THE

QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

NEW SERIES.

VOLUME I.

JANUARY TO JUNE, 1914.

BY AUTHORITY:
ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1914.

QUEENSLAND AGRICULTURAL JOURNAL.

VOL. I. PARTS 1 TO 6.

GENERAL INDEX.

D.

E.

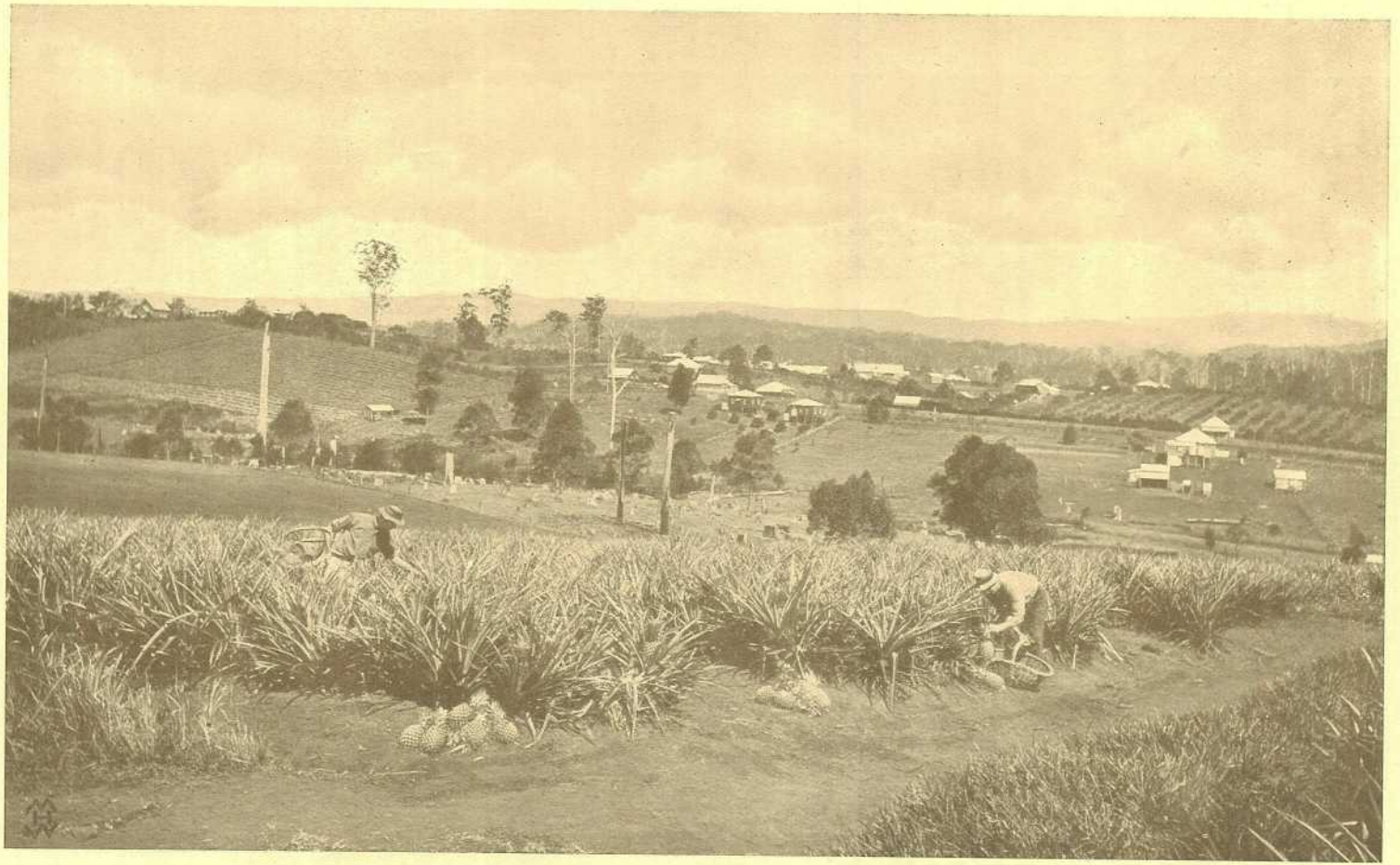
F.

G.

INDEX TO ILLUSTRATIONS.

DEPARTMENT OF AGRICULTURE AND STOCK, BRISBANE.

"Cutting Out for Christmas."



WOOMBYE, A RURAL TOWNSHIP ON THE NORTH COAST LINE.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. I. JANUARY, 1914. PART 1.

THE YEAR 1913.

As we enter upon the New Year 1914, it will be encouraging to look back and reflect upon the results achieved both in the Pastoral and Agricultural interests and in business circles generally, especially in our Interstate and Overseas Trade. In whatever direction we look, we find ample evidence of increased prosperity. Pastoral products—such as wool, sheep, cattle, &c.—have been in abundance, and prices realised all round have been highly satisfactory. The same may be said of the dairying industry, which has progressed all over the State in what may be described as an almost phenomenal manner. The sugar season just brought to a close has also proved highly successful—so much so that at least three new mills of the latest class, capable of turning out over 100 tons of sugar a day, are in course of erection. The wheat industry on the Darling Downs has shared in the general prosperity; and, although the area under this crop (132,345 acres) was not equal to the area sown in 1904, yet the probabilities are, when full statistics are available, that the yield will be over 2,000,000 bushels. Throughout the year there have been no industrial troubles. There has been no cessation in the labour required in our various industries; employers and employees have worked harmoniously together, with great benefit to the community at large. The seasons have, on the whole, been propitious, although fears were, on two occasions, entertained that we were on the eve of a drought. Happily the first genial rains fell at a critical time, with the result that crops were saved, the sugar, wheat, and other harvests were got in without loss. The abnormal heat and absence of rain in November and part of December gave rise to serious forebodings. Parts of the country were swept by bush fires, and hundreds of miles of grass was destroyed. No rain fell for some weeks. Fortunately, in the early days of December,

the short drought broke, and copious rains fell in almost all parts of the State in time to be of service to farmers, graziers, and sugar planters. Generally speaking, the year's operations give reason for thankfulness on the part of the whole community. And this reminds us that, in the United States and in Canada, a day is set apart after the crops have been secured—about the month of October, we believe—called appropriately "Thanksgiving Day."

Last October the "Nor'-West Farmer," Canada, had the following article on

THANKSGIVING,

which will find an echo amongst the people of Queensland:—

"In setting aside a special day, officially denominated as a time for thanksgiving to God for the bounty of the year, the rulers of our country not only offer a good example in their recognition of the Source of all good things; but they also exercise a wise leadership which we as a people can well afford to follow.

"We live in an age of wonderful human achievement. Day by day tells the story of the triumph of man over the obstacles that have always beset his pathway. New inventions, new methods, new discoveries, new truths—we meet them at every turn. Human progress is leading onward at a good stride.

"But let us not become presumptuous. Let us not forget that behind all the bustle of human activity there is a great Unseen Hand, a kind Providence, that operates the gigantic forces of the universe; and that even the best of man's endeavours would be totally unavailing in the absence of the beneficence of sunshine and shower with which He so graciously blesses the world.

"It is a great truth—a truth which Canada nationally as well as Canadians individually should never forget—that God's share in the partnership of raising the harvests, and of carrying forward all our other enterprises, is always absolutely essential to their success. It is to direct men's minds particularly to this thought that Thanksgiving Day is set aside.

"There is very much for which Canadians ought to give thanks this year. The bounteous harvest, gathered in such excellent condition, naturally suggests itself as the first great blessing. Then there has been the almost total preservation from great disasters of all kinds, whether by fire, flood, frost, or disease. Our diplomatic relations have been favourable throughout the year, and no threatening war cloud shrouds our political horizon. Our trade with other lands has gone on expanding —we have received from them an even increasing supply of the good things that we need, and we have found them, in return, good customers

for what we have to sell, And, more and better than all these, this has been a year in which Canada has increased the number and, let us also hope, the quality of its homes.

"Let us interpret the thanksgiving proclamation of 1913 not as an indicator simply of a day, but rather as having reference to an attitude—an attitude of heart and mind which will be marked by the ever blessed grace of thankful recognition of blessings received."

"QUEENSLAND AGRICULTURAL JOURNAL."

NEW SERIES.

WITH this number of the Journal we commence a New Series of issue, dating practically from the 1st July, 1913, on which date the Journal completed its sixteenth year of publication. That the Departmental Journal has met with the approval and favourable appreciation of those in whose interests it was first initiated by the then Minister for Agriculture (the Hon. A. J. Thynne) is evidenced by the large increase in the circulation and in the number of subscribers since its first appearance in July, 1897. Since that time the Journal has been received with such favour that to-day some 60,000 copies a year are mailed to subscribers throughout the States of the Commonwealth, New Zealand, and in many other parts of the world.

For many years the Department refused to make the Journal a general advertising medium, it only being intended as a vehicle for information and instruction on pastoral, agricultural, dairying, horse-breeding, and other industries engaged in by country settlers. Since, however, its sphere of influence has so greatly widened, it has been found necessary to modify this determination to the extent of accepting advertisements having reference solely to productions of the land or to manufactured articles needed by rural occupiers, thus not interfering in any way with the general run of advertisements in the public Press.

