area to be devoted to experiment work this season remaining to receive its final treatment preparatory to sowing. The peculiarities of this season have necessitated more tillage than has previously been required.

Sowing.—To date, $11\frac{1}{2}$ acres Bunge No. 1, $2\frac{1}{2}$ J. Brown, $2\frac{1}{2}$ Warren, and $5\frac{1}{2}$ of Amby have been sown, and are above ground. The sowing of the $13\frac{1}{4}$ -acre manurial experiment blocks will be completed to-day.

Cow-peas.—Owing to the fact that the ground wherein the crossbred plants are growing is badly infested with the nematode, there is every appearance of some valuable data being forthcoming as to the resistance and susceptibility of the different plants in similar crosses.

General.—Two silage demonstrations were attended to by Mr. Page during the month, and assistance rendered in another instance. A report on this will be furnished when the data as to cost, &c., have been secured. Applications for seed wheat have come forward a little more freely, and, notwithstanding that the season is a little advanced, they are still being received.

Stock.—Live stock of all kinds look exceptionally well, notwithstanding that the flies are very troublesome.

WARREN.

Manager's report for April:—

Weather Conditions.—The month of April proved very dry, only 238 points of rain being registered, this representing three days' fall. This rain only served to stimulate the growth of weeds, and proved of little benefit to the crops. Exceptional heat for this time of the year has been experienced.

Cereals.—The cereal crops have experienced very trying weather, no rain having fallen until twenty-two days after planting. Weeds proved very troublesome, and required much harrowing to keep them in check. As a result of this, much surface moisture has been lost, and the cereal crops have been thinned considerably. Two acres have been sown with seeds specially selected by the Department. These wheats are now growing excellently.

Twenty acres of lucerne have been cut and converted into excellent hay. This was stacked. The lucerne paddocks were cultivated after cutting.

The Orchard.—During the month the orchard was ploughed and cultivated between the trees. Towards the end of the month, the citrus fruits ripened well, and a quantity of fruit has been marketed. The section of the orchard from which the citrus trees were taken has been cultivated and planted with mangolds. These are now in need of rain.

Potatoes.—The potato crop, although not a pronounced success, has done well, and a good yield of potatoes will be the result. Up-to-Date variety has proved the best, each plant bearing excellent tubers. Brownell's Beauty have grown unevenly, and some of the plants have few or no tubers. The Defiance potatoes, imported from England, have set well, and will be reserved for seed. The Carmen potatoes have grown badly, most of the plants running to top.

Maize.—The maize crop will soon be ready for harvesting. Numerous orders for Early Leaming seed maize have been received, showing the popularity of this variety in Central Queensland. The white varieties, although excellently suited for this district, do not seem to be appreciated, the farmers "fighting shy" of them.

The Dairy.—We have now nineteen cows milking. All are milking well and giving good returns, considering the dry weather. Rhodes grass is our great mainstay. All the other grasses present a very dry appearance, but the Rhodes grass is quite green and fresh-looking. The cool, sharp mornings are now forcing us to rug the milkers, and thus prevent a decrease in butter fat. The young stock are all in splendid condition.

Clearing operations have been commenced, gelignite being used to blow up the stumps. We have already disposed of a considerable number of stumps and trees per means of this explosive, the cost of clearing being greatly reduced.

GINDIE.

The Manager reports for the month of April:—

The weather this month has been unseasonably hot, which led us to hope that we would get a good fall of rain, but I regret to say we were disappointed. We had five falls during the month, totalling 131 points. Parts of this district have been much better treated in this respect. The maize, which we hope to put into the silo about the end of next month (May), is looking well.

The greater portion of the month was occupied in assisting at the experiments in connection with the fly trouble, and I trust some definite benefit will be derived from these experiments. We find the flies are troublesome to the farm sheep that are carrying eight months' wool, and we have to give them a great deal of attention. At present it looks as if it will be necessary to crutch twice a year.

FROST PREVENTION.

The time is approaching which brings the most serious danger to the vine for the whole year—*i.e.*, the danger of spring frosts, which destroy in a few hours the young vegetation and coming crop, as happened in October, 1899, all over the Downs. The danger is a very serious one, and well worthy of being provided against, as, if the frost is severe, the destruction is complete; not only has all hope of a crop to be abandoned, but frequently the vine will be mutilated with dead wood to such an extent as to require its complete re-formation. The great frost of October proved very destructive to the vines at the Westbrook Experimental Farm,* many being killed down to the ground, and a larger number having the young wood killed. The result was a copious growth of suckers from below ground, which necessitated much labour to remove them, as others grew as fast as they were taken off, and at least 30 per cent. of the vines had to be re-formed on a sucker, which throws the vine back and destroys the symmetry of the vineyard. Of course no crop was secured, and in all probability the havoc done to the vines at Westbrook was experienced in many other vineyards, so that vignerons would do well to prepare for a possible repetition of such a frost. An illustration is given of the effect of the frost on one or two vines at the Westbrook Farm.

There are two ways of preventing the young shoots from being affected by frost. One is to protect them with mechanical appliances, and the other is to protect them with smoke. The first-named is easier, more certain, but more costly, and consequently can only be considered in cases of small vineyards or a few vines for household purposes. The appliances used are sheeting and matting of various materials stretched over the vines on frames, and they should be placed in position in the evening and removed in the morning when frost is threatening. Another good protector is to heavily mulch the soil beneath the vines with old straw, hay, cornstalks, or similar material; this prevents the radiation of heat from the soil and consequent lowering of the temperature. But these systems entail expense and loss of time in applying them, and, as observed above, can only be used on a small scale.

There remains the system of prevention by smoke, which is almost universally adopted in the larger vineyards in Europe. By interposing a stratum of smoke between the vines and the sky, great radiation of heat from the soil is prevented and the consequent lowering of the temperature to a dangerous point. This sounds easy of attainment, but is not so in fact, for the vigneron has not only to be alert to create his smoke at the right time, but he has also to arrange that the smoke shall not preserve his neighbour's vines while his own are being frosted. Some have an idea that the damage is caused by the subsequent thawing of the frosted vines by the sun, and that if the sun could be kept off the vines the shoots would not be injured. This view is quite erroneous. The freezing of the cells in the green parts of a plant causes them to

* Westbrook is no longer a State Farm under the Department of Agriculture and Stock.—Ed.

expand and burst. From that moment the affected part is dead, and, sun or no sun, will never come to life again. If, therefore, the experi-



PLATE 56.—EFFECT OF THE FROST OF OCTOBER, 1899, ON THE VINES AT WESTBROOK STATE FARM.

ment of shading frosted vines from the sun has succeeded, it was due to the simple fact that the cells had not been killed.

Now with regard to the time to apply the remedy. It is generally recognised that about daybreak is the most dangerous period for the vines, although very frequently the damage has been done earlier. From 3 a.m. to sunrise may be looked upon as the critical period. It is obvious that, unless there is command of an unlimited supply of fuel, the fires must be lighted before the above-mentioned time, and there the difficulty comes in, as few have the steadfastness to get up at that hour in cold frosty weather every time danger is threatening. It is done once or twice, but generally given up on the very night supervision is most needed. Even if a large supply of fuel is obtainable and the fires be lighted early, the vigneron must be up and on the watch, as, should the wind change a few points during the night, the neighbour gets the benefit of the smoke, and the protected vines are frosted. It therefore comes to this: That if the vineyard is to be insured against damage, the vigneron must, on those nights when frost is threatening, be on the alert all night or set an alarm to the early hours and get up.

Next comes the choice of materials. What is required is something that will make a good cloud of smoke, and yet burn slowly. Such materials as tar-barrels, &c., make plenty of smoke, but burn too quickly, and would be likely to pass out just at the time they were most required unless a large supply were at hand. The material which has given most satisfaction is damp straw, half-dried weeds, &c., heaped upon a foundation of burning logs or brushwood. It makes a big smoke, burns slowly, and is very inexpensive. All the litter of straw stacks, the harrowings of cultivation paddocks, corn stems, and similar rubbish will come in admirably for the purpose, and be the better for being got rid of. The materials, if dry, should be well damped and laid in heaps on the headlands round the vineyard, not too close together,—a few chains apart will be sufficient if the heaps are of fair size. If the bush is alongside the vineyard some fires could be kept going permanently for the fortnight the danger threatens, but, of course, they would only be of use when the breeze is from that quarter, and must not be relied on.

Damp sawdust mixed with sufficient tar to slightly coat all the material will create a dense smoke, but this not nearly so efficacious as the damp weeds and other rubbish recommended by Mr. E. H. Rainford in this article. It is necessary to have heaps in readiness all round the plot to be protected, as the wind may change, and blow all the smoke on to the neighbouring farm, leaving the to-be-protected crops at the mercy of the frost. But by having heaps ready for such an event this difficulty can be overcome. But, as Mr. Rainford says, the farmer must be on the alert from 3 a.m. to sunrise. The smoke production is, of course, suitable for bananas and other tall-growing crops such as sugar-cane, as well as for vines. Pineapples may be protected by a covering of grass or hay.

The Orchard.

FRUITS SUITABLE FOR THE HIGHLANDS OF QUEENSLAND.

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

As I am in receipt of a considerable volume of correspondence, embracing the far North to the Southern border, relative to varieties of fruit suitable to the various districts, I offer a few notes, comparisons, and selections which may assist prospective planters as to what and where to plant.

The altitude of the Southern tableland at Stanthorpe is 2,656 ft., and where the widest range of pomaceous and stone fruits succeed. The climate, however, is too severe for citrus and other evergreens as well as deciduous trees like persimmons, but certain oranges, if grafted to the trifoliata stock, would resist many degrees of frost, and in favoured spots may be grown with success for local use.

The altitude of the tropical tableland at Herberton and Tumoulin is higher, so also is the mean temperature higher by about 10 degrees than Stanthorpe; consequently a more limited selection of deciduous fruits is adapted. Other parts of the plateau at Kairi, Malanda, &c., being lower than Stanthorpe and warmer than Herberton, the selection is still further restricted. There are, however, many subtropical fruits that may be substituted.

Deciduous fruits, as a rule, are not recommended to be extensively planted in the far North at a lower altitude than that of Herberton, and in no case where citrus culture is to become the main source of income.

The following is a list of some deciduous fruits best adapted to the Northern tableland and kindred districts, viz. :—

Apples.—Astrachan, Red June, Hoary Morning, Irish Peach, Peasgood Nonsuch, Ben Davis, Fall Pippin, Rome Beauty, Greening, Carrvade.

Pears.—Keiffer's Hybrid, China, Stone, Vicar of Winkfield. These are not of high quality. The best dessert varieties are not suitable.

Apricots.—Royal, Moorpark (about Evelyn and Tumoulin only).

Figs.—Blue Provence, White Adriatic, Castle Kennedy, Brown Turkey.

Grapes.—Black Hambro, Syrian, Doradillo, Royal Ascot, Gordo Blanco, Concord, Dr. Hindley, Goethe, Iona, Wilder.

Peaches.—I am not keen on recommending peaches, they being so subject to fruit-fly, it is next to impossible to keep an orchard free in such a climate, but if people will plant, I advise the very earliest, viz. :—Sneed, Flat China, Downing, Edward VII., High's Early Canada, Early Newington.

Plums.—Wright's Early, First, Wickson, October Purple. The "Wild Goose" is also a useful plum where other varieties do not bear well, but should always be worked upon peach stocks.

Oranges.—For fairly strong volcanic loams: Navel, Jaffa, Joppr, Sabina, Homossasa, Valencia Late.

Oranges.—For lighter loams of granite, limestone or sandstone origin: Jaffa, Mediterranean Sweet, Parramatta, Queen, Siletta Valencia.

Mandarins.—Emperor (Canton) is the best for the North, but Beauty of Glen Retreat and Ellendale Beauty may be included.

Pomelos.—This much-neglected fruit is likely to become popular in a very few years. The seedless types of Cochin China and Siam are said to be excellent, but not so full-flavoured as some of the Floridian and Californian varieties. See Mr. Howard Newport's interesting pamphlet on this subject.

Lemons of fairly good keeping quality should also be grown at some distance inland. Limes and citrons will do better on the seaboard.

Persimmons.—Tanenashi, Haychi Ya, Nightingale's Seedless.

The following fruits are worthy of trial most of which will do well on some parts of the tableland, although all may not be profitable lines to grow, viz.:—Passion fruit and Pecan Nut (at Evelyn), Papaws, Tree Tomato, Olives, Avocad, &c.

A considerable number of the above varieties may be successfully cultivated in the Charters Towers region if irrigation could be applied. The remarks on citraceous fruits apply to the districts of the State generally.

A paper dealing with fruit specially adapted to the seaboard of Queensland will be published in a future issue.

GIRDLING FRUIT TREES WITH A ZINC BAND.

In the January and February issues of the Journal, we published some notes on cincturing fruit trees and grape vines, by Mr. C. Ross, Instructor in Fruit Culture, and cited some experiments made at Renmark, by the manager, Mr. C. H. Katekar, in the use of a wire girdle as preferable to cincturing (ringing). In a most valuable publication ("Second Progress Report on Bitter Pit Investigation") by D. McAlpine, 1912-1913, we find the following remarks on "Girdling with Zinc Band":—

"Ringing and wiring are not being recommended as matters of horticultural practice, but they have simply been employed to test the effect on Bitter Pit of restricting the flow of sap. Although no definite results have hitherto been obtained, yet they are sufficiently encouraging to cause a continuance of the experiments, and if the same results can be attained without the risks and troubles attendant upon the ordinary practice, then it may come within the range of the ordinary operations

of the orchard. It is a common practice with the orchardist to surround the stem of his apple trees with a zinc band for the purpose of preventing the root-borer beetle from ascending the tree to lay its eggs, and if a slight modification of this is used, constricted in the middle by means of wire, then the same effects are produced as in ringing without any wounding of the tree, and it may be moved or replaced as desired."

This method of girdling for fruit is strongly recommended by Poenicke on account of the good results obtained by adopting it. The "fruit-girdle," as he calls it, consists of a thin zinc band fastened tightly round the trunk of the tree, or, in strong-growing trees, around the principal branches. It is notched along its upper and lower margins, and the corresponding tooth-like projections gradually bend outwards in a sloping direction as the stem or branches increase in diameter. In this way the swellings of the cortex are allowed to expand without enveloping the fruit-girdle by its exuberant growth.

This is a very simple arrangement, and its chief advantage is said to lie in the products of assimilation being accumulated and stored up in the formative sap in the most perfect manner conceivable. It regulates the composition of the sap, and thereby enables the formation of wood and fruit to proceed in their proper proportions. It is said not only to improve the yield and quality of the fruit, but even to hasten the ripening in many of the early sorts. How far all these advantages favour or hinder the development of Bitter Pit remains to be seen. The relation between wood-growth and fruit-growth is no doubt an important one, and if there is a nice even growth in the apple, and the tree itself not making too much wood, the conditions are favourable for the production of healthy fruit; but, if the tree is making too much wood, and not supplying sufficient nourishment for the fruit, the physiological balance is disturbed. If the sap is controlled so that the fruit is regularly and properly nourished, there is little danger of Bitter Pit making its appearance.

The fruit-girdle can be removed when necessary, but it was found that it could be left in the same position for two or three years without injury to the tree.

Poenike sums up as follows, after having given the system a trial for a number of years:—"The fruit-girdle represents an extremely simple and perfectly reliable expedient, based upon the most recent scientific investigations. It simplifies the cultural methods in the orchard exceedingly, while it increases the yield and makes it far less dependent upon special knowledge and accidents. At a trifling cost, the fruit-girdle allows of a remarkable saving in current expenses.

"It is simply a means of constricting the stem or branch without running the risk of wounding them, in trees which have reached the fruit-bearing stage. In vigorous trees there is a surplusage of wood-growth that has to be removed by much labour at pruning time. If the fruit-girdle can be used to lessen this surplusage, without unduly impairing the vigour of the tree, and at the same time promoting fruitfulness, it may turn out to be a valuable device."

UTILISATION OF POOR SOILS.

At the late Chinchilla A. and P. Association Show in April last, some very splendid oranges were exhibited by Mrs. McSweeney, of Baking Board. They were grown on what Mr. J. Smith, Inspector of the A.J.S. Bank, describes as the "poorest soil in Queensland." Yet here Mrs. McSweeney has over 100 citrus trees in bearing, and, as Mr. Smith says, they beat the coastal fruit for flavour. These trees must have become immune to frosts, which are severe on the Downs, as the trees bear heavily, grow to a large size, and are of excellent flavour. Having seen most of the up-to-date orangeries on the coast, both on the Blackall

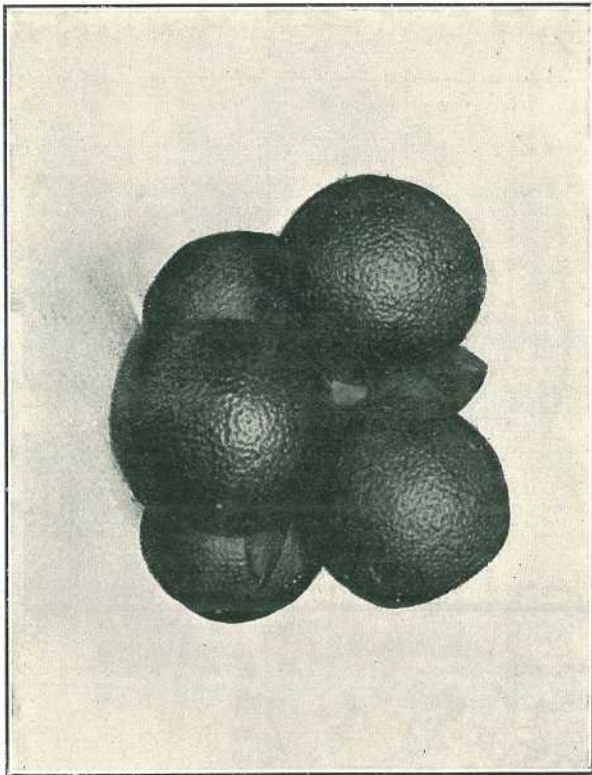


PLATE 57.—CLUSTER OF ORANGES GROWN AT BAKING BOARD.

Range and at Buderim Mountains, our informant says that this orangery in the wretched Baking Board soil beats them hollow. It is said that a good gardener can produce splendid crops on a bed of flagstones, and the results obtained on this orangery go to show what can be done by careful selection of trees, a knowledge of how to treat them, and constant care and attention under all circumstances. We have received a photograph of a cluster of five of these oranges on one stem, which formed part of Mrs. McSweeney's exhibit at the show. We shall probably hear more of this orangery when the Inspector in Fruit Culture, Mr. Ross, makes his next visit to that part of the country.

BANANA MANURING EXPERIMENTS AT BUDERIM MOUNTAIN STATE SCHOOL.

By the courtesy of Mr. J. D. Story, Under Secretary, Department of Public Instruction, we have received the accompanying report by Mr. R. G. Bartlett, Head Teacher of the State School at Buderim Mountain, Woombye, on the results of the work of his pupils in the cultivation of bananas. The instruction given them during their school days is of great value, and the results show what can be done in our country schools under intelligent and enthusiastic guidance.

RETURN OF RESULTS FROM 1ST MARCH, 1912, TO 28TH FEBRUARY, 1914.*

	No. Manure.	Incomplete Manure.	Complete No. 1.	Manure No. 2.
No. of stools	7	7	7	22
No. of bunches	15	16	20	53
No. of dozen	206	242	303	819
Average per bunch	13.7	15.1	15.2	15.4
Average per stool	29.4	34.5	43.2	37.2
Value at 3d. per stool	7s. 4d.	8s. 7½d.	10s. 9½d.	9s. 3½d.
dozen ... per acre† ...	£123 6s. 8d.	£150 18s. 9d.	£188 17s. 1d.	£162 12s. 1d.
Cost of manure ... per stool ...	...	6½d.	8½d.	1s. 4d.
... per acre ...	...	£9 8s. 6d.	£12 6s. 6d.	£23 4s.
Increase due to ... per stool ...	...	1s. 3½d.	3s. 5½d.	1s. 11½d.
manure ... per acre ...	...	£27 12s. 1d.	£65 10s. 5d.	£39 5s. 5d.
Gain after pay- ... per stool ...	...	9s.	2s. 9d.	7½d.
ing for manure ... per acre ...	...	£18 3s. 7d.	£53 3s. 11d.	£16 1s. 5d.

* The bananas were planted in September, 1911, and have been in full bearing for the twelve months under review. † Count 350 stools per acre.

MANURES.

Incomplete.	{ 2 lb. dried blood. 1½ lb. superphosphate.
Complete No. 1.	{ 2 lb. dried blood. 1½ lb. superphosphate. 1 lb. sulphate of potash.
Complete No. 2.	{ 2 lb. nitrate of lime. 2 lb. sulphate of pot. sb. 4 lb. superphosphate.

These quantities are supplied to stools every six months.

TREATMENT OF POTATOES FOR IRISH BLIGHT.

In England, in the preventive treatment of potatoes for Irish blight, the dry spraying or dusting of a specially prepared Bordeaux mixture, in the form of a very dry powder on to the potato haulms, has recently received a good deal of attention. Great saving in labour is accomplished in this way, and there is little fear of the under side of the leaves not being covered with the powder. The machine generally used costs about £30, but for experimental purposes the small hand-worked sulphur blower will serve. The best time to dry-spray potatoes is on a calm evening, for the least wind will carry the powder a long distance.

Viticulture.

CULTIVATION AND PRUNING OF THE GRAPE VINE.

In response to a request from Mr. Allan E. Moore, Marlborough, for information as to pruning grape vines, and on their culture generally, the Department, in the absence of Mr. C. Ross, Instructor in Fruit Culture, requested Mr. R. E. Soutter, manager of the State Farm, Bungeworgorai, who has had much experience in grape culture, to furnish a full reply to Mr. Moore's question, to the following effect:—

“The vine will, being a very hardy plant, grow in almost all kinds of soil. The most suitable, however, is a porous, easily worked loam, deep and well drained, subsoil sufficiently retentive to hold moisture to carry plants over a dry spell.

“In districts of heavy rainfall (torrential rains) and dry districts, too much slope is not advisable, as in one the soil is liable to wash and in the other too much exposure and drainage is present; therefore, a level or slightly undulating site is better.

“The preparation of the land should be begun in autumn, and the ground should be thoroughly stirred to a depth of 16 in. or 18 in., according to locality and quality of soil. Where gravelly subsoil is closer than this to the surface this depth is not necessary. The depth advocated can be reached by ploughing to a depth of 8 in. or 9 in. and then stirring up the bottom of the furrow another 8 in. or 9 in. with a subsoiler or plough with mouldboard removed following immediately.

“After this the weeds should be harrowed off and the ground permitted to lie during the winter, sufficient working being given to prevent crusting and growth of weeds. Cross plough in the spring and harrow, and, if necessary, cultivate or roll to bring the soil to the desired tilth.

The soil having been thoroughly prepared, the next thing to be done is to lay out the vineyard. This should be done with a view to overcome disadvantages of the site, to mitigate as far as possible the damage resultant from hail, and to facilitate working. If a level site or slightly undulating one, as previously recommended, this will present little difficulty.

“If on a slope, the vineyard should be laid out across the slope, the longer the rows being the less turning for the teams, making working less costly. Should hailstorms come from south-west then the rows should run north-east to south-west. In setting out the vines, the distances apart are governed by the climate and method of growing adopted. For a dry district, 8 ft. by 8 ft. if grown on stakes, and 8 ft. by between 8 ft. and 6 ft. in the rows if trellised—this will give, allowing space for roads, 650 vines per acre; 7 ft. by 7 ft. for staked and 7 ft. by 6 ft. for trellised vines in medium dry districts; whilst for the moister districts, 6 ft. by 6 ft. is sufficient.

“ The planting in square is recommended as, if on the bush system, vines can be worked two ways leaving very little to be done by hand.

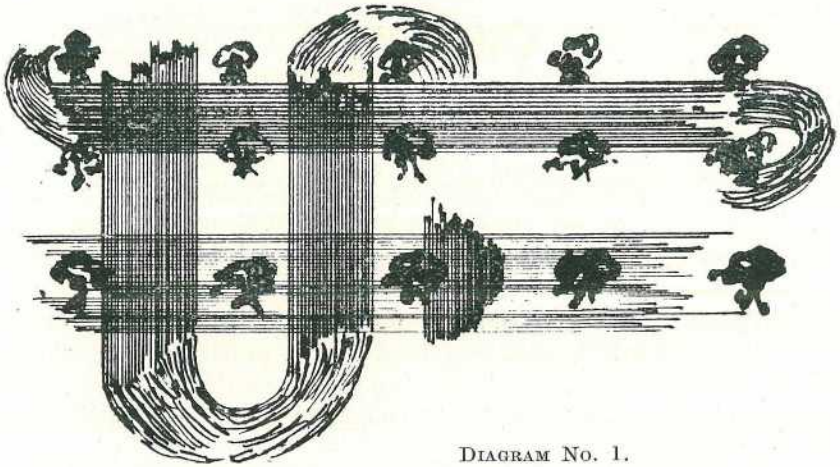


DIAGRAM NO. 1.

“ If narrow rows are planted, it will be necessary to have roadways throughout the vineyard for removal of produce, prunings, &c.

“ The most economical way to stock a vineyard is by using cuttings, though not so reliable as the putting in of rooted plants. The cuttings, which should be about 15 in. long, should be put in the ground slightly slanting, leaving only one eye exposed, the ground be well firmed round the cutting to within one-third of the top. Following the setting out, it will be necessary to keep weeds down and keep surface of the soil loose to prevent evaporation. Tie up young shoots as they reach a sufficient length to stakes to prevent being broken off by wind, &c. Prune low the first winter and late as possible.

Winter Pruning.—No fixed time can be stated as when to prune, though June and early in July is preferred by most. In warm districts it should be early, and in places where late frosts are likely to occur it should be delayed as long as possible. The methods in vogue are many, and are adopted according to variety (see pamphlets), climatical conditions, and mode of growing.



DIAGRAM NO. 2.



DIAGRAM NO. 3.

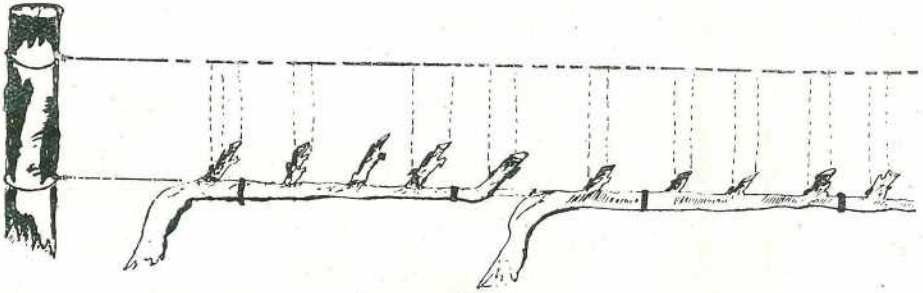


DIAGRAM No. 4.