The Annual Subscription to the Journal payable by *bonâ fide* farmers, and by those who gain their livelihood solely by rural pursuits, was fixed at One Shilling per annum, to cover cost of postage. As will be seen by the published scale of subscription, it varies—for schools of arts, and for persons not engaged on the land or who are resident in other States of the Commonwealth or in other countries—from Five Shillings to Ten Shillings per annum.

Complete Sets of Thirty Volumes, to July, 1913, may be obtained from the Department, bound, for £25, or in separate numbers for £10; single numbers of late issues, Six Pence per copy; and any available issues of early years, One Shilling per copy.

Agriculture.

ONION-GROWING.

The great possibilities of onion-growing in this State are not properly realised by farmers or market gardeners, as would appear from the fact that Queensland imports large quantities of onions from Japan. At this moment of writing a consignment of 1,200 bags has arrived from Japan, and has been selling at £10 per ton, whilst Queensland onions are being sold at the same time at £8 10s. There is no reason—whether on the score of cost of labour, climate, or soil—why the most favoured parts of Queensland should not make more of the onion industry. So far back as 1864, farmers at Oxley Creek imported seed from Portugal, and grew enormous crops of onions, which were easily sold at prices up to from £50 to £100 per ton. Grown in the field, the yield was from 6 to 10 tons per acre, according to soil and care in cultivation. These onions averaged 8 oz. in weight for the largest, and the most favoured sorts went about four to 1 lb.

The crop has the valuable advantage of being one of the few possible to the market gardener that need not be marketed at the moment of attaining maturity. A good crop of onions well harvested will provide something to go to market with all through the winter and well into spring and summer. Onions, to be successful, must be grown on clean land. The most suitable soil is a rich, sandy loam, free, friable, and easy to work—a soil that will not cake, and not lying so low as to retain the superabundant moisture after heavy rains. In such case the land should be well drained. Ideal lands for onion-growing, in the writer's experience, are the high scrub lands near Forest Hill, Laidley, and Gatton, where the soil answers to the above description. An eastern or south-eastern aspect has been proved to be better than if the land sloped to the west, as the onion does not require intense heat to bring it to perfection.

It has been stated above that the land should be clean and clear of weeds and of their fallen seeds. This applies equally, of course, to the seed beds. Hence, by sowing in April or May, there is little trouble from this source. Still, it is advisable that the land, both of the seed bed and of the area proposed to be planted out, should be turned up and exposed to the weather for some time previous to sowing—say, in February. Then between that month and April, if the land be scuffled two or three times, there will be not much future trouble from weeds.

As soon as the land is dry enough after the February rains to be properly worked, and when that work is completed, sowing begins. Getting the land into proper order means—if the land is not virgin soil, or if it has borne crops for many years in succession without manuring—

that it should be reduced to a fine tilth, and thoroughly well manured with stable dung, ashes, bonedust, soot, sulphate of iron, and sulphate of potash. A good manure for onions is a light dressing of dung, supplemented by 4 to 6 cwt. of superphosphate, 1 cwt. of sulphate of potash (or 4 cwt. of kainit), and 4 cwt. of ntrate of soda. Potash is of vital importance to onions, and should on no account be neglected. It is valuable in improving the keeping quality, and sulphate of iron is a preventive of onion mildew.

Getting the land in good order includes well rolling it, for an indispensable cultural condition for onions is to get the soil well firmed underneath without " panning " it. This condition is often lost sight of. If the soil is carefully worked, reduced to a fine tilth, and the plants are set out in a soil which is loosened to a depth of, perhaps, 8 in., no good results can be expected without rolling. The onion requires a firm bed; otherwise the plant, instead of making a large, well-shaped bulb, will run to " neck," and have more the appearance of a leek than an onion.

The best way to sow onions is to drill them in, although for small areas the seed may be sown in a seed bed, and the young seedlings be planted out. The drills should be from 8 in. to 15 in. apart, which will require from 2 lb. to 10 lb. of seed per acre. The seeds should be dropped at a distance of 2 to 3 in. apart in the drills, and the plants will afterwards be required to be thinned out with the hoe to 6 in. apart in rich land. The drills should be slightly raised, and the *roots* of the plants be firmly embedded in them. The *bulb* is not the root, and it should be allowed, so to speak, to squat *on* the surface, not *under* it.

As the plant grows, the soil must be kept perfectly clear of weeds; and where the working of the ground has thrown the soil against the bulbs, it must be drawn down so that only the root is in the ground. Where this has not been attended to, the remedy for the resulting want of bulb-formation is to wring the necks of the plants, or, at least, to bend them down with a twist. This will have the effect of inducing the formation of bulbs.

When sowing the seed, it need only be put just under the ground, as it requires but a very slight covering of soil. If sown deep, many seeds fail to germinate, and most of those that do appear will make an abnormal growth of neck, causing much labour in drawing away the soil from the incipient bulbs. There are few seeds so annoyingly deceptive as onion seed, as old seed will lose its germinating power, and imported seeds, unless carefully packed in airtight bottles or soldered tins, will scarcely germinate at all. Therefore, it is well to make sure of getting new seed. After sowing, germination should take place in about a week, and the onion comes to maturity in from 120 to 180 days (spring onions in from 60 to 90 days). They may be known to be ripe by the drying up of the tops. As soon as this happens, pulling should be done quickly, because, if wet should come on, the bulbs may start a fresh root action. This, besides making them harder to pull, will seriously impair their quality. After they are pulled, the onions are left in narrow

" windrows " to get well dried and ripened, and may then be removed to a dry barn, subject to a free current of air. Should they show any signs of heating, they must be at once turned over, and the bad ones picked out during the process.

The best varieties for our Queensland climate are—Mammoth Silver King, Brown Spanish, Brown Globe, Yellow Globe, and Silverskin.

For spring onions, sow White Tripoli in drills about 9 or 10 in. apart. Besides a little hoeing in summer, they require no attention.

In the old country very heavy crops of onions are harvested. There the average market-garden crop is from 12 to 15 tons per acre. An average onion as sold in the London markets weighs about 8 oz., and has a circumference of 10 in. in the widest part. Many are larger and heavier (up to from 1 to 3 lb.); others are so small as to run to three dozen to the lb.

The great possibilities of onion-growing may perhaps be realised from the following figures given in " Commercial Gardening "—Vegetable-growing for Market:—

" Assuming the rows to be 1 ft. apart, and the plants, after thinning out, to be 3 in. apart, as a fair distance for market-garden culture, there would be 174,240 to an acre. At an average weight of 8 oz. each, the yield per acre would be nearly 39 tons. At £4 per ton, this would represent £156 per acre for the matured crop, without counting the thinnings—all saleable for salads. If the plants are thinned out to 6 in. instead of 3 in. apart, there would be 87,120 bulbs to an acre. These would yield 19 tons on the 8-oz. basis, and £76 per acre at £4 per ton."

Think what such crops would represent if sold at the usual Queensland prices of £8 to £10 per ton!

From experiments carried out on the " Times " Experimental Farm in 1910, the following results were obtained from a square chain of land (1/10 of an acre) from seed sown in boxes in February, and transplanted 12 in. by 3 in. in April (174,240 bulbs to the acre):—The varieties of onion were: " Ironhead," 2,640 lb. (= 11.7 tons per acre); " Cream Globe," 2,878 lb. (= 12.8 tons per acre); " Wroxton," 3,960 lb. (= 17.6 tons per acre); "Ailsa Craig," 4,950 lb. (= 22.1 tons per acre).

The onion has few enemies in this State. Sometimes the crop suffers severely from the ravages of a green grub which is numerous in some soils, especially badly tilled ground. These come forth at night, and cut the young plants off level with the surface. Hence land intended for onions should be previously carefully examined for these pests, and, if possible, receive a dressing of soot, which is not only obnoxious to the grubs but is a valuable manure for onions. One of the best preventives is to use the hoe frequently, this being beneficial from a cultural point of view; while the green grubs, wire worms, &c., are brought to the surface in view of birds, which soon destroy them. Spraying with kerosene emulsion may also be tried, but the hoeing is the most effective plan.

KEEPING ONIONS.

Onion-growers usually find that if, owing to a slow market, onions have to be held over for any length of time, the chief difficulty is their liability to sprout. This must, if possible, be avoided, because, whenever growth is set up in any bulb or seed, that seed deteriorates in proportion to the extent of growth. Anyone who has tried to eat an old seed potato, which has been inadvertently gathered up with a new crop, will be aware of this fact. Onions, when pulled, should not be stored away at once, but should be left on the ground for a few hours to dry. Then they should be put away dry, in the coolest shed or barn available. They require constant looking over to sort out any bad ones, for, as in the case of fruit, such as oranges, apples, pears, &c., a single rotting onion will infect all those in its immediate neighbourhood. It used to be the custom, and probably is to this day the custom in the good, old-fashioned farm-houses in the old country, to hang the onions in strings to the kitchen rafters in company with hams, flitches of bacon, &c. This hanging in strings is a good plan where it is only a question of keeping a few for home consumption, but, in the case of many tons, the labour entailed would not be recompensed by the profit.

In an article on this subject in a French journal, mention is made of an observation of great importance which deserves the attention of farmers and market gardeners. After some experiments made on ten plots manured with chemical fertilisers, the resulting crops of onions were put away in bags and carefully numbered with a view to planting them out in the following spring to obtain seed from them. When the time for planting had arrived, it was found, to the astonishment of all concerned, that, under identical conditions of temperature and light, certain lots had sprouted, and were exhausted by young, premature shoots, whilst the other lots still remained hard and solid, without a trace of a shoot. The collections having been carefully ticketed, it was easy to prove that the produce from plots deprived of sulphate of potash were exhausted by a too-hurried vegetation, whilst that which had received the potash manure was perfectly preserved. Such experiments are well worth repeating, and it would be to the advantage of the agricultural world if those few advanced farmers who make such trials of fertilisers would publish the results of their experience.