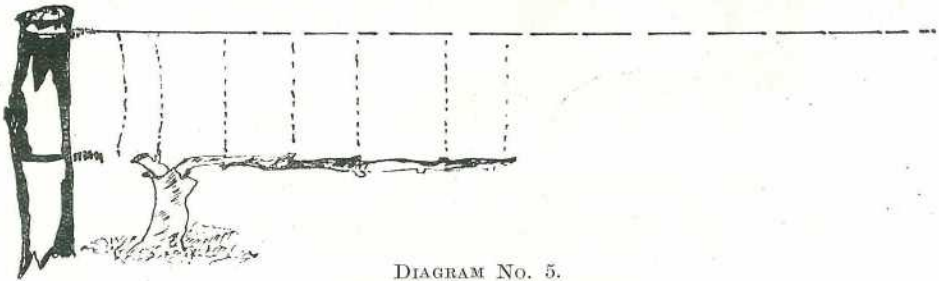


DIAGRAM No. 5.

“ These are a few of the recognised best methods for Queensland culture.

“ *Summer Pruning.*—Suckering and disbudding: Suckers are those shoots which spring from the old wood and are generally unfruitful. These can be rubbed off with the hand, which operation should be done as soon as possible after they appear.

“ Disbudding consists in the removal of shoots on the one-year-old wood not showing fruit, or thinning out.

“ Topping, which consists in the removal of the end of the shoot, is recommended by some authorities, but is not absolutely necessary under Queensland conditions.

“ *Tying.*—This should be done when buds are swelling; the canes are then more pliant, consequently are not so liable to crack. Material for tying; strands from potato bags, old binder twine, rushes, New Zealand flax, &c., are all suitable. Binder twine or similar material, which is inclined to cut into the vines as they grow, will in all probability have to be cut during the summer.

“ *Cultivation.*—Summer: Consists in keeping the surface stirred and the vineyard free of weeds. Winter: Ploughing 4 in. to 6 in. deep should be carried out as soon as the pruning is finished, throwing away from the vines. This destroys any surface roots, which are not advantageous, more especially in dry climates, and sweetens the soil.

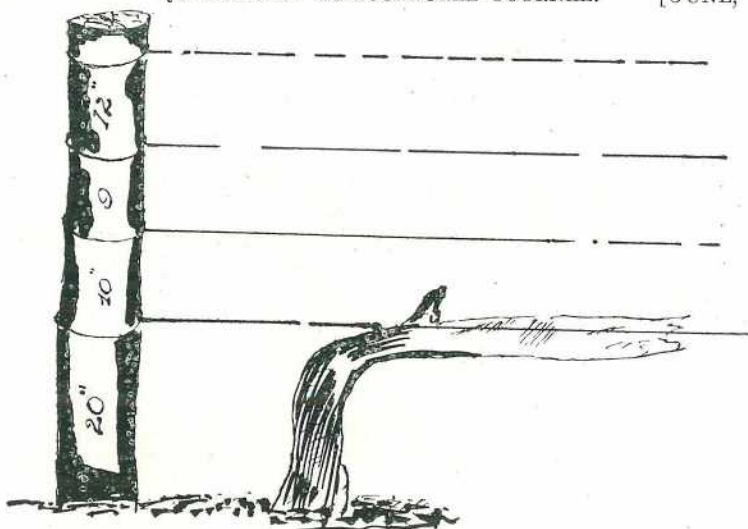


DIAGRAM NO. 6.

“ Any detail information will be gladly furnished if required.

RECLAIMED RUBBER.

In “ Grenier’s Rubber News,” light is thrown upon the amount of reclaimed rubber annually used by manufacturers, the estimates varying, as a rule, between 100,000 and 250,000 tons per annum, although much larger figures have occasionally been mentioned.

“ After corresponding with the leading British and foreign reclaiming firms, Mr. Maclaren judges that the total of the actual scrapped rubber annually collected has amounted in recent years to approximately 280,000 tons, from which about 140,000 tons of reclaimed rubber compounds are annually produced. Of these compounds, however, the actual rubber content does not exceed 40 per cent., so that the amount of new rubber displaced by the reclaimed article cannot well exceed 56,000 tons per annum.

“ There is one important point about the position which deserves more notice than it has received. The reclaiming industry is not a new one, but the strides it made in 1910 and 1911 were enormous. It was in these years that the consumption of reclaimed rubber rose from a comparatively small figure to over 50,000 tons per annum. If to the generally accepted figures of rubber consumption in recent years we add the vast increase in the use of reclaimed compounds, we shall find that the world’s demand for rubber has progressed at a very much bigger rate than is commonly imagined. Instead of an annual increase of 10 per cent., it is probable that the total quantity used by manufacturers has risen by a figure nearer 20 per cent. As the reclaiming industry is declining almost as rapidly as it formerly rose, it would seem to follow that the field thus left open to plantation rubber is almost as large as that created by the disappearance of supplies of the wild article.”

Tropical Industries.

NOTES ON DATE-GROWING.

HAND POLLINATION, ITS ADVANTAGES, POLLEN STORING FOR VERY EARLY FLOWERS OF FEMALE TREES IN THE ENSUING YEAR, ETC.

[CONCLUDED.]

Date when the Trees come into Flower.—In some other parts of the world it has been found that date palms usually come into flower while the mean temperatures are between 60° F. and 77° F. . . . The time of flowering of a date tree varies with the variety as well as with the climate, however, and it is probably also influenced more or less by the water supply, &c. [Instances are here given of date trees flowering at widely separated intervals during the year.—Ed. "Q.A.J."]

One date tree of either sex will produce from five to thirty clusters in one season, and a month may elapse between the times that its first and its last flower cluster is ready for fertilisation.

Method of Artificial Pollination.—Pollination is the conveying of pollen grains from the pollen sac of the stamen to the stigma or receptive point on the carpel. In good date-growing countries this operation is performed by the cultivator. It is usually done in the following way:—The male flower cluster with its enclosing spathe is cut from the tree, generally immediately before the spathe splits open. The stage at which the spathe is ready to split open may be known by comparing the spathes that are just splitting with those that have not yet reached that stage. It will be seen that when ready to split, the spathe will have assumed a brown colour, a soft texture and other characters by which the splitting stage is fairly easily known. By removing the spathe then it will be seen that the waxy scales are closed over and protecting the stamens of the flowers, and if these scales are lifted, it will be seen that the pollen sacs have not yet burst. If on removing the spathe, the flower cluster is exposed to the sun, it will be found that within a few hours the waxy scales of the flowers have opened out and that the pollen sacs have burst and are shedding their pollen. Sometimes the male flower cluster is cut from the tree just after the spathe opens, but in this case there is a chance that many of the pollen sacs may have opened and that much of the pollen dust may be shaken out and lost while removing the flower cluster from the tree and carrying it to the female trees. If the flower cluster is removed just before the spathe opens, the pollen will not be lost in carrying it about. The spathe must be very near the bursting stage before the male flower cluster is cut from the tree however, as otherwise the pollen grains will not be mature enough to fertilise the ovules of the female. Having obtained a male flower cluster in the proper stage of development, a female flower cluster is next found which

is just appearing between the parts of its bursting spathe (*see* photo. No. 3 and photo. Nos. 5 and 6), and one or two small branches are broken from the male flower cluster and are inserted among the small branches of the female cluster. In due time the male flowers open, the pollen sacs burst and the pollen is carried by wind or insects to the stigmas of the carpels of the flowers in the female cluster. In most cases the Arabs place only one branch of the male flower cluster among the branches of

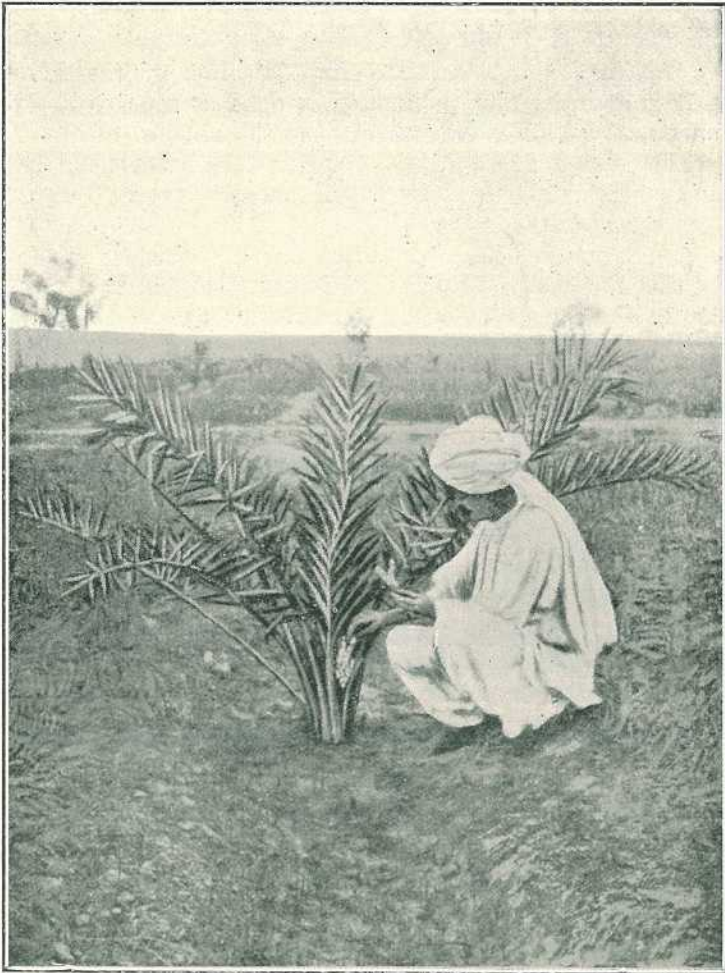


PLATE 58 (Photo. 6).

Arabian Date Palm, planted at Multan Central Gaol, September, 1910, being hand-pollinated in March, 1912.

the female cluster and then loosely bind the branches of the female cluster around the inserted male branch; the binding being done by a strip of palm leaf or string and in such a way that it will become undone by the time the fruit begins to develop. In Sind two small branches of the male flower cluster are said to be usually inserted in the female flower cluster and no tie is used.

Number of males required per 100 females.—As the number of flower clusters on both male and female trees are about equal and there are 100 or more branches in a male inflorescence, one male tree will suffice to fertilise 100 female trees approximately where one male branch is used to a female flower cluster, and will suffice for fifty trees approximately where two male branches are used. It is evident, therefore, that if the male trees produce a fair number of flower clusters, two male date trees ought to suffice to pollinate 100 female trees. It is safer, however, to have three male trees to every 100 females.

Hand Pollination demands Regular Attention at the Flowering Season.—It is essential that pollination is done as soon as the female spathe bursts, as within a very short time the stigmas of the carpels become withered and unresponsive. For this reason the plantations of good date cultivators are carefully and frequently inspected during the flowering season and every flower cluster is fertilised as it becomes ready. As hand pollination is being introduced into the Punjab, I may here emphasise that unless careful and regular attention can be given to the pollination of the female flower clusters in the flowering season, good results will not be got where only 3 per cent. of the trees are males and no wild males are growing near. Pollination is a very simple process, however, consisting merely of thrusting a branch of a male flower cluster into a female cluster, and probably two visits per week during the flowering season would be sufficient to ensure getting the flowers in the proper stage of development for pollination.

Preservation of Pollen.—Pollen may be kept for at least one year with safety if it is stored in a dry place. For storage purposes the flower cluster is frequently not removed from its spathe, and if it is removed from its spathe, it is usually stored in a paper bag. Where male trees are late in coming to flower and females are early, it is advisable to store a few male flower clusters, which contain ripe pollen, so that pollen may be at hand when the early females come into flower in the following season.

Selection of Male Trees.—Some male trees produce more pollen and some come earlier into flower than others. In propagating male trees, to be used to pollinate female trees whose fruits are to be sold for consumption, off-shoots should be taken from trees which produce much pollen and which come into flower at or a little before the time that the females are in flower. If new varieties of dates are to be bred, male trees should be used which have been reared from seeds got from good varieties of trees and which have had good male and female ancestors.

Characters of Male Trees do not Influence the Fruit formed as the Immediate Result of Pollination.—It is most convenient if males can be propagated, which come into flower in succession throughout the female flowering season. If the trees produce a plentiful supply of pollen in the proper season, other qualities of the male tree selected are mostly unimportant if rearing of date trees from seedlings is not undertaken, as the characters of the male are not transmitted to the fruit formed as the immediate result of a pollination. If the seeds of those fruits are

sown, however, the plants produced will probably show some of the characters of the male used.

Percentage of Males required for Natural Pollination.—Where pollination is done by natural agencies—*i.e.*, where the pollen is carried from the pollen sacs on the male tree to the carpels on the female by wind, insects, and other agencies not controlled by the farmer—about 50 per cent. of the date plantation should be male trees, and these should be well mixed with the female trees to obtain the best results. Cases are on record in which pollen is believed to have been carried many miles by natural agencies, and female date trees fertilised by it, but where the distances between the male and female trees are great, good results could only be expected when the winds are in a favourable direction, the air not too humid, &c., &c., at flowering time.

Advantages of Artificial Pollination.—(1) Fertilisation will be more certain. (2) Forty-seven per cent. of the trees on a plantation which are males and bear no fruit, can be replaced by good fruit-bearing females, and, therefore, practically double the crop of fruits can be got from a given area of land with the same water supply, and the only difference in labour being the pollination of the trees, and the collection and disposal of the extra fruits.

FRUIT DEVELOPING AND RIPENING PERIODS AND FRUIT PRESERVATION.

Falling of two of the three Fruits from a Female Flower.—When date flowers are pollinated, all three carpels in the female flower are usually fertilised and begin to develop (*see sketch C*). When the fruits get to about the size of peas, two of the three fruits fall off, and one date fruit only is left to ripen in each flower (*see sketch D*, and photo. 7). . .

Seedless Dates, and their relation to Pollination.—If these dates begin to develop without being fertilised, all three dates may remain on the flower, but they will be seedless and generally of poor quality. When a large number of seedless dates are found, it may usually be concluded that fertilisation has been defective, as the absence of the seed in a date is, in most cases, due to the ovule not being fertilised. In such cases, if hand pollination has been employed, the method of performing it, the stages of development of both the male and female flowers, the rainfall, &c., at the time of pollination, should all be carefully looked into. If the trees were pollinated by natural agencies, the number of male trees around, their distances from the female plant examined, the direction of the winds, the rainfall at the flowering period, &c., should all be carefully considered. . . .

Reducing the number of Bunches of Fruit to ten or twelve per Tree.—After the fruits have become sufficiently developed to show what sort of bunches may be expected, about ten or twelve of the best bunches should be selected to remain on the tree, and the remainder should all be cut down. If the bunches are poor, a greater number are left on the tree.

Too many Fruits on a Date Tree.—If more fruits are left than the tree can develop properly, a large number shrivel without coming to proper maturity. . . . With those people who do not understand date culture properly, there is always a tendency to avoid reducing the number of date bunches where necessary, but there is no more advantage in leaving too many bunches of fruits on a date tree than there is in leaving too many maize plants in a maize field.

Moist Atmosphere at ripening Time.—As has been stated already, fruits are very apt to fall off the trees before they are ripe if the atmosphere at the ripening period is too moist. In localities in which the



PLATE 59 (Photo 7).

A Bunch of Date Fruits in which only one carpel has been fertilised. The fruit produced by the fertilised carpel is large, well developed, and contains a seed. The remaining carpels have developed into seedless fruits. The fruit from the fertilised carpel can be distinguished near the centre of the bunch by its much greater size. Normally after fertilisation two of the three carpels in each female flower fall to the ground when the fruits are about the size of a pea, but in most flowers in this bunch all three carpels have developed into seedless fruits.

climate is usually dry enough for the date fruits to ripen properly, rains at the ripening period may do very great damage to the crop by fermenting the fruits.

Ripening of Fruits.—Ripe dates are usually had in Multan and Muzaffargarh by the 20th July, and the harvest is usually over by the 15th September. All the dates on a cluster do not ripen simultaneously. If a variety is a fairly good one, the people in these districts usually pick the dates off the cluster as soon as their ends show a small ripened spot. The ripening is then completed by spreading the fruits on mats in the sun. Dates are rarely completely ripened on the trees in the Punjab. Dates which have their skins broken, or which are in a bad condition, should be carefully removed from the cluster when ripening. If these are not removed, the whole cluster becomes tainted. If the variety is not very good, the cluster is cut from the tree when about 50 per cent. of the fruits on it are ready, and the fruits are then spread in the sun. Any fruits which do not ripen while spread are fed to goats, &c.

Protection of Fruits from Enemies.—The chief enemies complained of are human thieves, parrots, and other birds, wasps, and monkeys in some parts of the Province. A chaukidar (watchman) usually looks after the trees from the time the fruits have developed sufficiently to attract enemies until they are harvested. The following is recorded in the "Multan Gazetteer," 1901-02, regarding the watchman:—"He receives about Rs. 4 per month and a small number of dates, and he attends, taking one month and one locality with another, some 300 trees." He sees that no human thieves steal the fruits, and he keeps off birds by shouting, slinging stones, &c., &c. To help to scare away birds he frequently hangs bells and other contrivances for making a noise on the trees, and shakes these occasionally by means of strings. In date-growing countries the bunches of fruits are often encased in rough baskets made of palm leaves to prevent birds getting at the fruits. The basket should be made as open as is consistent with its purpose, as it prevents a good deal of sunlight getting at the cluster of fruits, and probably retards ripening. Another method is to hang a number of small branches of some very thorny plant round each cluster of fruits. This is very effective in preventing birds getting at them, and is more open than the basket usually is. A good thick layer of thorns round a fruit cluster would probably also give monkeys some trouble in getting at them. Rings of thorns round the stems of the trees where the trees are not too close together might also hinder monkeys from getting at the fruits. Fortunately, however, there are no complaints of depredations from monkeys in the areas of the Punjab which seem best suited for date-growing. To prevent depredation by wasps, &c., the fruit clusters might be enclosed in coarse muslin bags (see photo. No. 8).

Preservation of Dates.—The methods of preserving dates, together with some other points connected with date culture, will be dealt with more fully in a future paper. Only a few remarks will therefore be made here. Most varieties of dates only keep fresh for a few days after being plucked from the trees when ripe, unless they are partly dried or otherwise preserved.

The varieties of dates differ very much in the length of time they keep fresh without being preserved, however. Preservation of dates by drying depends upon the fact that bacteria concerned in the fermentation cannot live and perform their work in a sugary solution above a certain concentration. Therefore, the juice of those dates that keep longest fresh is usually less watery than those that go rancid sooner. The preservation by drying is usually done by spreading the fruits thinly on

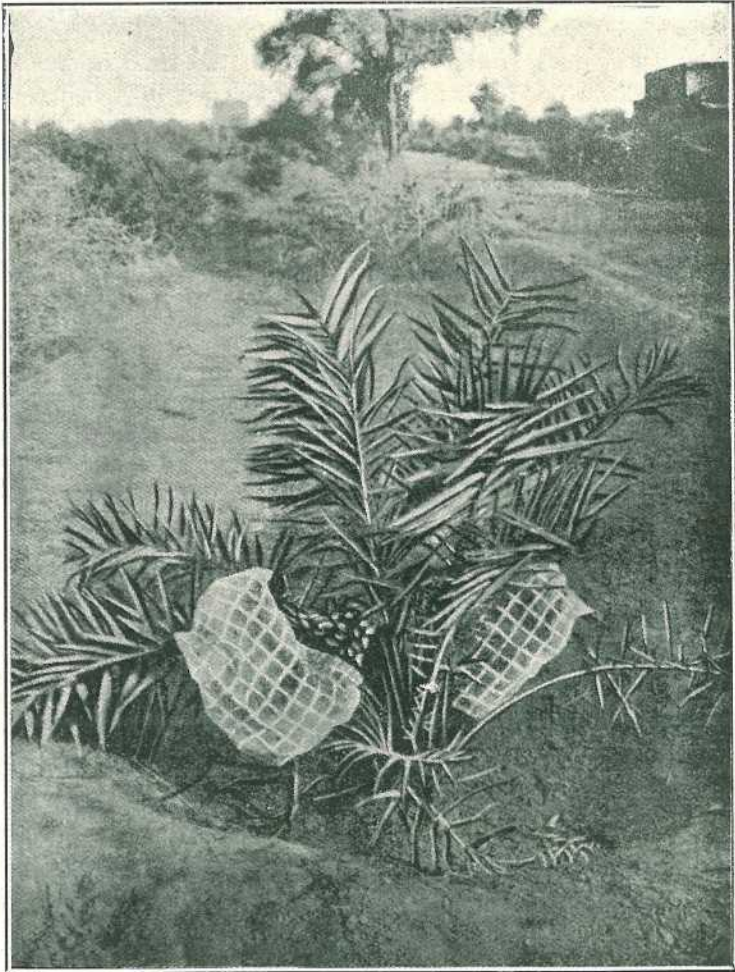


PLATE 60 (Photo. 8).

Arabian Date Palm, planted at Lyallpur, September, 1910, bearing first crop of fruits, July 1912. Two of the three bunches of fruits on the tree are protected by special net bags from the attacks of birds, wasps, &c.

a mat in the sun. The object to aim at is to dry off just as much of the water from the fruit as will leave the juice as concentrated as will preserve the fruit for the length of time required. More water than this is not dried off as weight is lost, the fruits have a less plump and attractive appearance, and the flavour is impaired. Different varieties of fruit will

require to be exposed to the sun for different lengths of time to bring them to the necessary stage of dryness; and if the sky is cloudy or the atmosphere is more or less humid, the length of time of exposure required to dry a particular variety sufficiently will also vary. In Muzaffargarh in good weather some varieties require to be spread in the sun about one week in order to reduce them to the proper stage of dryness; others require only three or four days. Date cultivators very soon get to know approximately how long a particular variety of date fruit will require to be exposed to dry it to the proper stage, and they become very accurate in their estimations of how dry the fruits must be in order to preserve them sufficiently for their purposes. All decaying fruits must be carefully removed from the others during drying, as they taint the whole lot if not removed. The fruits require the closest attention while being preserved if the best results are to be got. Mr. J. C. Gaskin, Assistant for Commerce and Trade, Bagdad, in a note kindly forwarded to me on 22nd October, 1912, states "a considerable quantity of boiled dates are annually shipped from the Batineh Coast, Katif, and Busrah to India where they are considered a luxury, and are used by the Hindus at their festivals. The Indian date-growers could perhaps with much advantage treat their surplus in the same manner, and cut out the imports from Arabia. The dates are boiled when they are yellow before they become ripe, and fetch a higher price than the ripe dates. One advantage is that the grower can get rid of his inferior dates and recoup himself early in the season." At present the date-growers in the Punjab could not hope to carry on a large and successful trade in dates nicely packed up for the higher prices in the market, as even if samples of the fruits were accepted in the market as suitable, date-growers could not collect any considerable quantity of exactly the same quality of fruits, owing to the pernicious habit that the people have of rearing most of their trees from seeds.

How to Discover Early Whether a Variety of Date Palm is Suited to a Particular Locality.—If any cultivator wishes early satisfaction regarding the quality of the fruits that a particular variety of date palm will produce in his particular conditions of soil and climate, in what months it will ripen its fruits, &c., I would advise him to plant on his land a few young date trees of that variety and which have just become old enough to bear fruits. If he will treat them well as regards water, &c., they will probably yield fruits in their second year after planting. As stated above, we have got fruits at Lyallpur from strong Arabian suckers in the second year after planting, but this result is much more likely to be got if young trees which have just begun to bear fruits are used instead. In either case it is very important that the plants shall be planted in good soil and be well treated.

CROPS OF DATES PER TREE AS ESTIMATED IN THE PUNJAB. PROFITS TO BE EXPECTED FROM DATE-GROWING IN SUITABLE DISTRICTS.

Crop of Dates per Tree.—The crop of fruits got per tree has been variously estimated at from 10 seers (20 lb.) to 250 seers (500 lb.), and average yields in various places have been calculated at anything from

20 seers (40 lb.) to 60 seers (120 lb.) or more. As the crop of fruits got per tree varies greatly not only with the variety of tree, but with the age of the tree, the quality of the land, the amount of water supply, the climate of the locality, &c., &c., a fair estimate of the average yield is difficult to get. Regarding the crops of dates yielded per tree in the Punjab, the "Multan Gazetteer" informs us as follows:—

"It is difficult to say what the average produce of a full-grown tree may be. At the recent settlement the produce recovered by the owner or baikhar after deducting payment in kind and miscellaneous losses was assumed to be 30 seers (60 lb.) of green dates in Kabirwala, and 20 seers (40 lb.) in the other tahsils."

Gross Income for Date Fruits per Acre.—If 139 good palms are planted per acre (trees 19 feet apart in the rows and the rows 16.4 feet apart), they are hand pollinated, 20 (1 seer = 2 lb.) seers of fruits (the lowest estimate to hand) are got per tree, and the value of the fruits is 8 seers per rupee; then allowing four male trees per acre, the gross income would be Rs. 337-8-0 (1 rupee = 1s. 4d.); and if 30 seers were got per tree, the gross income would be Rs. 506-4-0. We have already seen that Muskat dates simply packed in 1-lb. cardboard boxes are selling in Lahore at annas 8 per lb. (1 anna = 1d.), and that Algerian dates packed in ½-lb. packets in a way that will preserve them for more than a year are selling at Rs. 1-2-0 per lb. in Simla. I have also an American newspaper before me which states that last year some dates grown in Indio-California were sold at Rs. 2-10-6 per lb., and that they are selling at Rs. 3-2-0 per lb. there this year. These prices are for dates packed to have a more or less nice appearance on the dinner table, or to preserve them for a lengthened period, &c., but, although these prices give some indication of the possibilities of date culture, an extensive market could not be got for such commodities at once. I therefore do not wish to take too much notice of these prices. Dates do not require to be resown every year like most farm crops; they do not usually require much attention as regards water after the trees are established; they require no or little attention during the greater part of the year, and the fruits require little preparation for the market. With Basra date fruits of fourth or fifth quality actually selling in the unpacked condition in the market here at 3 to 4 seers (6 to 8 lb.) per rupee, our estimate of a gross income of Rs. 337 per acre for fruits alone seems most moderate, and if this is so, dates properly farmed ought to be a most remunerative crop when grown in suitable districts.

Date Palm, Bye-products, Their Value, &c.—Date-growers in Arabia estimate that they receive about 5 annas per tree for the sale of date palm leaves, fibre from the bases of the leaves, stalks of date inflorescences, &c. (Gaskin's note, dated 22nd October, 1912.) This works out to Rs. 43-7-0 per acre of 139 palms. These materials can be made into many useful articles, such as crates for fruits, poultry, and pottery; cages for poultry and small birds; fencing for fowl runs, chairs, stools, sleeping couches, &c. Those interested in the manufacture of ropes, mats, baskets, &c., from date leaflets and the fibre from the bases of leaves should purchase small

samples of these from Dera Ghazi Khan. The cost will be practically nothing, and the articles will give a better idea of their suitability for the purposes for which they are made than any description could convey. There is also the possibility of making sugar, wines, &c., from dates.

Imported Arabian Trees.—Some doubts have been expressed as to whether imported Arabian palms would bear the same quality of fruit in



PLATE 61 (Photo. 9).

Young Arabian Date Tree bearing its first crop of Fruits at Lyallpur in July, 1912. The plant was planted as an offshoot in September, 1910.

India as they would at Basra, but there has been no evidence either from Punjab or from other parts of the world to indicate that the quality of the fruits from the imported trees will be inferior to those produced in their original home. (See photo. 9.)

THE TAMARIND.