In August or September onions in the Southern part of the State should be ready for market; therefore any advice as to the keeping of the crop, if found necessary, should be acceptable to growers. One hundredweight of sulphate of potash per acre will have the effect above described.

THE SOYA BEAN.

Much has been written in the Australian Press during late years of the Soya bean as a profitable crop for farmers, and experiments have been made with it at the State Nursery at Kamerunga, but nothing has resulted from the experiments beyond proving that the soils and climate of some parts of Queensland are well adapted for the cultivation of this crop.

A communication has lately been received by the Department of Agriculture and Stock from Messrs. Thompson and Co., Dalny, South Manchuria, giving interesting information concerning the commercial possibilities and actualities of the bean, and suggesting that the Department experiment with the seed at the State Farms and in Western districts like the Maranoa, where the rainfall is comparatively small and uncertain, offering at the same time to supply the necessary seed, and, if the experiments proved successful, the firm would consider the taking up of a large tract of land in Queensland and growing the bean in quantity, as there would be no difficulty in disposing of the product. The present price of the beans in Europe is £9 per ton.

Messrs. Thompson and Co. furthermore enclosed an extract from the report (for 1912) of the Trades Commissioner for the Government of the Union of South Africa on the subject, which we summarise as follows, premising that the bean is a native of South-eastern Asia, which requires about the same temperature as maize, that it endures drought well, and is not easily injured by excess of moisture. Like other leguminous crops, it accumulates nitrogen in the nodules on its roots, and thus enriches the soil for the next crop:—

Although it has been grown and used as an article of diet in China and Japan even before the time of Confucius, its cultivation seems to have spread very slowly to the surrounding countries. Up to the year 1907, the export of Soya beans from Manchuria did not exceed 120,000 tons, of which the bulk was absorbed by Japan, and as a commercial oil seed it was first introduced to the notice of the British and Continental manufacturer towards the end of 1908, when large quantities were exported to the oil mills of the United Kingdom. Those oil mills crush annually upwards of 1,000,000 tons of oil seed, of which about 600,000 tons are cotton seed, 350,000 tons Soya beans, and the balance linseed. It is estimated that Great Britain and the Continent of Europe can take 10,000,000 tons of Soya beans per annum, and the annual crop in Manchuria is estimated at only 1,600,000 tons. In that country the yield per acre is from 1,100 to 1,600 lb. The average height of the plant is from 2 to 3 ft., with from 42 to 105 pods per plant, each pod bearing from two to three seeds. The flowers are self-pollinated. Under favourable circumstances the seeds will germinate and appear above ground in six days after being sown, and attain a height of from 2 ft. to 4 ft. in six to ten weeks, and the crop may be secured in from five to six months.

At the Government Experimental Farm in South Africa, where 80 varieties were tested (there are over 300 varieties of the bean), yields up to 2,000 lb. per acre were obtained. If grown for forage, as much as 12 to 13 tons of fresh fodder per acre may be produced, which may be used for hay or for silage purposes.

Growing Soya beans for grain is distinctly profitable, owing to the large demand in Europe. But the question to our mind is, whether, under our labour conditions, it would pay as well as it does in cheap-labour countries. A 1,000-lb. crop, at the highest price for the beans, would sell for £4 10s. in Europe, and, deducting labour for production,

freights, commission, &c., there would appear to be little in it to attract the attention of farmers, who can make far more out of dairying, sugar-planting, potato, onion, and maize growing. As a catch-crop amongst coconut and rubber trees, the Soya bean would doubtless prove of great value.

As far as the feeding value of the bean is concerned, it is said to be at least twice as valuable for food as maize, as it is very rich in protein, but it is best fed in conjunction with maize. As a green manure, it is undoubtedly valuable in restoring the soil, being a leguminous plant.

The expenses per ton for bags, railage, and freight from Harbin to Vladivostock are set down at £1 13s.; add ocean freight to England, £1 10s.—£3 3s.

The expense of transport from South Africa to England is set down in the report we quote from at £1 9s.

But Queensland is further from England than South Africa; and, whilst it might pay to grow and export Soya beans thence to Europe, we cannot see that the crop could be profitably produced in this country, even although oil mills were erected.

The following summary of the uses of the Soya bean and its products, given by "Tropical Life," April, 1913, is interesting:—For dynamite and high explosives, soap, linoleum, india-rubber substitute, margarine, paints and varnishes, in place of linseed oil, various edible foods, toilet powder, salad oil, vegetable cooking oil in place of lard, oil, &c., preserving sardines, lamp oil, lubricating, as food in place of peas, flour for soups, biscuits, brown bread, artificial milk and cheese, substitute for coffee, for sauces; cake for feeding cattle, and for manure.

SEWAGE AS A MANURE.

"The Wealth of India" says that Dr. J. Grossmann, in discussing "The Utilisation of Sewage in Agriculture" before the British Association—Agricultural Section, stated that the total value of the nitrogenous matter, phosphates, and potash compounds contained in the liquid part of sewage was equal to £20,000,000 per annum. The value of its solid matter, termed "sewage sludge," was about £1,000,000 per annum, and he had succeeded in designing a practicable method by which this amount could be made available. By his process the dried sludge was mixed with a small percentage of acid and subjected to the action of superheated steam, which carried off the fatty matters (which were condensed in water) and left an inodorous brown powder, completely sterilised, which contained, on an average, 1·5 per cent. of nitrogen, 3 per cent. of phosphate of lime, and ·5 per cent. of potash, distributed in almost molecular state over from 30 to 40 per cent. of organic matter similar to humus, and mixed with a certain amount of carbon in an extremely fine state of division. The process did not add to the cost of sludge disposal, was automatic, and worked day and night without a break.

THE HISTORY OF COTTON-GROWING IN QUEENSLAND.

By THE EDITOR.

FIRST PHASE—1852 TO 1870.

The possibilities of cotton cultivation in Southern Queensland attracted the attention of far-seeing, enterprising colonists about sixty years ago (1852), when experiments were made by Captain Logan and Messrs. Ambrose Eldridge and Poole on the Brisbane River. In that year 70 bales and 18 bags of cotton were shipped by them, through the agency of Messrs. J. and G. Harris, to England; and in 1854, 18 bales of 600 lb. each were shipped to Sydney to be forwarded to London by the s.s. "Great Britain." Mr. Eldridge's cotton was grown at what is now the populous suburb of Milton. In 1853 and in succeeding years the Brisbane River frontage between Messrs. A. and J. Carmichael's sawmills and the South Brisbane Cemetery was largely planted with cotton, as were several other places on the river.

In a letter to the "Moreton Bay Courier," now the "Brisbane Courier," Mr. Eldridge gave the following particulars of his experiment in cotton-growing, which was the precursor of many millions of pounds of cotton being grown in East and West Moreton a few years later: —

The quantity of land cultivated was 5 acres, and the seed was planted in the latter part of October, 1852—

	£	s.	d.
Breaking up and preparing the land for seed	12	10	0
Planting and weeding	10	0	0
Gathering 2,500 lb. of seed cotton, at 1d. per lb. ..	10	8	4
Drying, baling, bales, carting to market, &c.	5	0	0
	37	18	4
Return from 2,500 lb. seed cotton	52	1	8
Profit	£14	3	4

No mention is made of the variety of cotton planted; but, presumably, it was Sea Island cotton, as it brought 2s. 6½d. per lb. in England, where it had to be hand-cleaned by gaol labour, as there was no cotton gin in Europe at that time.

In 1860 Captain Towns, who was the founder of Townsville in North Queensland, took up 240 acres on the Logan, granted him free for the purpose of growing cotton, sugar, or coffee. This was the beginning of Townsvale (not to be confounded with Townsville, on Cleveland Bay, in North Queensland).

In 1863 kanaka boys were employed on the plantation. Captain Towns's partner (Mr. Walker) was an enthusiastic advocate of cotton-growing; and in 1869, when 500 acres were under cotton in the colony, Townsvale cotton took the first prize in the Paris Exhibition against the whole of the cotton-growing centres of America. Mr. Walker predicted that some day cotton would be one of the main products of Queensland. "Queensland," he said, "will yet be one of the greatest cotton-producing centres of the earth."

The largest output of cotton at Townsvale for a single year was 380 bales, and, as the Government granted a bonus of £10 on each 500-lb. bale of clean cotton, the bonus on this quantity was £3,800. Presuming that the cotton was sold in England at 2s. 6d. per lb., the total revenue for this shipment amounted to £27,550.

The bonus was afterwards reduced to £5, then to £2 10s. per bale, and finally ceased altogether; and when cotton was once more grown in America, after the Civil War, it was found impossible to compete with that and other cotton-growing centres, and the industry died.

The first cotton gin in Australia was introduced by a Mr. Elliott, who was persuaded to come to the colony by the celebrated Dr. Lang, who was really the initiator of the industry in Northern New South Wales. The machine was a very crude, rough one, with wooden rollers, and was not a success; but Mr. D. F. Longlands improved somewhat on it.

In 1861 Mr. Henry Jordan, immigration lecturer in England, created a furore in that country by his lectures on cotton-growing in Queenslan l. His writings on the subject were eagerly read, and Dr. Lang's book on Queensland was bought by thousands of intending emigrants.

I should have mentioned that at the World's Fair in 1862 prizes for Queensland cotton were awarded to W. Cairncross, Bulimba (1); J. Pratten, Cooper's Plains (2); W. Thompson, Norman Creek (3), for Sea Island cotton; and for Uplands cotton, W. J. Rodé, German Station (near Nundah), took first prize.

The winners received silver and bronze medals.

The Sea Island cotton exported in those days (1864) was such a vastly superfine fibre that it attracted the attention of Mr. Bayley, a Manchester cotton spinner. He said, "I saw at once that from such a cotton a yarn could be manufactured superior to any that could be spun in England." The yarn was ultimately sent to Calcutta, as the Lancashire weavers of that period could not produce a fabric from it, as it was so delicate; neither could the weavers of Scotland and France succeed. In due time, however, Mr. Bayley received a sample of the finest muslin ever manufactured, produced by the skill of the Indian weavers from Queensland cotton.

Owing to the labours of Dr. Lang and Mr. Henry Jordan, general attention was directed in the United Kingdom to Queensland as a field for investment in cotton cultivation, and a continuous stream of immigrants poured into the colony, amongst whom were six families of the first section of the Lancashire and Queensland Co-operative Emigration Society, Limited.

This society, which promised to become one of the most important of cotton-growing companies, was founded on the co-operative principle; the lands and crops to be the common property of the whole, and the profits to be used in securing the speedy immigration of the members still in England. The company were to take up land represented by the land orders (then granted to every immigrant arriving in the colony) of its members, and make a preliminary outlay of £5,000. I must here

explain that in the sixties the Queensland Government granted to each immigrant a land order (transferable and saleable) for £40, to be used in the purchase of land. A first order for £28 was received by the immigrant on arrival, and the balance of £12 was payable when the immigrant had resided continuously in the colony for two years.

The first of the society's members arrived in the Black Ball ship "Sunda"; and a Mr. W. Lee, manager of the Lancashire Co-operative Cotton Company, came to Queensland, and, at a large meeting at the old school of arts, explained the objects for which the company had been formed. He said that they were all aware that great distress had occurred and was occurring in Lancashire through the people of America having ceased to grow cotton, and "had taken to killing each other instead." He had determined, with others, to start a company, and, if the black niggers of America did not grow cotton, to come to Queensland and grow it for themselves. "If," he said, "Queensland had been availed of by the Home Government fifteen years ago (*i.e.*, about 1850), the great slaughter in America would never have been, for this colony would have been producing cotton which would have made the manufacturers at home indifferent to American cotton."

The prominent men of Queensland of that day numbered amongst them Mr. (afterwards Sir Charles) Lilley, the Rev. George Wight, Mr. Ham, Mr. George Board, and many others. It was Mr. Ham and Mr. Board who directed Mr. Lee to the block of land on which the company were going to commence operations. Most of the company had determined to go on to the land and work it for two years, receiving no wages during that time. Messrs. Perry Bros., W. Brookes, J. Markwell, and others had been most liberal in their assistance towards the project.

The land was between the Pimpama and Coomera Rivers, known as McKay's paddock, and in full view of Moreton Bay. As to the company, 25 shares had been set aside for the working men, and they were all taken up, and the £12 10s. they had paid would be worth £50 in twelve months. All would work for rations only (at cost price) for two years, and at the end of the time everyone would have his share of the company's profits. About sixteen of the working members had amongst them upwards of £600.

About this time the Right Rev. Dr. Quinn, then Roman Catholic Bishop of Brisbane, received a communication from the Manchester Cotton Supply Association, intimating that the association had forwarded by the "Chatsworth" six cotton gins as a present to, and for distribution by, the promoter of the emigration from Ireland to Queensland. These gins were, on arrival, offered as prizes to small settlers who might be the producers of the best sample of cotton exhibited at the various agricultural shows throughout the colony.

The gins were hand gins, which could only turn out a very limited quantity of cotton per day, and, of course, would be useless for commercial purposes.

As the American War progressed, the cultivation of cotton expanded in Queensland; and soon the lands on the Brisbane, Bremer, Logan,

Albert, Mary, Burnett Rivers, and at Booval, Bundamba, Redbank, Oxley, &c., were largely devoted to cotton.

About this time (1867) the Government bonus was reduced to £5 per bale of 300 lb. of ginned cotton of any variety. This was afterwards reduced to £2 10s., and finally ceased.

The only cotton ginners in the colony in 1867 were—Messrs. J. and G. Harris, Alexander and Armour, Frazer and Buckland, G. Raff and Co., O'Reilly, and Pritchard, at Brisbane; A. J. Boyd at Oxley; in Ipswich, Messrs. Cribb and Foote and the Ipswich Cotton Company; and J. and G. Harris at Harrisville.

The usual charges then were for freight, insurance, warehouse and dock expenses, commission, &c., a little over 2½d. per lb. for Uplands, and 3d. per lb. for Sea Island cotton.

It may be mentioned that the Booval (West Moreton) Cotton Company realised 2s. 6½d. per lb. for their cotton in 1867. Thirty bales were sent to England per "Centurion," and the gross return amounted to £1,450. The crop for that year was expected to reach 150 bales.

To show the rapid reduction in the price of cotton in England at the close of the American War, the writer, who had been growing, buying, and ginning and shipping cotton during the boom time, had some 25 bales, the last of the season's crop, ready for shipment. Messrs. J. and G. Harris, through whose agency all his cotton was shipped, strongly advised him to sell to them at 7¾d. per lb. (the prices previously obtained for Uplands and mixed cotton having been from 1s. 2d. to 10d. per lb., plus bonus). He preferred to ship the cotton at his own risk, and when the account sales arrived the highest price the shipment realised was 7d. per lb., leaving a balance on the wrong side.

As evidence of the eager demand for cotton by the British spinners, it may be recorded that at the writer's ginnery a considerable quantity of discoloured cotton had accumulated, and was used, as occasion required, as waste for engine-cleaning purposes. When the season closed, the whole of this cotton, stained red, blue, and green, was put through the gin, baled, and sent to England, plainly branded, "damaged cotton." When the account sales were received in Queensland, one halfpenny per lb. was deducted from the price, owing to the consignment having been apparently "slightly damaged by salt water." The best Uplands was then bringing 1s. per lb.; and this lot, which was looked upon in Queensland as waste, brought 11½d. per lb.

The price paid to the primary producer in those days for Uplands cotton—usually of a very mixed character—was 3d. per lb.; and, as the crop usually ran to from 1,000 to 1,500 lb. of seed cotton per acre, the farmers averaged about 1,200 lb., which at 3d. per lb. was worth £15. The seed was not considered of any value, and was allowed to rot in heaps or was dumped into the river. To-day the seed is worth from £4 to £6 per ton.

The decline in the production of cotton ending in 1886 was due to various causes, chief among which was the inability to compete with the excessively low prices consequent on the cessation of the Civil War in

America. Cotton-growing had by that time regained its premier position in the United States, and had again become its leading export article. Other factors were the inability to cope with the insect pests which were responsible for heavy losses that since have been avoided by reason of experience gained in treating crops in a manner preventive of loss from this source.

Planters, moreover, had neglected the improvement of the varieties of cotton; seed used from the gin, as was the usual custom, never proved satisfactory, hence the quality and yield fell off to an unremunerative position. The earlier trials of cotton, carried on in the absence of a local knowledge of suitable soil and climatic conditions, resulted in many instances in poor returns discomfiting to all interested.

The advance of sugar-growing was also a strong factor in the abandonment of cotton; the rich coastal areas, not so well adapted to the cotton plant, proved ideal for cane, requiring, as it does, more fertility and moisture than cotton, and led farmers to engage in the sugar business in lieu of the latter.

The large drop in price of Upland fibre from 1s. 3d. to about 4d. per lb. in Liverpool, with no reduction in cost or expedition in the transport of the article to England; the general uncertainty of the market oversea; the extension of manufacturing enterprises, drawing from the farmer the juvenile element on whom the grower largely depended for his picking staff; the allurements of the dairying business —were all contributing factors bringing about the cessation of cotton-growing.

Despite the fact that the cotton industry collapsed in so signal a manner, it had fulfilled its mission; inasmuch as the East and West Moreton districts had been proven to be good cotton-growing centres. The export of raw cotton at that period exceeded the export of wool—a feature not to be lost sight of, and one that in later times impressed the former planters with a desire to again carry on an industry that had accomplished so much to advance rural pursuits in as yet a new and untried country.

Anyone travelling in those early days through the districts of the Logan, Ipswich, Fassifern, and on the Darling Downs, would find clear evidence of prosperity, the sequence of the cotton crop. Many notable farmers who, with their descendants, rank amongst the most prosperous settlers in those regions, first learnt the principles of rural economy through their acquaintance with the cotton plant. One feature of this is to be seen in the closer settlement promoted through cotton-farming.

In those days 80 acres was considered a fair-sized holding; and if a grower had 20 to 40 acres under cotton, the residual product gave a sufficient return amply compensating for his season's work.

Hence it cannot be regarded in any sense that because growers abandoned this vocation the effort had been a failure. While prices in Liverpool were good, growers realised up to £50 per acre on a crop of cotton; prices receding made the return less profitable, hence the gradual diminution of the land under this crop.