As it appears that there is to-day a good market for tamarinds in the Southern States of the Commonwealth, a few lines on the subject of the cultivation of the tree, the yield of fruit, and method of marketing may be acceptable. In the past there has been no demand for this fruit on a large scale, although it has been grown successfully in various parts of Queensland, from Brisbane northwards, since 1872, and probably much earlier. In March, 1913, however, an enquiry was received by the Department of Agriculture and Stock for two or three tons of tamarinds, not for a condiment, but for the manufacture of boot polish, for which purpose we understand the fruit is largely used. Two species of the tamarind are known—the East Indian (*Tamarindus indica*), the pod of which is elongated, being six times longer than it is broad, and containing from six to twelve seeds; and *Tamarindus occidentalis*—the West Indian Tamarind, the pod of which is short, being only three times longer than it is broad, and containing from one to four seeds.

Under favourable conditions, the tamarind is a large, beautiful, spreading tree, attaining a height of from 40 to 80 ft. in India and Java. The foliage is feathery, and acacia-like, and the clusters of yellow and red flowers come out from the sides of the branches. The pods, when ripe, are brown in colour and brittle, and the interior soft flesh is also brown, covered and permeated by woody fibres. The fleshy part is agreeably sour.

CULTIVATION.

Notwithstanding the fact that the cultivation of the tamarind has extended to all suitable tropical countries, the tree, unlike the orange, lemon, mango, coconut, mangosteen, durien, &c., has nowhere been grown in separate plantations. Here and there may be found a small group of trees, but more generally it is utilised as a shade tree near houses or is planted as in Java and India for avenue and clump purposes, and without doubt there is scarcely any other tree which is so suitable for these avenues. It is a very long-lived tree. The trunk and branches are so strong that they bid defiance to the heaviest wind-storms, while the delicate, feathery, dense foliage form an overhead, wide-spreading shade. For this reason the tamarind was prized first as a shade tree, and taking second place as a fruit tree. The planting and after care of the trees are the least costly and troublesome than is the case with rubber, coconuts, citrus fruits, &c., as the former require no protection from wind, do not make great demands on the soil, demand no particular care or nursing, are not troubled much by disease or insect pests, and bear heavily for a very lengthened period. As regards soil, two conditions only need be observed: First, that it should not be swampy, nor retain stagnant water, and, secondly, that there should be no rocky subsoil or even rock boulders in the neighbourhood of the trees, although they thrive best in a dry soil, but only slightly damp. The tamarind will not thrive in loose sand. Under these conditions the character of the soil with regard to fertility is negligible. It would be difficult to find any soil embracing the above qualities in which the tamarind will not thrive.

The tree is propagated from seed in a nursery with plenty of humus, the soil being thoroughly pulverised. The seeds are then planted at distances 1 ft. apart each way, and covered with $\frac{1}{2}$ in. of soil. It is usual before sowing to soak the seed for twenty-four hours in lukewarm water to hasten germination. The seeds, not always being of equal size, the largest should be selected. If the seed is to be kept for some time, or exported, it should be packed in dry sand in clay, or China pots, hermetically closed with oiled paper. For keeping purposes, it is best to take the seed from hardly ripe fruit, instead of from dried pods, as the latter cannot be relied on. The seed bed must be kept slightly damp, and, of course, be free from weeds. Should any insects attack the young sprouts, they should be dusted with plenty of ashes and lime. As soon as the young shoots appear above ground, each plant must be shaded until it attains a height of about 10 in., the simplest plan being to erect a rough framework over the seed bed and cover it with matting or light linen stuff. There must, however, only be a sort of half-shade, just breaking up the sun's rays. The best way to raise plants for putting out is to sow the seed in pots, which enables the planting out to be done without exposure of the roots. Transplanting may be done when the plants are 2 ft. high and the seed bed must be thoroughly drenched with water so that the soil will cling to the roots and a large ball of earth pressed on to them. On no account must the roots be exposed. As the tree will eventually attain an immense size, like the oak or horse chestnut, plenty of space must be given between the plants, say, of at least 40 ft. each way.

If a plantation be formed, then the land must be ploughed, subsoiled, and harrowed, as in the case of an orange grove, but where the trees are planted singly as in the neighbourhood of houses, or in avenues, holes must be dug 3 cubic feet in extent, the soil removed must be freed from stones, roots, and clods, and mixed with compost or soil rich in humus, before being returned. The holes must be prepared at least a month before planting, so that the soil may set, otherwise the soil will sink so much with the plant that the bark will rot or the tree will grow crooked. For the first four years the young tree must be fastened to a stake, and shade must be provided for the first three or four weeks. In a dry season plentiful watering is necessary. Then the tamarind may be treated like any other fruit tree, with the exception that pruning is unnecessary, especially if planted for shade purposes, but if fruit is desired, it is well to cut out too-closely growing branches. The wounds should be at once dressed with wax.

THE HARVEST.

In eight years the tree will bear its first fruit crop and the harvest last about two months. The fruit must be perfectly ripe, as before this condition is reached the flesh will be too sour and the fibre too woody to give a good result. When fully ripe, the pod is of a dark-brown colour, and, furthermore, should easily be cracked between the finger and thumb. Once ripe the fruit should be promptly gathered, as in some tropical countries they have then many enemies such as monkeys, a troop of

which animals will quickly make a clean sweep of the crop. Parrots, cockatoos, and other birds, squirrels and flying foxes and many insects are also troublesome at harvest time.

The fruit should never be knocked off with poles as is frequently done, as this damages the fruit-bearing branches, with the result of a poor crop in the next season. For high trees ladders should be used, and the fruit cut off by an ordinary fruit cutter.

PREPARATION OF THE FRUIT.

The simplest way of preparing the fruit for keeping is to dry the pods in the sun, covering them with light linen or glass to keep off insects which would lay their eggs in them, and thus cause much damage. When dried they are ready for home consumption or for export. From Brazil regular small shipments of dried tamarinds are made to North America. They are also exported from Asia and Egypt undried, but packed in salt. The well-known tamarind pulp which mostly comes from the West Indies, is easily prepared as follows:—The pods are opened and the contents are laid out on a table in rows. The pulp is first cleansed of all particles of broken pods, and then placed in layers in a cask. When the cask is nearly full, sugar-cane juice just on the point of granulation after boiling is obtained from the nearest sugar-mill, and this is poured over the pulp. The syrup penetrates all the layers from top to bottom, and forms the pulp into a compact mass. As soon as it is cool (the syrup being added when hot from the cooler at the mill), the cask is headed up, and is ready for shipment. Sometimes a more clarified syrup is used which produces a better commercial article. The pulp loses none of its natural taste by the process, in fact, it has a still more agreeable flavour. At the same time this process might be improved upon. For instance, the pulp may be passed through a hair sieve, this being the only way to get rid of the seeds, fibre, and broken pods. Then the clean pulp should be boiled with white sugar syrup as in the case of the manufacture of marmalade, adding perhaps a little spice such as vanilla, ginger, or cinnamon. Other improvements might be suggested, but it is important to take care that the natural flavour of the pulp is not destroyed by either sugar or condiments. Packing could also be improved. Casks should not be used. Either glass jam jars or small wooden kegs, the latter coated on the inside with shellac, are far preferable.

Finally, the timber of the tamarind tree is excellent for building and upholstery work. We have taken the above notes from Professor H. Semler's work on Tropical Agriculture.

TAMARIND TREES IN QUEENSLAND.

In Central and North Queensland there are several bearing tamarind trees. On Ross Island, Townsville, we are informed by Mr. C. Ross, Instructor in Fruit Culture, there is a fine, fruit-bearing tree over 40 ft. in height, on Mr. Wellington's property. At Mareeba, in North Queensland, Mr. E. Miller, Abbotsford, has several trees in bearing. There are some half-dozen trees at the Kamerunga State Nursery, Cairns, and

at Bundaberg, Mr. N. E. Goodchild has trees producing a few hundred-weights annually. Probably there are many others in the North. The price of West Indian tamarinds in Australia is about 6d. per lb., and Queensland growers, after paying freight and charges and dealers' commission, would net 4d. per lb. f.o.b. at all Queensland ports.

THE LUCE CANE HARVESTER.

In our March issue we gave an account of the work performed by the Luce cane harvester at a trial of the machine at Audubon Park, Louisiana. We now have further confirmation of the value of the machine, as shown by a letter published in the "Louisiana Planter" (and reproduced in the "Queensland Sugar Journal" of 9th April) written to Mr. Geo. D. Luce, by Mr. Frank Barker, of the Clothilda Plantation, Raceland, Louisiana, to the following effect:—

"Dear Sir,—Reporting on actual field work of the Luce cane harvester on my Clothilda plantation, would say that it was tried in D74 cane, running 40 tons to the acre, sufficiently to show that even in this heavy cane it would do excellent work. As all of the D74 and D95 was in very soft land, and there being no mud legs on the wheels, it was given a more thorough try-out in native or purple cane, averaging about 30 tons per acre.

"This cane was, for this variety, quite straight, but considerably blown down, leaning, and admittedly in bad shape for machine handling. The result may be fairly stated as follows:—

"The bottom cutting was in all cases perfect, a square clean cut being made, and about 4 in. lower than hand cutting, which, besides adding much to the sugar yield, would seem to make stubble shaving unnecessary. Leaning or blown down cane was brought up and handled as well as that standing straight. Stripping was as good as the average hand work. Topping was as exact as hand topping, except on short cane, crooked cane, or suckers not long enough to reach the topping knife. No attempt had been made to house the machine; the working parts being left exposed, so that their movements in operation could be noted. In this connection it is but justice to the machine to state that those parts that cannot be housed—that is to say, the bottom cutters, the topping knife and the stripping brushes—cleared themselves perfectly, being as free from cane trash when stopped as when they were started. The other parts, such as shafts, sprockets, and gears can, in a commercial machine, be fully housed and protected.

"The expressed opinion of those who saw the machine, nearly all of them practical men, is that machines built in commercial style along these lines, some parts strengthened, and the whole made lighter, as it can be done, will solve the problem of the cane harvester, and give us a practical machine that will harvest all of the D74 and D95, and, in fact, all cane, light or heavy, that is grown in rows, and is reasonably straight.

"Wishing you the success that both yourself and the machine deserve, I beg to remain."

DETAILS OF THE SUGAR CROP OF 1913.

The Government Statistician (Mr. Thornhill Weedon, F.S.S.) has issued a statement showing the actual results of the sugar campaign for 1913. The total yield was 242,837 tons, which showed an increase of 129,777 tons on the season of 1912. The figures are as follows:—

Division and District.	Area Crushed for Sugar.	Total Area for Sugar.	Weight of Cane.	Sugar.
	Aeres.	Aeres.	Tons.	Tons.
Rockingham and York Peninsula—				
Cairns and Douglas	10,928	17,072	190,795	25,159
Ingham and Mourilyan	15,831	25,331	269,814	37,255
Total	26,759	42,403	460,609	62,414
Edgumbe—				
Ayr and Townsville	7,711	13,777	205,546	25,903
Proserpine and Bowen	2,985	3,788	55,968	6,535
Mackay	25,320	37,021	498,888	55,211
Total	36,016	54,586	760,402	87,649
Wide Bay—				
Bundaberg and Gin Gin	21,688	26,384	438,030	51,476
Biggenden, Childers, Gayndah, Maryborough, and Tiaro	15,236	19,516	363,377	34,849
*Gympie	170	294	3,353	...
Total	37,094	46,194	804,760	86,325
Port Curtis—				
†Gladstone	309	458	5,704	400
Moreton—				
Logan	968	1,465	18,759	1,635
Marburg and Rosewood	405	520	5,819	552
Maroochy	1,062	1,641	25,182	3,287
Nerang and Southport	190	476	4,353	575
Total	2,625	4,102	54,113	6,049
Total, 1913	102,800	117,743	2,085,588	242,837
Total, 1912	78,142	141,652	994,212	113,060
Increase or decrease	24,661	6,091	1,091,376	129,777

* Mostly crushed in Maroochy.

† Part crushed in Bundaberg.

In addition to these figures the statement shows that the area for plants was 2,541 acres in 1913 and 3,515 acres in 1912.

The area of stand-over or unproductive cane in the several divisions was as follows:—Rockingham and York Peninsula, 14,397 acres; Edgumbe, 17,541 acres; Wide Bay, 8,850 acres; Port Curtis, 149 acres; Moreton, 1,462 acres. This gave a total of 42,399 acres, as compared with 59,995 acres in 1912.

The principal yields in other years were:—

1907	..	..	..	..	188,307
1910	..	..	..	..	210,756
1911	..	..	..	..	173,296

Animal Pathology.

TUBERCULOSIS IN COWS.

Writing to the "Live Stock Journal" of 20th March, Mr. H. Leeney takes up the cudgels in defence of cow's milk. He says:—

"That it has never yet been definitely proved that any human being has been infected by the consumption of cow's milk; that it is difficult to infect bovines with human bacilli; that the experiments by sub-cutaneous, intra-venous, and intra-peritoneal injection of vast quantities of virulent sputum often failed; that some subjects were poisoned but not infected with tuberculosis; that some lesions proved retrogressive although this virulent material was employed, and that none were infected by natural means.

"Neither Koch nor anyone else who has studied the subject would say that a dentition abrasion in an infant's mouth might not afford an entrance for a stray bacillus, but what are the chances? Surely the available statistics give the answer! I do not think it will be denied that three times as much cows' milk is consumed by infants to-day as was taken by a previous generation whose mothers recognised their duty, and it cannot be denied that the returns of deaths from tuberculosis have fallen by 50 per cent. If the cow, as often asserted without any evidence whatever, is the chief cause of tuberculosis in human beings, then we ought to have three times as many cases, instead of 50 per cent. less."

STOMACH OR WIRE WORMS IN SHEEP.