Settlement, despite the absence of railways, spread into districts which, but for the high value of the cotton crop, would not have been settled for years; and the distance which farmers transported their fibre in those days over bad roads proved the mettle of the pioneers of farming in Queensland.

To-day, however, the acclimated varieties, known to thrive all over this State from Cape York to Point Danger, indicate that much has been learned on the question of cotton-growing. Perhaps the most important fact recognised is the wonderful drought-resisting capacity of the plant.

During the 1901 drought, when forest trees were dying, the cotton shrub thrived right through the ordeal. Hence it has been demonstrated that cotton can defy drought as no other crop can, and is, by reason of this valuable feature, eminently suited for the dry regions of our Western country.

Another important feature related to this pursuit is the fact that, in conjunction with sheep farming, it can aid the settlement in a much more effective way than is possible without this combination. Cotton being in most Western areas grown as a perennial, it can be depended on for forage for sheep in times of scarcity.

West of Rockhampton, settlers have been able to tide their sheep over a period of drought by turning them on to the cotton areas. The small sacrifice of cotton was more than compensated for in the saving of the sheep, and subsequently the cotton plant resumed its vigour.

A cotton farm is Nature's silo to the sheep farmer, and the certainty of relief in this way at a critical time will enable the farmer to keep more sheep to the acre than is now prudent in the absence of a reserve such as the cotton plant.

By the rotation of cotton, the pasture for sheep can be materially improved as herbage, such as is generally produced among cotton plants, invariably proves much superior pasture than the native grasses. As proving the wide range in which the cotton shrub can be grown, the results of records of the ginning at Ipswich this season show that cotton has been sent of excellent quality from such remote places as Inglewood and Miles, west of Brisbane; Capella and Gogango, west of Rockhampton; and Hughenden, west of Townsville; while at the recent Exhibition at Bowen Park superior types of long-stapled cotton of the arboreous and herbaceous varieties were exhibited by Mr. Joseph Campbell, of Cairns.

[TO BE CONTINUED.]

COST OF GROWING WHEAT IN WESTERN AUSTRALIA.

The President of the Perth Chamber of Commerce recently gave the following figures as the mean cost of growing wheat in Western Australia:—Ploughing, 6s. 6d. per acre; first cultivation, 2s. 6d.; second cultivation, 2s.; drilling and harrowings, 3s.; grading and pickling, 1s.; superphosphate, 4s.; seed wheat, 4s.; sowing and harvesting, 6s. 1d.; bags, 3s. 6d.; total, £1 12s. 7d. Taking the average yield of 11·56 bushels at 3s. per bushel, there is a gross return of 34s. 9d. per acre, leaving a return of 2s. 2d. per acre. But against this has to be put cartage to railway, and nothing is allowed for rent or interest.

TEACHING THE YOUNG IDEA—WHEAT COMPETITIONS IN WESTERN AUSTRALIAN SCHOOLS.

We take the following highly interesting article on the subject of "Wheat Competitions in Western Australian State Schools" from the "Town and Country Journal," Sydney, to which journal we are also indebted for the illustrations:—

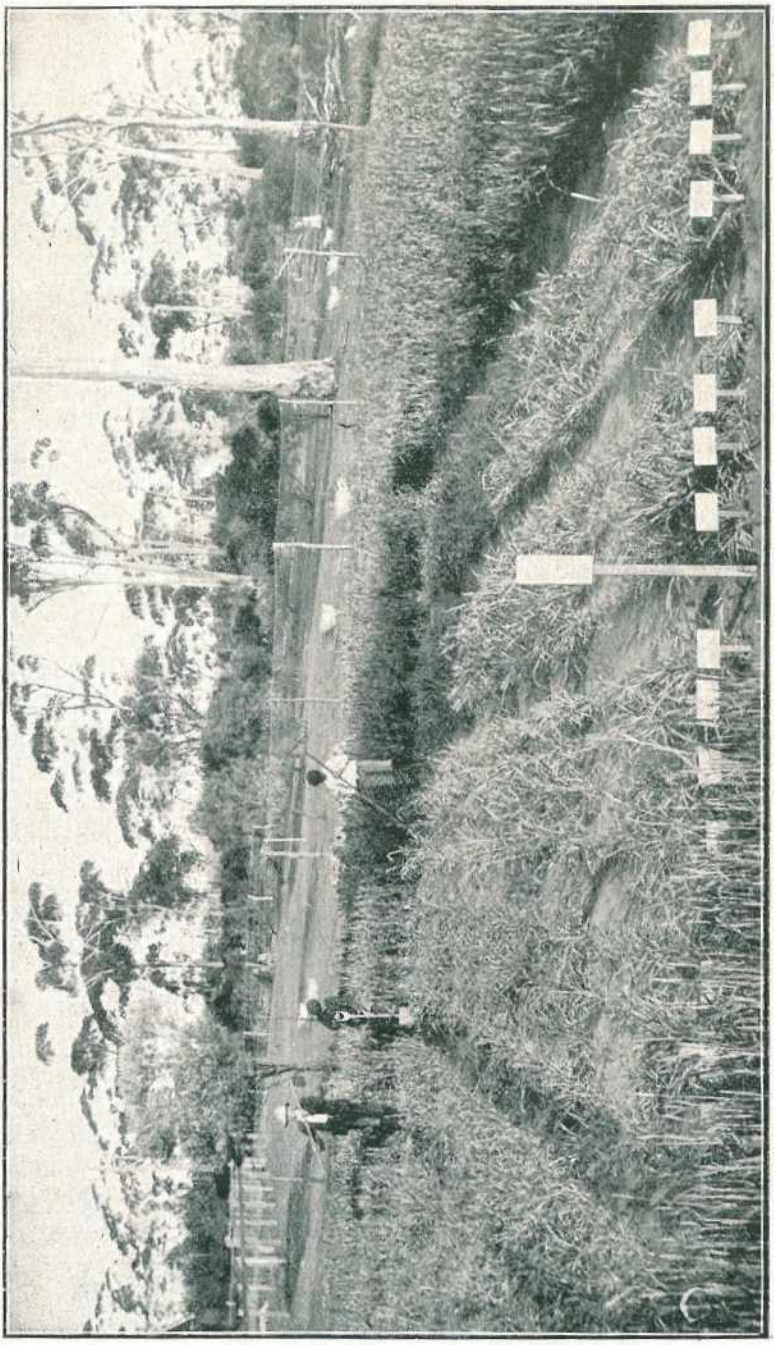


PLATE 1.—EXPERIMENT PLOTS AT THREE SPRINGS STATE SCHOOL (W.A.)

In New South Wales and other States of the Commonwealth, gardening now plays a most important part in school curriculum—flowers, vegetables, grasses, and cereals being cultivated, according to the location of the school and the suitability of the soil. The growing of vegetables is mostly undertaken by boys, as is also that of cereals, while girls and smaller children devote their attention to floriculture.

WORTHY OF IMITATION.

To Western Australia, however, belongs the honour of starting a competition in wheat growing in the schools that has been productive of good results, and is worthy of being imitated by schools in New South Wales and other States. Mention of the competition was made in the "Town and Country Journal" recently, and in connection with it Mr. Carmichael (N.S.W. Minister for Education), on his attention being drawn to it, spoke of it as being a good idea, and also said he would endeavour to introduce a similar competition here. Our illustrations depict some of the wheat plots grown in school gardens in Western Australia, which competed and won prizes in the competition.

THE COMPETITION.

Dr. Ellis, of Coolgardie, was the originator of the wheat-growing competition. He takes a very keen interest in nature study in the schools throughout the State. To the three most successful competitors in the wheat competition, Dr. Ellis presents prizes; a gold medal for the first, silver for the second, and bronze for the third.

The conditions of the competition are as follows:—Children may set any number of single grains of wheat of any variety or varieties that they choose, and grow them under any conditions whatever. There is absolutely no limitation at all in this respect. It is, however, necessary that an accurate account of the conditions under which the grains are grown shall be kept. When the wheat matures the best yield from any single grain is to be gathered by the teacher, who will count the total number of grains produced by the original single grain, place them in an envelope, certify to the accuracy of the conditions having been observed, and enclose the pupil's account of the conditions under which the original single grain of wheat produced the yield which the teacher has gathered and forwarded to Dr. Ellis. The child who can produce the most grains from the original single grain will receive the prize.

COMPETITION RESULTS.

The results of this competition for 1912 were as follows:—1. Norman Oliver, Jennapulin, Turvey wheat, 64 heads, 2,049 grains. 2. Jas. A. Scott, Kellerberrin, Bearded White, 38 heads, 1,264 grains. 3. Charles Clinch, Three Springs, Club or Square Head, 26 heads, 1,177 grains. 4. Lionel Brimson, Three Springs, Club or Square Head, 24 heads, 1,048 grains. 5. Wilfred Birch, Kellerberrin, Tardent's Blue, 49 heads, 1,010 grains. 6. Richard Brayster, Kellerberrin, Correll's No. 3, 27 heads, 978 grains. 7. Gilford Haines, Three Springs, Correll's No. 3, 22 heads, 925 grains. 8. Doris Garston, Moojebing, Lott's, heads, 726 grains. 9. Walter Gilsenan, Middle Swan, Baroota Wonder, 13 heads, 454 grains.