Consequent upon the publication of Mr. W. G. Brown's lecture, in which he advocated the rearing of sheep on coast lands, very great interest has been aroused on the subject, and many inquiries have reached the Department as to the best grasses on which to pasture the sheep (the natural grasses being wholly unsuitable), and as to the possibility of the sheep becoming affected by stomach worms. For the information of those interested in the matter, we republish a paper by Mr. Sydney Dodd, F.R.C.V.S., formerly Principal Veterinary Surgeon and Bacteriologist in the Department of Agriculture and Stock, on worms in sheep and the treatment to be adopted for destroying them:—

"Stomach worms in sheep and calves are known to exist pretty generally throughout the world, and are often a source of great loss to stock-raisers. In some parts of Queensland this condition is one of the most serious drawbacks to sheep-raising, the mortality amongst lambs being very high. In calves, also in some districts, parasitic gastritis or stomach worm is very prevalent, more especially on the coastal districts or where the climate is moist. In the latter animal it gives rise to a condition known amongst stockowners as 'bottle.'

“Stomach worms are to be found in ruminating animals of all ages, but in adult sheep and cattle their presence, unless in very large numbers, does not usually give rise to any outward symptoms, although they are a source of infection to young stock. It is in lambs and young calves that their effects are most serious.

SYMPTOMS.

“The most constant symptom is scouring, and this is seldom or never absent. Accompanying the diarrhœa is rapid loss of flesh and loss of appetite. An unusual thirst is often seen, and lambs at times show a tendency to lick sand or earth; but the evidence of this latter is often only seen when the fourth stomach is opened after death. The temperature may be above normal. There is no cough as a rule.

“In the more chronic cases, the disease is accompanied by dropsical swellings of the dependent parts, chiefly seen under the lower jaw. The swelling in the latter place in calves is said by stock-owners to have some resemblance to a bottle, hence its popular name in Queensland—‘bottle.’ There is also great anæmia, seen in the marked paleness of the visible mucous membranes, such as of the eye and mouth.

“In some cases the course of illness is very acute in very young animals—these sometimes dying in a very few days, but, as a rule, the course is a chronic one, the animals being more or less ill with the above symptoms.

“A positive diagnosis of this disease may be made by killing one of the badly affected animals and opening the fourth stomach, then emptying its contents into a shallow glass dish or basin. If the worms are present in great numbers, as they usually are, by carefully searching the liquid one can see them wriggling about very vigorously, like eels. They are from $\frac{1}{2}$ to $1\frac{1}{2}$ inch long, and about as thick as a pin. Or, in order to observe them better, one should empty out the stomach contents, and scrape the lining of the stomach with a knife, then mixing the scraping with a little clean water in a small flat-bottomed glass dish.

“The worm which is most prevalent in these conditions is known as *Strongylus contortus* (or *Hæmonchus contortus*), receiving its name ‘contortus’ owing to its having a red-and-white twisted appearance like a barber’s pole, due to the arrangement of the ovarian tubes around the intestines. The body of the worm is usually brown or reddish.



Strongylus contortus
(Stomach Worm,
natural size).

LIFE HISTORY OF THE TWISTED STOMACH WORM.

“The *Strongylus contortus* is ovo-viviparous—that is, the eggs contain living embryos before the former are discharged from the adult worm.

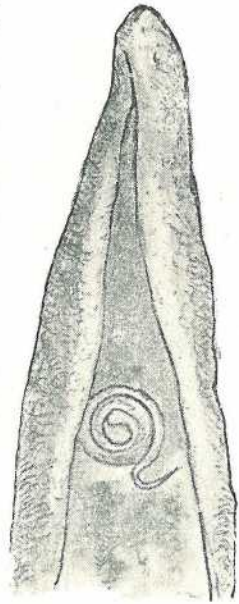
“The life history of this worm has recently been worked out by Mr. Ransom, Zoologist to the United States Department of Agriculture, and is as follows:—

“In the stomach of affected animals, the worms, after being fertilised by the male, produce large numbers of eggs, which are very minute. These are passed out with the droppings, and are scattered widely over the paddocks.

“If the temperature is above 40 degrees to 50 degrees Fahr., the eggs hatch out in from two hours to a few weeks, depending upon whether the temperature is high or low. If the temperature is below 40 degrees Fahr., the eggs remain dormant, and can remain in this condition for two or three months, and afterwards hatch out if the weather becomes warmer. Freezing or drying soon kills unhatched eggs. The minute worm which hatches from the eggs feeds upon the organic material in the manure, and grows until it is nearly one-thirtieth of an inch in length. Further development then ceases until it is swallowed by a sheep or other ruminant, after which it again begins to grow, and reaches maturity in the fourth stomach of its host in two or three weeks. The chances of the worms being swallowed are greatly increased by the fact that they crawl up blades of grass whenever sufficient moisture, such as a rain, fog, or dew, is present.

“The young worms which have reached the stage when they are ready to be taken into the body of the host are greatly resistant to cold and dryness. They will survive repeated freezing, and have been kept in a dried condition for thirty-five days, afterwards reviving when moisture was added. At a temperature of about 70 degrees Fahr. young worms have been kept alive for six months, but experiments have shown that land over which no cattle, sheep, or goats have been allowed to graze for a year will be free from infection at the end of that period.

“The time required for a clean pasture to become infectious after sheep, cattle, or goats are placed upon it depends upon the temperature—that is, the eggs of the worms contained in the droppings must hatch out, and the young worms develop into their final larval stage, at which stage they are able to continue their development in the body of their host, and the rapidity of this depends upon the temperature. The final larval stage is reached in three or four days to three to four weeks after the eggs have been dropped from their host, according to the temperature conditions. It has been proved that eggs or newly-hatched larvæ are unable to develop if swallowed by an animal—a certain degree of development must first take place outside the body of its host—and although a certain amount of infection may take place through drinking from pools soiled by droppings, yet the most frequent source is the pasture; and it explains why this disease is much more prevalent on the coastal district or where the rainfall is heavy, thus keeping the grass continually moist.



Embryo of *Strongylus contortus* coiled on the tip of a blade of grass.—After Ransom. Enlarged 100 times.

TREATMENT.

“In America very elaborate methods have been devised for freeing the pastures from infection, but generally speaking the conditions obtaining in this country do not admit of their practical application here.

“Various remedies have been used for destroying stomach worms. The one used most commonly in South Africa is a solution of bluestone (sulphate of copper), and I have frequently used it with satisfactory results. The bluestone should be in clear blue crystals, with no white patches or crusts. It should not be dissolved in an iron or galvanised vessel—an enamelled bucket answers very well. Rain water is best for making the solution.

“The doses recommended are as follow:—

For Lambs: Take 1 lb. (avoirdupois) of pure bluestone and 1 lb. of Colman’s mustard (fresh). Mix well with 12 gallons of rain water.

Dose for Lambs: 3 to 6 months old, give 2 oz.; 6 to 9 months old, 3 oz. 9 to 12 months old, 3½ to 4 oz.

For Sheep: Take 1 lb. (Avoirdupois) pure bluestone, 1 lb. Colman’s mustard (fresh). Mix with 10 gallons of rain water.

Dose for sheep over 12 months old, give 4 oz.

Dose for calves, 15 to 30 grs. of bluestone dissolved in 1 quart of rain water.

“The animals should be fasted from twenty to twenty-four hours before dosing, and they should be kept away from water on the day they are dosed. It is important that the bluestone and water be accurately weighed and measured, and a graduated medicine glass should be used to measure out the various doses individually. In dosing sheep it is better to leave them standing on all four legs, as it has been found by experience that if the dose is taken quietly when the animal is in the standing position most of the liquid will pass directly into the fourth stomach, while if the animal is placed on its haunches, only part of the liquid goes immediately into the stomach where it is needed. An assistant places the sheep between his legs, and raises its nose up to a level with its forehead. The person giving the dose then places his hand lightly over the animal’s nose and inserts one or two fingers into the left side of the animal’s mouth in order to open it. At the same time he inserts the neck of the bottle containing the measured dose, and pours gently as fast as the animal will drink. No attempt should be made to force the animal’s mouth wide open or to hold the nose high in the air.

“Many sheep are killed by careless or hurried dosing. Great care should be exercised in order to prevent the liquid going down ‘the wrong way’—that is, into the lungs. Therefore, if an animal coughs or bleats, stop pouring and lower the head at once. Do not be in a hurry to get the job finished or try to break records. If a very large number of animals are to be drenched, it is better to drench a certain proportion daily, and turn those dosed into a separate paddock until the whole are finished.

“It is also advisable before dosing the whole of the flock to test the drench by dosing a few of the animals first, and then waiting a day or so to see whether any bad result follows.

“In America good results have been obtained from a single dose of a 1 per cent. solution of coal tar creosote. The solution is made by shaking together 1 oz. of coal tar creosote and 99 oz. of water (making 5 pints altogether). The dose of this mixture is as follows:—

Lambs, 4 to 12 months old, 2 to 4 oz.
Sheep, 12 months and over, 3 to 5 oz.
Calves, 3 to 8 months old, 5 to 10 oz.
Yearlings, 1 pint.

“Coal tar creosote has been found to vary greatly in composition, and in the United States complaints have been made that the drug dispensed by some chemists as coal tar creosote has failed to give satisfactory results.

“Gasoline is one of the popular remedies in America for stomach worms. If gasoline treatment be adopted, it is important to repeat the dose, and it is usual to give it on three successive days. The evening before the first dose is to be given the animals are shut up without feed or water, and are dosed at 10 o'clock the next morning. Three hours later they are fed and watered. At night they are again shut up without feed or water. The next morning the second dose is given, and the third morning the third dose, the treatment before and after dosing being the same in each case.

“The doses are:—

Lambs, $\frac{1}{4}$ -oz.	Calves, $\frac{1}{2}$ -oz.
Sheep, $\frac{1}{2}$ -oz.	Yearlings, 1 oz.

“The dose for each animal is mixed and given separately in linseed oil or milk. Gasoline should not be given in water.

“In addition to whatever treatment is adopted, it is very necessary that the strength of the animals should be maintained by generous feeding.

PREVENTION.

“From what has been said in the preceding pages, it will be seen that worms have no power of reproduction outside the body of their host, and therefore the chances of worms infecting an animal are in direct relation to the number of sheep and cattle grazing over the pasture, and also the size of the latter. It will be easily understood that if the area of the grazing land is large and the relative number of sheep and cattle on it small, there is less probability of an animal eating grass that is contaminated with worm embryos than there would be if the conditions were reversed—that is, a small grazing area and a large number of animals on it. In other words, overstocking of land plays a great part in the cause of this disease. Paddocks on which a large number of lambs are grazed are certain to be greatly contaminated, and lambs put to graze on this the following season run great risk of infection. A few worms may probably be found in most sheep, but their eggs cannot develop into mature worms inside the body. They must be passed out with the excrement, and after a certain stage of development find their way into the body of another lamb or calf. From this it is evident that worms may be present for years without any serious loss. It is only when the number of worms swallowed

by an animal becomes excessive that the train of symptoms and results ensue.

“Therefore, in order to reduce the prospects of infection to a minimum, lambs or calves should not be grazed over ground that has become grossly infested with worms. The larger run they have the better. Also, it should be remembered that moist spots are very favourable places for harbouring the immature worms. If a paddock has become heavily infested, the better way would be to remove sheep and cattle from it for a year, and only use it for grazing horses; or, in some districts that are more closely settled, the land could be cultivated for a year.

“Stomach worms are not so prevalent on those runs where the grass has been frequently burned off. This is what one would naturally expect, knowing the life history of the worm; but, unfortunately, this means of keeping down worms is not practicable in many instances, because it is the small selector who often suffers the most heavily, and he cannot, as a rule, afford to burn off his grass; and also worms are most prevalent in moist places, and here the grass is usually too green to burn.”

REMEDY AGAINST MOSQUITOES.

Some time ago we received a communication from Mr. J. D. Howlett, of Bingham, Urangan, enclosing a cutting from the Maryborough “Colonist,” stating that New Jersey, in the United States, ranks among the most mosquito-infested countries in the world. There immense tracts of land are deserted on this account. Some years ago a scientific commission was formed to devise a remedy. After patient research this body decided to employ a shrub from South America called *Ocimum viride*, on account of a peculiar odour which it possesses, which the mosquitoes dislike, and which puts the insects to flight and frees the locality of them. A single branch in a room and a plant growing near a house are, it is stated, sufficient to establish immunity.”

This plant is known locally as “Mosquito Balm.” Mr. F. M. Bailey, Colonial Botanist, says that it does not grow in Queensland, but that there is an allied species, *Ocimum sanctum*, the Sacred Balm found in the Cloneurry district. Mr. Howlett states that when travelling some years ago in the bush he camped in a farmer’s paddock at Myrtle Creek, near Maryborough; it was a wet time and mosquitoes were very troublesome. Yet not a mosquito came near the camp, although only 3 miles away, where he camped on the previous night, the pests were in swarms. At Myrtle Creek the timber was all thick scrub and undergrowth. He believes that there must be some shrub which grew there naturally. And this was not the only place on the coast where he had the same experience. He stayed three days and nights at Myrtle Creek, and, as the farmer said, the mosquitoes had never been known to come within the boundary of the scrub, although beyond at the creek crossing they were plentiful. There is no such useful plant growing at Bingham or Urangan, where mosquitoes and sand-flies never cease from troubling. It would be interesting to know whether any other bush-dweller has had the same experience as Mr. Howlett.

Entomology.

THE NUT GRASS COCCID.