The competition was taken up with much enthusiasm, and surprisingly good results were obtained. It is worthy of notice that late

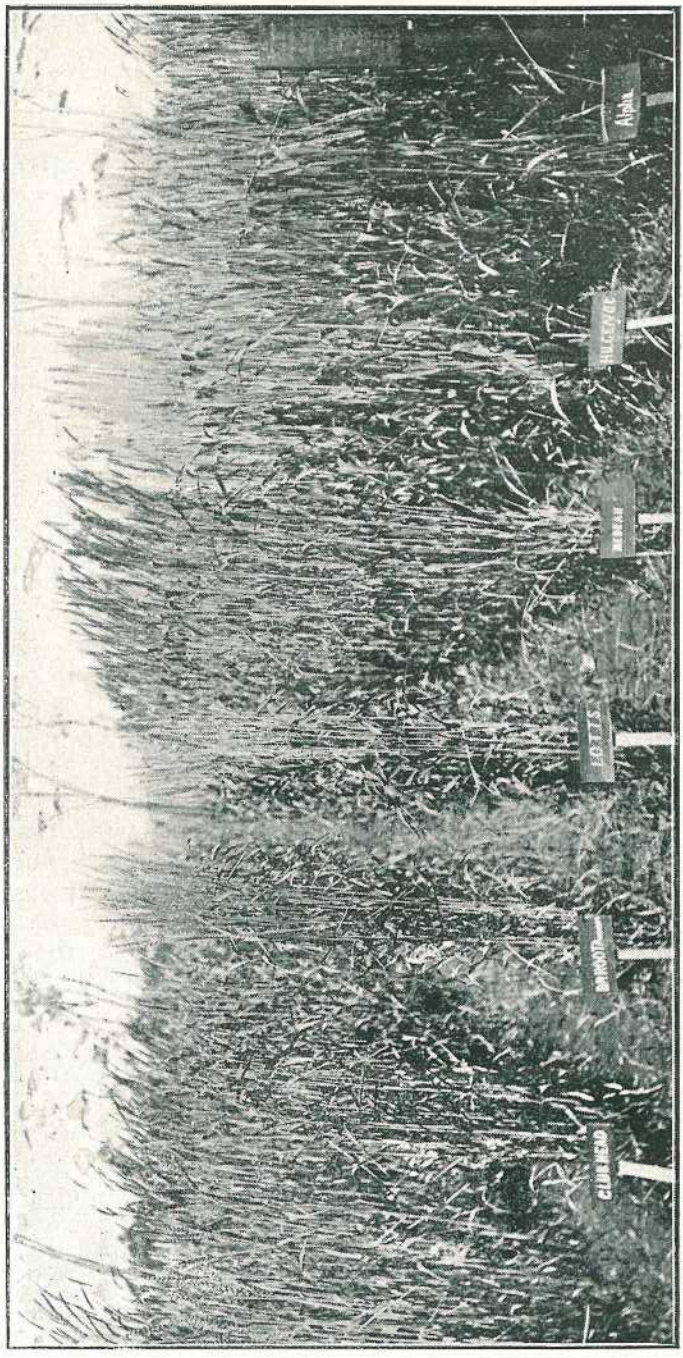


PLATE 2.—SOME OF THE VARIETIES OF WHEAT GROWN AT THREE SPRINGS SCHOOL.

varieties—viz., Turvey, Bearded White, Club Head, and Tardent's Blue —headed the lists.

MATERIALS SUPPLIED.

The Government of Western Australia assists in every way possible the gardening lessons given in the State schools. The Education Department supplies tools, fencing, and seeds of flowers, vegetables, and economic plants free of charge. Many of these are provided by the Agricultural Department, the officers of which are at all times ready to give valuable help. Trees, shrubs, &c., are supplied to schools through the Forestry Department, which distributes many thousands of young trees each year. The demand for these is so great that their stock is invariably exhausted before the end of the planting season. Chemical manures have been presented to schools by private firms, whose generous assistance in this respect is gratefully acknowledged. Nearly 300 schools received supplies during 1912. The Royal Agricultural Society has greatly assisted the department in drawing public attention to the nature of the work done by arranging each year for children's industries to be represented. This year prizes to the value of over £50 were offered for work done by school children. Business firms and private individuals have also done much by advice and help freely given to individual schools.

It is interesting to mention that Mr. G. L. Sutton (Commissioner of the Wheat Belt), who has given special assistance to the gardening movement in the State schools, has supplied seed for the purpose of carrying out an experiment showing the effect of treating seed wheat for smut. Many schools are carrying out the work, in order to demonstrate the efficiency of treating seed before sowing.

THE OBJECT IN VIEW.

The general idea is that the teachers who are carrying on this work shall endeavour to arouse interest in the culture of plants suitable to the locality. The pupils care for and observe the plants grown, and study the relations between plant life and the surroundings. In this way a very broad view of plant life is obtained, so that the chief features of plant life, growth, and culture may be noticed, while a mass of information on plant structure, growth, weather, soil, water supply, and the operations of agriculture is gradually gathered by the pupils themselves.

It is considered that such a course will lead up to the more definite and scientific studies which find a place in the curricula of the secondary schools, colleges, technical schools, and agricultural or farm schools. School gardening, therefore, supplies a link between the informal nature study of the lower classes and the studies in the sciences which are taken up after the child leaves the primary school.

DIVISION OF SUBJECTS.

The work may be divided up as follows:—

1. Ornamental flower gardening.

2. Tree-planting and ornamentation of school grounds and surroundings.

3. Vegetable growing, usually more or less experimental.

4. Experiments in the cultivation of economic plants, including rotations, cultivation methods, water conservation, seed selection, &c.

5. Special experiments in wheat-growing.

INCENTIVE TO OTHERS.

Undoubtedly the excellent results of the experiments in wheat culture in the schools of Western Australia should be a strong incentive to schools situated in wheat-growing districts in other States of the Commonwealth to go and do likewise.

[Especially in the Roma district, where wheat-growing is scientifically carried on at the Roma State Farm.—Ed. "Q.A.J."]

THE SUGAR CROP OF 1913.

The Government Statistician, Mr. Thornhill Weedon, has issued the following estimate of the results of the sugar crop for 1913, and comparative results of the 1912 season:—

Division, &c.	Area Crushed.	Cane Crushed.	Sugar at 94 N.T.
	Acres.	Tons.	Tons.
No. 1 District—			
Estimate, 1913	26,904	453,049	62,268
Actual, 1912	22,691	334,343	42,110
Increase, 1913	4,213	118,706	20,158
No. 2 District—			
Estimate, 1913	36,921	754,217	86,044
Actual, 1912	26,605	288,644	31,946
Increase, 1913	10,316	465,573	54,098
No. 3 District—			
Estimate, 1913	36,301	800,129	87,063
Actual, 1912	26,029	322,764	33,995
Increase, 1913	10,272	477,365	53,068
No. 4 District—			
Estimate, 1913	2,964	57,749	6,121
Actual, 1912	2,817	48,461	5,009
Increase, 1913	147	9,288	1,112
Whole State—			
Estimate, 1913	103,090	2,065,144	241,496
Actual, 1912	78,142	994,212	113,060
Increase, 1913	24,948	1,709,932	128,436

PUBLICATION RECEIVED.

We have received from the author (Mr. Henry Tardent) an essay on "The Life and Poetry of George Essex Evans, written for the Brisbane 1913 Eisteddfod." The story of the poet's life is given from his earliest youth, and will surprise many who have known him only through his literary abilities. The essayist quotes several appropriate fragments of some of the poets, and particularly a portion of what is well termed an approach to the perfection of the Virgilian Georgics, as relating to modern farming and dairying, in which the late poet was proficient—"The Song of the Australian Dairyman."

Mr. Tardent has certainly handled his subject in a most interesting manner, and we recommend all admirers of George Essex Evans's poetry and prose to read the essay.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF NOVEMBER, 1913.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Loch...	Ayrshire	31 Aug., 1913	1,081	4·4	53·40	
Glen ...	Shorthorn... ...	27 Oct. ,,	1,059	4·2	49·82	
Bluebelle ...	Jersey	13 July ,,	692	4·7	36·62	
Butter ...	Shorthorn... ...	27 Sept. ,,	877	3·6	35·80	
Honeycombe	,, ...	7 June ,,	607	4·6	34·67	
Auntie ...	Ayrshire	15 July ,,	775	4·0	34·63	
Pauline ...	Shorthorn... ...	8 Oct. ,,	852	3·6	34·08	
Miss Bell ...	Jersey	25 Sept. ,,	717	4·2	33·73	
Bell ...	,, ...	7 July ,,	669	4·4	33·04	
Silver Nell ...	Shorthorn... ...	26 Sept. ,,	723	4·0	32·31	
Nellie II. ...	,, ...	5 June ,,	776	3·6	31·04	
Madame Melba	Holstein	10 Nov. ,,	863	3·2	30·44	
Burton's Lady	Shorthorn... ...	23 June ,,	692	3·8	29·30	
Lonesome ...	Ayrshire	26 Oct. ,,	729	3·6	29·16	
Miss Edition	Jersey	19 July ,,	652	4·0	29·13	
Lennie ...	Ayrshire	1 Sept. ,,	697	3·7	28·68	
Cocoatina ...	Jersey	19 May ,,	529	4·8	28·61	
Sweet Meadows	,, ...	20 Aug. ,,	409	5·8	26·97	
Gem... ...	Shorthorn... ...	8 Aug. ,,	604	3·7	24·76	
Daisy ...	Holstein	14 Feb. ,,	745	3·0	24·52	
Miss Melba	,, ...	22 Jan. ,,	590	3·6	23·60	
Countess of Brunswick	Shorthorn... ...	22 July ,,	641	3·2	22·61	
Miss Morton	,, ...	14 Oct. ,,	666	3·0	21·92	
St. Elizabeth	Jersey	19 June ,,	332	5·8	21·89	
Lady Brunswick	Shorthorn ..	27 Oct. ,,	511	3·7	21·03	

RESULTS OF THE QUEENSLAND ENTRIES IN THE COMPETITIONS FOR BACON, BUTTER, AND CHEESE AT THE DAIRY SHOW, ISLINGTON, 21st and 24th OCTOBER, 1913.

BUTTER.

Although not successful in obtaining a first prize, Queensland was first in number of awards with 13; New South Wales was second with 11; Victoria third with 6; New Zealand fourth with 4; and South Australia fifth with 1.

The following were the points awarded:—

SALTED BUTTER.

—	Flavour, 55.	Texture, 20.	Colour, 10.	Salting, 10.	Packing, 5.	Total, 100.	Remarks.
Taieri, N.Z.	53	20	10	10	5	98	1st Prize
Dungog, N.S.W.	54	18	10	10	5	97	2nd Prize
Warwick	52	19	10	10	5	96	3rd Prize
Downs (Toowoomba)	50	18	10	10	5	93	H.C.
Downs (Clifton)	48	18	10	10	5	91	
Downs (Miles)	51	20	10	9	5	95	Reserve and V.H.C.
Pittsworth	50	16	10	10	5	91	
Warwick (Texas)	50	16	10	10	5	91	
Maryborough (Kingaroy)	48	16	10	10	5	89	
Maryborough	48	16	9	10	3	86	
Maryborough (Biggenden)	50	16	8	10	4	88	
Marburg	50	16	10	10	5	91	
Esk	50	14	10	10	5	89	
Chinchilla	50	16	9	10	5	90	
Gayndah	48	17	9	10	4	88	
Nanango	48	16	9	10	5	88	
Logan and Albert	49	15	10	10	5	89	
Mount Bismarck	45	12	10	10	5	82	
Maleny	48	16	10	10	5	89	
Wide Bay	48	17	9	10	5	89	
Pommer Bros.	50	18	7	10	4	89	
Caboolture	48	14	10	10	5	87	
Silverwood (Terror's Creek)	45	15	9	10	4	83	
Silverwood (Gatton)	50	16	10	10	5	91	
Stanley River	45	18	9	9	5	86	
Grantham	52	17	10	10	5	94	V.H.C.
Boonah	48	17	10	10	5	90	
Laidley	50	18	10	10	5	93	H.C.
Booval	52	16	10	10	5	93	H.C.
Warwick (Allora)	50	16	10	10	5	91	

UNSALTED BUTTER.

—	Flavour, 60.	Texture, 25.	Colour, 10.	Packing, 5.	Total, 100.	Remarks.
Taieri (N.Z.)	57½	24½	10	5	97	1st Prize
Downs (Miles)	56½	23½	10	5	95	2nd ,,
Denman (N.S.W.)	55½	23	9½	5	93	3rd ,,
Downs (Toowoomba)	53½	22	8	5	89½	Reserve
Pittsworth	50	19½	8	4	81½	Com.
Nanango	50	19	8	5	82	,,
Pommer Bros.	52	20½	8½	4	85	,,
Grantham	50	19	8	5	82	,,
Warwick (Allora)	51½	19½	8½	4	83½	,,

CHEESE.

The condition of the whole of the Queensland cheese was spoilt through its being carried at too low a temperature, it having been stowed with the butter on the ship. The cheese being new, the low temperature prevented it maturing. The condition of the cheese was soft, those from the Warwick Factory being in very bad condition, they having been packed in crates with no ventilation, the battens being close together; the best cheese made would not carry under such conditions. One of the Warwick cheeses burst on the stand. It is imperative that a space be left between each batten of crate. Under different circumstances the cheese would have made a creditable exhibit, as they were well made and good flavoured.

The shape was good, but those from the Mount Tyson Factory were spoilt through being put in crates that were too small for them, thus leaving the batten marks on sides of cheese.

BACON.

The two exhibits of bacon from Queensland did not compare very favourably with the exhibits from the British Isles. The principal faults were in the butchering, suitability of side, flavour, and colour. The butchering was not clean, the cuts being jagged. Too much cheek left on. Too much left on the hocks. Oyster bone should be removed, leaving round bone of gammon exposed.

The following were the points awarded the sides which secured the 1st prize, and also the points secured by the exhibits from Queensland:—

BACON POINTS.

—	Highest Possible Points.	1st Prize. Herts. and Beds. Bacon Factory, Hitchin.	Darling Downs Co-operative Bacon Company.	J. C. Hutton, Brisbane.
Style and workmanship	15	14	10	5
Suitability of side, its general proportion	20	20	10	10
Firmn-ss of fat	10	8	6	6
Fin-ness of rind	5	4	3	3
Colour	20	16	12	10
Flavour (which includes mildness)	30	25	20	18
TOTAL	100	87	61	52

Bacon experts at the show were of opinion that there will be a great future for Australian bacon.

HERD TESTING.

By E. GRAHAM, Dairy Expert.

Fortunately, a vast area of the land within this State is specially adapted to the purpose of dairy farming, and in many districts Nature has generously provided a fertile soil, frequently coated with suitable natural pasture or ever ready to respond to cultivation; while a bounteous supply of water and the other essentials that make for the successful development of the industry are to be found associated in a manner that betokens the possibility of the expansion of dairying to almost unlimited proportions, provided a fair measure of remuneration can be concurrently maintained.

Certainly our conditions are equally as favourable as those appertaining to the Southern States, but, on the other hand, it is on record that the average yield of milk and the quantity of butter fat produced by the milch cows utilised for the purpose of dairying in this State are comparatively lower than is the case in either New South Wales or Victoria. Some years ago I drew attention to this fact, and, with a view to assist in effecting an increase in the general productiveness of the dairy herd, the present system of herd testing was devised and sanctioned by the then Minister for Agriculture.

In framing the conditions necessary to be observed in connection with the performance of herd testing, an effort was made to simplify the operations as far as possible, and at the same time to preserve a reasonable accuracy in the results obtained.

The expense of the convenience to the dairymen was also made a consideration, and it is doubtful whether any other dairying community is able to secure a similar service to that offered here, in return for such a small sacrifice of labour or monetary outlay.

Outside the labour involved in weighing, sampling, and recording the milk yields of the individual cows, the work of herd testing is performed by an officer of this Department, practically free of any further cost to the dairyman concerned.

The forms necessary for recording the weekly and monthly milk yields of the dairy cows are supplied, and two explanatory leaflets are available for distribution to those interested in the work. One leaflet sets out the objects of herd testing, and the other conveys information as to the manner in which the samples of milk should be taken and the weights of milk recorded by those submitting their herds for the purpose of testing.

In view of the numerous communications received from divers Farmers' Progress Associations and Farmers' Unions seeking information relative to herd testing, it may not be out of place to give here the particulars contained in the leaflets above referred to, especially as they convey in detail the information that in reality forms the basis of the system under which herd testing is at present conducted within this State:—

THE OBJECT OF HERD TESTING.

The object of the dairy herd testing shall be to raise the standard of productiveness of the milch cows in the dairying districts of Queensland, and to give the dairymen such instruction in milk testing as shall enable them to test and record the milk yields of their cows and compute the butter produced.

The method adopted will be to systematically weigh and periodically test the milk yielded by individual cows, and on these results will be computed the amount of commercial butter produced during a given period.

When the earning capacity of each animal is arrived at, it will then be possible to eradicate from the dairy herds any unprofitable cows that may now be utilised for dairy purposes.

The supervision of the scheme and the testing of the herds will be controlled by the Department of Agriculture and Stock, and the actual testing of the milk yielded by the cows entered will be carried out by an officer appointed by that Department. No fee will be charged for such service.

The work shall be carried out in such manner that an approximation may be made of the value of every cow in the herd, calculated solely from a productive point of view, and with disregard to the breed of the animal submitted.

A dairy farmer desirous of having his herd of cows tested must make application, in writing, to the Under Secretary, Department of Agriculture and Stock, Brisbane; set out the number of cows in profit owned by him; give an assurance that he is willing to daily record the weights of milk drawn form the individual cows; and give such other minor assistance as may be found necessary to render the test results reliable and valuable.

It is the wish of the Department that the full benefits of the officer's services may be available to both the dairymen and the State, and that all milch cows proven unremunerative as butter-fat producers will be withdrawn from the herds, and replaced by more suitable and profitable animals. It is not expected that any faulty or unprofitable cows divulged through the efforts of our officer will be disposed of by an unscrupulous dairyman to his more guileless neighbour.

DIRECTIONS FOR TAKING SAMPLES FOR TESTING, ETC.

In taking the sample of milk the greatest care must be exercised, as upon this practically depends the value of testing.

As soon as the milk is drawn from the cows it should be weighed. A small spring balance is the most suitable for this. Immediately after weighing pour the milk from one bucket to another, and without delay take a small quantity with the ladle as supplied and pour into the sample bottle. The larger sized ladle is to be used for taking the morning sample, and the smaller sized ladle for taking the evening sample of milk.

The composite sample bottles as supplied contain a preservative, and must be kept securely corked after each sample is taken. Do not wash out the bottle before putting the milk in.