Mr. Froggatt, Government Entomologist, New South Wales, in reply to correspondents who have recently applied to the New South Wales Government for information with regard to the coccid which destroys nut grass, writes in the "Agricultural Gazette of New South Wales" (2nd May):—

"The Nut Grass Coccid (*Antonina Australis*) feeds upon the nut-like roots of the nut-grass in the grass and lucerne paddocks of the Hunter River district. It will kill out the nut-grass if the land is not disturbed, thus allowing the coccids to thrive, whereas, if the ground is ploughed, they die out. A number of experiments have been carried out by transplanting scale infected nut-grass into other districts, but without much success, as it appears to be difficult to establish it under new conditions, although it has been known to be successful in some districts.

"The parasite is peculiar to the nut-grass, which is really a sedge and not a true grass. It has never been found on any useful crop or grass.*

"The parasite does not travel through the soil unless it can follow the roots of the nut-grass, but it may be spread by very carefully turning over the ground, causing the minute larvæ to be distributed over the paddocks."

A CABBAGE MOTH ATTACKING TURNIPS.

By E. JARVIS, Assistant Government Entomologist.

One of our least known cabbage moths, *Godara comalis*, has recently manifested a decided liking for turnips, the caterpillars feeding openly on the leaves, which they soon skeletonize in a manner illustrated on Plate 62.

This species is sometimes found in association with *Hellula undalis*, a notorious pest known as the "Cabbage Webworm," which not only tunnels the centre and stem of this vegetable, but is destructive at times to turnips, radishes, stocks, &c.

The caterpillar of *Godara comalis* is greenish, dotted with black (see Figs. C, G, H on plate), and the upper surface of the body marked with three longitudinal pale-yellow stripes.

* About three years ago the insect was found at South Brisbane, feeding on buffalo grass on the crown of the leaves, by Mr. Tryon, Government Entomologist, Brisbane.

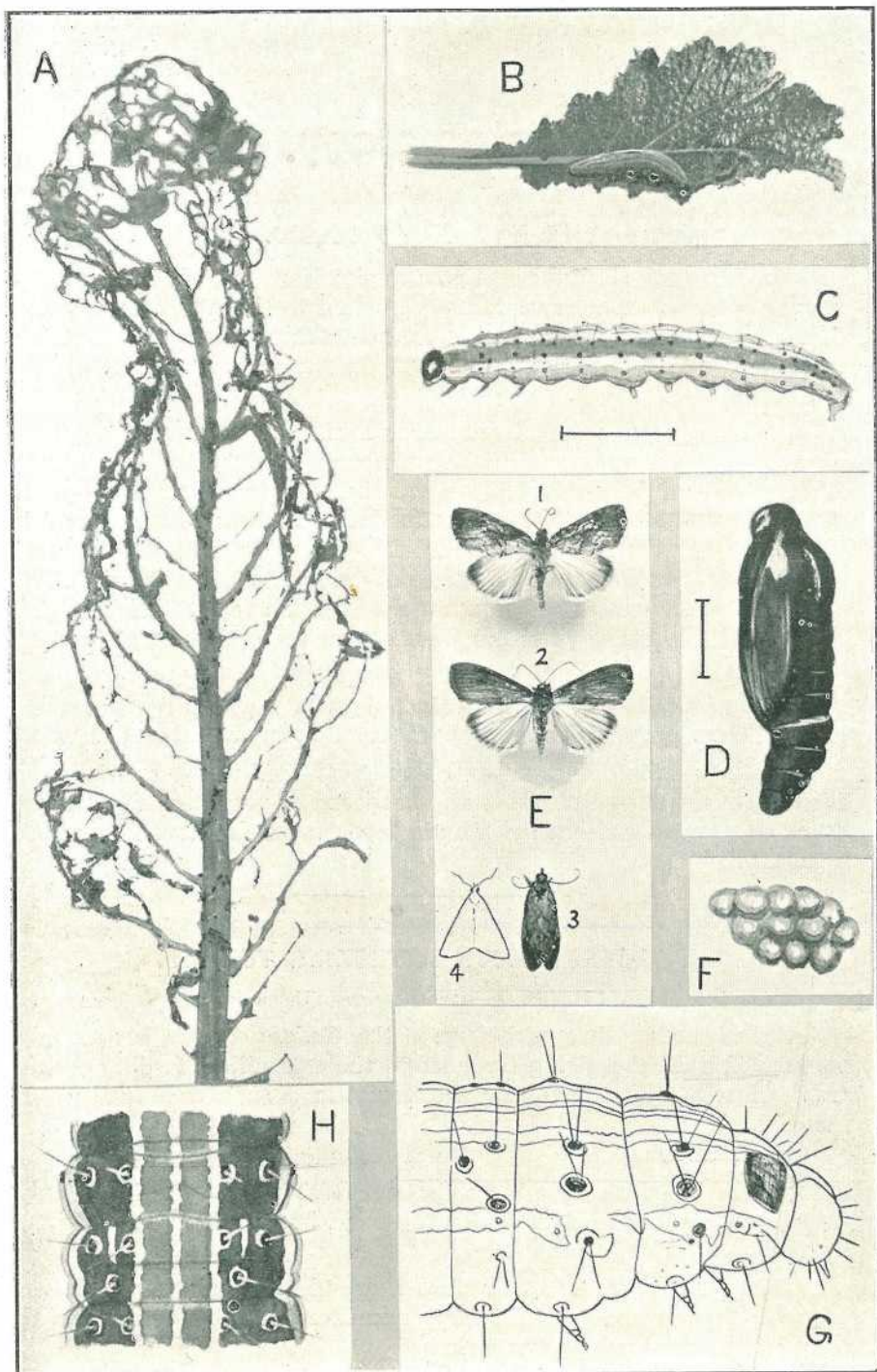


PLATE 62.

A—Turnip leaf, skeletonized. B—Young turnip leaf eaten on one side, and larva *in situ*. C—Caterpillar (magnified about four times). D—Pupa (four times natural size). E—Moth (*Codura conalis*), natural size. 1, male; 2, female; 3, resting position; 4, outline of resting position of *Helthula undalis* (natural size). F—Eggs (highly magnified). G—Thoracic and first abdominal segments (magnified ten times), showing position of spots, streaks, hairs, &c. H—Top view of third thoracic and first abdominal segments (magnified ten times).

It is pinkish-brown on the sides, yellow along spiracles, and light-green on ventral surface. The head is brownish-yellow, and the body tapers slightly towards each extremity.

The perfect insect, which is a little larger than that of the cabbage webworm, and of a different shape (see Fig. E), has yellowish forewings mottled with brown, whereas those of the latter moth are dark-grey, flatter when in repose, and carried in a position that causes the insect to assume the form of a somewhat acute triangle (see E—4).

It is not surprising that *Godara comalis* should attack a closely related plant like the turnip, but its occurrence on this vegetable appears worth recording, pointing as it does to the possibility of the pest becoming increasingly troublesome in the future.

REMEDIES.

With reference to control measures it must be remembered that prompt treatment at the commencement of the season is of the utmost importance, since destruction of the first brood of moths will materially decrease the injurious action of succeeding generations.

Arsenical sprays are of little use against larvæ well established among the heart leaves of big cabbages, but should be effective when applied to young plants, or to the foliage of turnips.

This pest has not, I believe, like *Hellula undalis*, been hitherto recorded as attacking cabbage seed-beds, but in the event of its acquiring the habit, Bordeaux mixture sprayed upon seedlings whilst in the bed, and when planted out, should act as a deterrent.

Adopt a system of clean culture which shall entail the destruction of all weeds, especially of cruciferous plants; and be careful to at once destroy any very badly injured cabbages, and never allow stumps with worthless leaves to remain in the ground after marketing the vegetables. Such refuse should be put in a heap and burnt without delay.

Cultivating between cabbages with "Planet Junior" teeth at a time when the most injurious brood of larvæ are in the pupal state would doubtless destroy many of them, and also improve the general condition of both the crop and soil.

TOMATOES FROM CUTTINGS.

It is not generally known that tomatoes will grow freely from cuttings. Make the cuttings rather long. Lay them horizontally in the ground at a depth of 2 or 3 in., leaving the head above ground. Water judiciously, and roots will spring from every joint. This plan gives the plant a good hold in the ground, and a quick start.

General Notes.

THE FIRST ARTESIAN BORE IN AUSTRALIA.

The March and April issues of "The Pastoral Review" contain two very interesting articles on the early days of boring for artesian water. "The True Story of the Beginning" is graphically described by the Hon. Simon Fraser in the March number of the above journal. He mentions that in 1882 four boring machines were obtained by the Queensland Government, and at Winton, in Central Queensland, water was obtained by boring at a depth of 336 feet, but it had to be raised by pumping, and was by no means adequate for the purpose of supplying the needs of the township, and in 1884 Winton was only saved from a water-famine by trains of tanks mounted on wagons hauled by traction engines. Yet all this time there lay beneath the drought-stricken district a vast body of clear fresh water under a sufficient pressure to make it gush forth from the subterranean depths as soon as an outlet should be provided. The discovery of the supply was left to private enterprise. Mr. Fraser then goes on to describe the circumstances which led to his engaging a Canadian wellborer (Longhead), who introduced the "Canadian Pole Tool" plant, and who commenced boring in December, 1886, in the Colton Bush Paddock, 30 miles from Cunnamulla. In six weeks he had reached a depth of 1,000 feet, and had not gone much further when the water rose in the bore and overflowed from the tubing at the surface. This event, Mr. Fraser says, happened in February, 1887, and was the beginning of the artesian water supply of Australia.

Following on this is a letter from Mr. John Bignell in the April issue of the "Review," who claims to be the first to search for artesian water in Queensland, "or at least in the Warrego district." After consulting with Mr. Russell, of the Meteorological Department of New South Wales, his firm (E. and J. Bignell) decided to try their luck, and imported a diamond drill from America, with all the necessary tools and rods for borings up to 1,000 feet. The Queensland Government carried part of the plant free of cost to Roma. There the plant was hauled 300 miles by teams to Widgeeogara. This was in 1883. As soon as boring operations were started all went well for five weeks, when a good supply of sub-artesian water was struck at 380 feet from the surface. Then, however, heavy drift-sand put an end to the boring. A second bore was then put down, and at 365 feet a good supply of stock water was obtained, but, after boring some few feet further, the heavy drift-sand held the bit and rods, with the result that the bit studded with diamonds and the core barrel were left in the hole, and were never recovered. These two bores watered 40,000 sheep through the drought of 1885, and were the salvation of the sheep on the holding.

According to Mr. H. S. Officer, when referring to Mr. Fraser's article in the "Review," the first artesian flow was obtained, and the first flowing well bored, on Kallara station, near Bourke, New South Wales, in 1879, the work being carried out by the Messrs. Officer's then manager, Mr. David Brown, to whom the credit must be given. This is confirmed on reference to the "Official Year Book of New South Wales."

POTATO PENETRATED BY NUT-GRASS.

The accompanying illustration serves to show how clean land-where nut-grass has never appeared may yet be affected in the remarkable manner here depicted. The root of a nut-grass plant has perforated the potato, and a nut has developed in the centre. This potato was part of a consignment from Beenleigh, purchased in the Brisbane market by Mr.

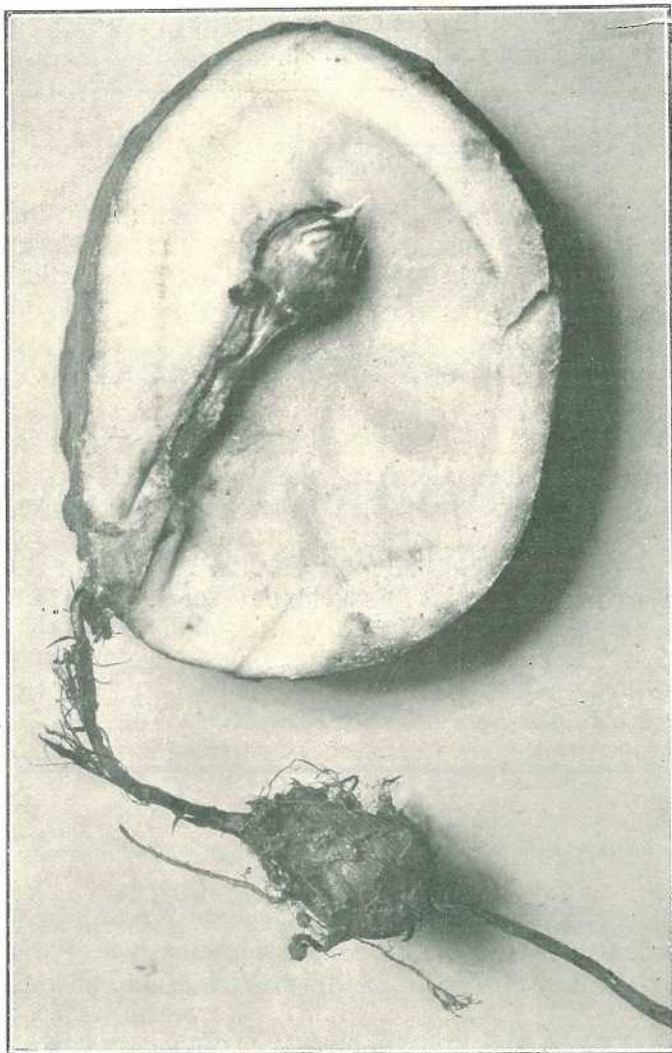


PLATE 63.—NUT GRASS NUT GROWING IN A POTATO.

T. Dunn, of Moorooka, to whom we are indebted for the photograph. If this were a seed potato, and the bulk of the consignment had been purchased for planting, not only one but possibly dozens might prove so affected, and thus the pest would be quickly propagated. In a season when potatoes are not cut, but planted whole, the evil would not be discovered until the mischief was done.

Answers to Correspondents.

EARTH REMOVED FROM AN EXCAVATION.

“SELECTOR,” Kingaroy—

According to your diagram and measurements, the amount of earth excavated is 955 cubic yards. This is approximately, but possibly not absolutely, correct, as another cross section should have been given.

HARNES OIL.

“SUBSCRIBER,” Wondai—

The best buggy harness oil is said to be “Black Satin” oil, which is used by the livery stables and can be procured from Messrs. Butler Bros. and other wholesale houses in Brisbane. Kindly see notice to correspondents on page viii.

SEASONABLE SOWINGS FOR WINTER CROPS.

“NEW CHUM,” Noosa—

It is far too late to sow cucumbers, melons, pumpkins, marrows, &c. You may sow seed of the Globe Artichokes. Eschalots may be grown throughout the year. There is still time for lettuce and endive, also for Kohl-rabi; carrots and radishes may be sown at intervals throughout the year. Broad beans will do if sown between March and September. Where frosts prevail, French beans can be sown only from the end of August to about April. Peas may be sown from January to September. April and May are too late for sowing cauliflower, but cabbage in some districts will do well if sown from February up to August or September. You should obtain a good “Gardener’s Calendar,” meanwhile we send the Department’s pamphlet on “Market Gardening in Queensland.”

THE VALUE OF THE RUPEE.

“TRAVELLER,” Townsville—

The Indian rupee is worth 1s. 4d. According to the Report of a Royal Commission on Indian Finance and Currency, which has just been published, the sterling value of the rupee is prevented from rising above 1s. 4d. by more than the cost of remitting sovereigns to India. That is to say, no one will pay for a sovereign in India more than 15 rupees (its equivalent at 1s. 4d. to the rupee), because he can get rupees at that rate from the Government for any amount of sovereigns. The exchange value of the rupee has been steady at about 1s. 4d., because if anyone demands more than this rate the Secretary of State (including the Government of India) puts him out of the market by offering at that rate of exchange either way. This is fully explained in the March issue of the “Wealth of India.” Your sovereign will be exchanged for 15 rupees in India, and no more. A rupee is not pure silver. It weighs 180 grains, of which 165 grains are pure silver and the rest alloy.

SPICED BEEF.

E. E. WARD, Inglewood—

Spiced beef is one of the fine arts. The beef should first be kept in pickle for about two days, and should then be wiped quite dry before adding the spice. Then, mix together some allspice, coarse brown sugar, and a very little cinnamon, and rub this well into the beef on all sides. Place on a big dish, and keep it in a cool place, turning it every day and rubbing in more spice. Should the surface become at all dry, a little more pickle must be added, and the dish on which it then stands should be cleaned every three days. Continue this process for a fortnight, then wash in clean cold water, and place in a jar or tin only just large enough to contain it, with a very little cold water. Then place in a boiler, and boil fast for ten hours, if for a joint of 10 lb.—less time for smaller joints. Allow it to cool in the jar, and on taking it out, scrape off the outside, which will probably be black. The joint is then ready for consumption.

BANANA CULTIVATION.

W. G. STUART RUSSELL, Eumundi—

In reply to your questions on banana cultivation, &c.:—

1. *The standard fertiliser* approved by Mr. Brünnich in his Sixth Progress Report on Manuring Experiments at Buderim Mountain (June, 1913), KPN, is for rich soils—3 cwt. of potassium sulphate, 2½ cwt. of dried blood or nitrate of lime, and 4 cwt. of superphosphate per acre. To be applied twice a year. The fertilisers cost about £12 10s. annually, the cost per stool being 10d. With this manure, the average yield of bananas at Buderim has been 345 bunches (3,035 doz. bananas), value, at 3d. per doz., £38 per acre. Double the amount of the fertiliser on poorer soils resulted in 457 bunches (4,330 doz. bananas), value £54 per acre, and future yields were expected to be much higher. The quantity of fertiliser for each stool would be about 3½ lb. at each manuring. Apply in Spring and Autumn.

The ground is scuffled between the rows and the manure applied, and the soil is then well mulched.

2. *Cutting Surface Roots.*—Opinions on this point differ very largely, some planters in the W. Indies, Fiji, &c., maintaining that it is injurious, others that the cut roots send out numbers of rootlets which enable the plants to obtain more plant food, as is stated in my pamphlet on the banana.

3. *Concerning Stripping Dead Leaves.*—The latest authority (Fawcett on the Banana) does not recommend pruning off the dead leaves. If these are cut away, the sheathing leaf stalks which form the outside of the trunk dry up, and do not perform their office. But if plants are closely clustered together there is too much shade, hence the stems get weak, lengthen out, and become brittle. In such a case the dead leaves are better removed.

4. *The Fruit-fly*.—A useful spray for the fruit-fly is composed of sugar, 3 lb.; arsenate of lead, 4 lb.; water, 5 gallons. Apply with an ordinary spray pump. As you say that the arsenate discolours the fruit, the next best way is to enclose the bunch of fruit in cottonette, as used to be done in North Queensland.

For Root Disease.—There is no remedy except to avoid planting on land where the disease has occurred, and on no account to plant suckers from such land.

Fruit Rust (Discolour).—Dust with flowers of sulphur.

Nematodes.—There is no cure but rooting out the plants.

Banana aphid does not do much damage. A dusting of tobacco dust will settle this trouble.

You are quite right about the application of potash, which is essential to the well-being of the plant.

MANURE FOR A SMALL MARKET GARDEN CROP.

Market gardeners on a large scale apply stable manure in various quantities, ranging from 25 tons to 100 tons per acre, but more than 50 tons is regarded by some as wasteful or at least not economical; 25 tons is a medium application in market gardening. In the most intensive garden operations manure is often spread to a depth of 3 in. For a small garden with beds covering only about 25 square yards, an application of stable manure at the rate of 5 lb. per square yard is sufficient, especially if supplemented by artificial. Coarse manures should be ploughed or dug under, while those of fine texture will be most beneficial when used as a top dressing, especially on heavy soils. This surface application has a marked effect in improving physical conditions, in making soils warmer, more friable, and less liable to baking and wasting.

In soils of rather poor fertility it is a good plan to use stable manure in drills, but this is not customary when the soil is of high fertility. But it is without doubt an advantage in the thinner soils, because it secures greater concentration of plant-food in the immediate region of the roots, and results in a more economical use of the manure applied.

FRESH MANURE *VERSUS* ROTTEN MANURE.

On this subject there is much to be said, and usually farmers and market gardeners in all countries pin their faith, except under peculiar circumstances, on well-rotted manure. Now, this is what Mr. Ralph L. Watts, Professor of Horticulture in the Pennsylvania State College, writes in his valuable work on "Vegetable Gardening":—

"In general farming, the best practice is to apply manure to the land as soon as possible after it is produced. This may also be the best policy in certain lines of vegetable farming; as, for example, grass land to be planted in early cabbage and early sweet corn might well receive

dressings of fresh manure after hay harvest of the previous season. In field trucking—*i.e.*, market gardening on a large scale—a very general and commendable practice is to apply fresh manure at any time, provided all conditions are favourable to such applications. The probabilities are that yields will be better than if an attempt is made to store the manures and apply them when well decomposed. It is a well-known fact, however, among market gardeners that fresh stable manures are not suitable for intensive operations in market gardening, because they are not quick enough in their action, and their coarse textures prevent thorough incorporation with the soil particles. Again, fresh manures are likely to cause a rank growth of certain crops, such as tomato, egg-plant, peppers, melon, and cucumber at the sacrifice of the fruit. With root crops such as radish, turnip, beet, carrot, parsnip, and salsify, fresh manures not only cause excessive top growth, but also prevent the proper root development. It is, therefore, generally conceded that rotten manure is indispensable in all intensive lines of vegetable gardening."

Now, about composting. The same authority says: "On almost every place devoted to market gardening there is a compost pile. Although it is called the compost pile, it seldom contains much material in addition to horse manure. . . . Composting destroys troublesome weed seeds. Valuable data upon this subject have been published by the Maryland (U.S.A.) Station. The results obtained show that (1) When manure is allowed to ferment in piles for six months, no danger of distributing weeds is incurred; (2) when manure is allowed to remain in piles, undergoing partial fermentation, little danger of distribution is incurred.

THE COMPOST PILE.

Although composting is essential, it should be avoided as much as possible, for decomposition cannot be controlled without some loss of plant food. It also requires a large additional expenditure of labour in the extra handling.

In the management of compost heaps, the gardener should see that leaching and fire-fanging are controlled, and that the finest texture is secured. To accomplish these ends, it is customary to stack in rather compact, flat piles not less than 4 ft. deep, and covering as much area as may be necessary. The piles are so deep that there can be no leaching if they are built with perpendicular sides. They must be watered with a hose often, and freely enough to prevent fire-fanging. To improve the texture, the piles are turned from one to three times at convenient intervals. About six months are required to secure the proper decomposition.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY, 1914.

Article.		MAY.	
		Prices.	
Bacon	...	lb.	6½d. to 9½d.
Bran	...	ton	£5 5s.
Butter	...	cwt.	102s.
Chaff, Mixed	...	ton	£5 10s. to £6
Chaff, Oaten (Victorian)	...	"	£5 10s. to £5 15s.
Chaff, Lucerne	...	"	£5 5s. to £5 12s. 6d.
Chaff, Wheaten	...	"	£4 10s.
Cheese	...	lb.	7½d. to 7¾d.
Flour	...	ton	£9
Hams	...	lb.	1s. 2d.
Hay, Oaten (Victorian)	...	ton	£6 to £6 10s.
Hay, Lucerne (Prime)	...	"	£3 10s. to £4 15s.
Honey	...	lb.	2½d.
Maize	...	bush.	3s. 11d.
Oats	...	"	3s. 6d. to 3s. 8d.
Onions	...	ton	£8 to £8 10s.
Pollard	...	"	£5 15s.
Potatoes	...	"	£8 to £9
Potatoes (Sweet)	...	cwt.	1s. to 1s. 6d.
Pumpkins	...	ton	£1 10s. to £2 5s.
Wheat, Milling	...	bush.	3s. 9d.
Eggs	...	doz.	1s. 2d. to 1s. 9d.
Fowls	...	pair	2s. 9d. to 4s. 6d.
Geese	...	"	5s. 6d.
Ducks, English	...	"	2s. 6d. to 3s.
Ducks, Muscovy	...	"	3s. 6d. to 4s. 3d.
Turkeys (Hens)	...	"	7s.
Turkeys (Gobblers)	...	"	11s. to 14s.

SOUTHERN FRUIT MARKETS.

Article.		MAY.	
		Prices.	
Bananas (Fiji), G.M., per case	...	17s. to 17s. 6d.	
Bananas (Fiji), G.M., per bunch	...	3s. to 9s.	
Bananas (Queensland), per case	...	8s. to 12s.	
Lemons, per gin case	...	15s. to 17s.	
Mandarins, per case	...	9s. to 10s.	
Oranges (Queensland)	...	5s. to 9s.	
Papaw Apples, per double case	...	10s.	
Passion Fruit, per quarter-case	...	9s.	
Pineapples (Queensland), (common), per case	...	10s. to 12s.	
Pineapples (Queensland), (Ripleys), per case	...	12s. to 13s.	
Pineapples (Queensland), (Queens), per case	...	12s. to 14s.	
Pineapples (Rough), (Queensland), per case	...	10s. to 1 s.	
Tomatoes, per quarter-case	...	2s. 6d. to 5s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	MAY	
	Prices.	
Apples, Eating (American), per case	...	9s. to 13s. 6d.
Apples, Eating (Local), per case	...	5s. to 7s. 6d.
Apples (Cooking), per case	...	3s. to 7s. 6d.
Bananas (Cavendish), per dozen	...	2½d. to 4d.
Bananas (Sugar), per dozen	...	2½d. to 3d.
Cape Gooseberries, per quarter-case	...	8s.
Cocoanuts, per sack	...	12s. to 14s.
Custard Apples, per quarter-case	...	4s. to 5s. 6d.
Lemons (Local), per quarter-case	...	5s. to 7s.
Mandarins, per quarter-case	...	4s. 6d. to 5s. 6d.
Oranges, per case	...	3s. 3d. to 6s.
Papaw Apples, per quarter-case	...	2s. to 4s.
Passion Fruit, per quarter-case	...	5s. to 7s.
Peanuts, per pound	...	3d. to 3½d.
Pears, per half-bushel case	...	5s. 6d. to 6s.
Pineapples (Ripley), per dozen	...	6s. to 8s.
Pineapples (Rough), per dozen	...	6s. to 7s. 6d.
Pineapples (Smooth), per dozen	...	4s. 6d. to 9s.
Rosellas, per sugar bag	...	1s. 6d. to 2s. 6d.
Strawberries, per tray	...	1s. 6d. to 1s. 9d.
Tomatoes, per quarter-case	...	1s. to 3s.

TOP PRICES, ENOGGERA YARDS, APRIL, 1914.

Animal.	APRIL.	
	Prices.	
Bullocks	...	£9 15s. to £12 2s. 6d.
Cows	...	£7 17s. 6d. to 9 12s. 6d.
Merino Wethers	...	27s. 6d.
Crossbred Wethers	...	25s. 9d.
Merino Ewes	...	20s. 6d.
Crossbred Ewes	...	21s. 9d.
Lambs	...	20s. 6d.
Pigs (Baconers)	...	61s.
Pigs (Porkers)	...	59s.

PRICES FOR COTTON AT LIVERPOOL.

Current prices for cotton up to 14th April, 1914, are given as follows in the "Weekly Circular" of the Liverpool Cotton Association:—Sea Island, 12½d.—12¾d. per lb.; Egyptian Brown, 8-40d.—10-70d. per lb.; Egyptian Abassi, 9-85d.—11-55d. per lb.; Indian, 4⁷/₁₆d.—6½d. per lb.

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 checked 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 drilled, or 15 to 16 lb. broadcast, 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. Sow Guada Beans (Snake Gourd) at the end of September.

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 tricolor, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberöses, 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 sulphide 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 trunks 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 the 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.