Write the name of the cow plainly in the column on the sheet supplied for that purpose, and attach the name of the animal to each sample bottle; then, as the cows are milked, mark the weight of milk below their names, and take the samples as above directed.

When the sample bottles are sufficiently full, they must be sent to the officer in charge of the testing in your district. The officer will furnish you with his address, and give such other information as you may require.

The weighing and recording of the weights of milk yielded by each animal shall be continued throughout the period of lactation. The taking of the composite samples will be done at intervals of about three months. The sample bottles will be periodically supplied by the testing officer.

As far as possible the testing officer will instruct dairy farmers in the practice of testing milk by the Babcock method.

In every instance the full complement of cows in profit in the herd must be entered by dairymen.

It is not intended that the testing officer will give results relative only to a few selected animals from each herd.

In a future issue of the "Agricultural Journal," I hope to furnish some of the actual results and other particulars connected with herd testing since the inception of the work in Queensland.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER, 1913.

Five thousand two hundred and eighty-five eggs were laid during the month. The weather has been very warm, several days ranging from 100 deg. to 106.2 deg. Fahr. This has had a tendency to affect the laying, but, owing to the free use of water on the floors of the houses, we had no deaths from heat apoplexy. Green feed is very scarce, and, if rain does not come soon, matters will be serious. Broodies have been very numerous this month, as many as three out of one pen at the same time. Moritz Bros. win the monthly prize with 158 eggs. The following are the individual records:—

Competitors.	Breed.	Nov.	Total.
J. R. Wilson	White Leghorns	127	1,073
A. H. Padman, S.A.	Do.	142	1,062
Loloma Poultry Farm, N.S.W.	Do.	146	1,031
Moritz Bros., S.A.	Do.	158	1,028
T. Fanning	Do. (No. 2)	137	1,026
O.K. Poultry Farm	Do.	129	1,025
Range Poultry Farm	Do.	138	997
T. D. England	Do.	128	970
E. A. Smith	Do. (No. 2)	136	966
R. Burns	Black Orpingtons (No. 2)	131	949
J. F. Coates	White Leghorns	132	945
F. McCauley	Do.	110	944
S. E. Sharpe	Do.	116	943
H. Tappenden	Do.	136	937
R. Burns	Black Orpingtons (No. 1)	137	934
J. Zahl	White Leghorns	128	927
Jas. McKay	Do.	127	920
A. T. Coomber	Do.	141	918
Cowan Bros., N.S.W.	Do.	128	917
Doyle Bros., N.S.W.	Do.	136	909
Mrs. Munro	Do.	137	900
W. D. Bradburne, N.S.W.	Do.	142	896
E. A. Smith	Do. (No. 1)	142	893
Mrs. Sprengel, N.S.W.	Do.	123	885
Yangarella Poultry Farm	Do.	136	877
H. Hammill, N.S.W.	Do.	128	873
A. F. Camkin, N.S.W.	Do.	146	868
R. Jobling, N.S.W.	Do.	123	859
D. Grant	Do.	123	854
J. Archibald, N.S.W.	Do.	141	835
J. Gosley	Do.	110	826
T. Fanning	Do. (No. 1)	134	820
C. Leach, N.S.W.	Do.	134	818
J. Murchie	Brown Leghorns	140	815
Mrs. Craig	White Leghorns	141	808
A. Schbrowski	Brown Leghorns	114	807
T. Stephens	White Leghorns	113	789
Mrs. Bieber	Brown Leghorns	137	758
J. Anderson	Red Sussex	114	757
A. C. Collis, N.S.W.	White Leghorns	144	754
Totals		5,285	36,113

State Farms.

As might be expected from the climatic conditions of the past month—abnormal heat and absence of rain combined with serious bush fires—the reports from the farming districts have not been encouraging; and the State Farms have naturally shared in the general depletion of crops and unfavourable conditions for preparation and seeding of the land.

Usually, the Northern districts are more favoured than the Central or Southern coast lands during dry seasons, but towards the latter end of last year the North has had its undue share of trouble. From the

KAMERUNGA STATE NURSERY.

the manager reports that the last six months—from 1st June to 30th November—show a record drought so far as the Kamerunga district is concerned, the total rainfall for that period being only 2·75 in., made up of only a few points at a time, which, in the Northern coastal district, is looked upon as a very severe drought. Consequently, the July and August rains having failed, no spring planting of sorghums, buckwheat, cowpeas, &c., for seed could be done. Arrowroot, yams, and ginger were planted after a slight shower in October; but the gingers were not able to hold their own against the weather conditions. Many legume crops were practically annihilated, despite all efforts for their preservation. The bean fly appears to have been very destructive. The coffee-trees flowered and the young fruit set; but the manager feared that, owing to the dry season, the beans would be small, as he always found this to be the case when there was no rain to swell the young fruit.

KAIRI.

In common with all rural districts, the Kairi State Farm has suffered for want of rain. Amongst the grasses none have withstood the dry conditions so well as the Rhodes Grass. Clovers, both in the field and observation patches, completely disappeared; but the manager has every reason to expect that they will put forth a fresh and vigorous growth when the wet weather sets in again. So short has the farm been of grass that it became necessary to feed only a few special beasts, and instead of 150 head it has only been possible to keep up a herd of 100. Mangolds and sugar beets appear to have done well, notwithstanding the dry conditions; the former weighing up to 13 lb., and the latter to 7 lb. each. These are not at all specially large samples; but when one realises that approximately 9,000 of them can be grown on an acre, it gives some idea of the tonnage it is possible to harvest from a given area. The manager also states that they stand excessive wet and any frost they are likely to get in Queensland. If sown in January or February, they provide just the feed wanted during the constantly recurring dry spring

months. Cow cane has also proved a valuable roughage. Carrots also have come through the dry weather so well that it is considered they would be a valuable addition to our fodder crops, suitable for growing for feeding during the dry spring or severe winter months.

WARREN STATE FARM.

Reporting on the position of affairs at Warren, the manager states that the farm has suffered somewhat as has been the case with the rural industries of the State generally, drought conditions having prevailed during the past few months, withering up all the native grasses. Here, the Rhodes Grass again shows its value in a dry season, having kept its colour and growing fairly in spite of the weather, the severity of which may be gauged by the fact that since last June, and up to the middle of December, the total rainfall only amounted to 1·18 in. Fortunately, there are 722 acres in Rhodes Grass on the farm, growing well on poor box country. Although the land has been ready for some time for other crops, it has been impossible to plant any summer crops. Some idea of the state of the land may be formed when we are told that the wheels of the plough had to be weighted down to enable the land to be ploughed to a depth of only 6 in. The fruit trees are described as looking well, but bearing very little fruit. The grapes, however, were bearing beyond expectations. Forty acres of lucerne have struggled against the dry season fairly well, and a small crop was taken off on 1st December.

The stock are reported as doing well, although the great heat was very trying to the pigs, who suffered severely.

The manager says, in conclusion, that a large quantity of hay and silage is on hand, and, although a good fall of rain would be welcome, there is enough fodder to keep all the stock in good order for another six months without any rain. Advantage has been taken of the dry weather to destroy prickly pear.

Since this report was written, a fair amount of rain has fallen; and, if the late rains continue, Warren will soon recover from the effects of the drought, especially as the Rhodes Grass has held its own so well; 70 points of rain were recorded on 15th December, but this did more harm than good, as it caked the surface of the land and only germinated some weed seeds.

DESTRUCTION OF DODDER IN LUCERNE.

An Adelaide paper states that careful experiments made on lucerne fields invaded by dodder show that dodder can be destroyed by strong applications of 800 lb. of nitrate of soda to the acre. The fertilising action of the chemical makes sodium nitrate more advantageous than ferrous sulphate and other caustic salts, which are somewhat dangerous to vegetation. Further, that lucerne and other leguminous forage plants subject to dodder are benefited by the fertilising action of the nitrate, notwithstanding the faculty they possess of absorbing atmospheric nitrogen by their root nodules.

The Orchard.

IS THE TOMATO A FRUIT?

The question whether a tomato is a fruit or vegetable is the subject of correspondence in one of the English agricultural papers. One of the professors of the University of Leeds settles it by saying that the tomato is a true fruit, for the reason that it is the product of the ovary, endocarp, and seeds after fertilisation. He also says the apple is not botanically a true fruit, though the tomato certainly is.—"Exchange."

Mr. F. M. Bailey, Colonial Botanist, says that, commercially, the tomato is a vegetable, but botanically it is a fruit.

ONE CAUSE OF THE FAILURE OF TOMATOES TO SET FRUIT.

The attention of the State Commission has been called by various truck gardeners in and around Sacramento to the failure of tomato vines to set fruit after a large number of blossoms had formed. The vines were thrifty and blossomed well. The flowers would hang on the vines for a certain period of time, then fall off, leaving part of the peduncle attached to the stem.

Specimens were sent to Mr. H. S. Fawcett, then plant pathologist of the State Commission, who determined the fungus as a species of *Macrosporium*, possibly that species known to cause the late blight of potatoes and the fruit spot of tomatoes. The writer placed several stems and blossoms of an infested tomato plant in a moist chamber for several weeks, and, on examination, thousands of spores of this fungus were obtained.

A grower used 10 lb. of precipitated sulphur to 100 gallons of water on his tomato vines which had hitherto failed to set fruit, and was rewarded by a fair crop of tomatoes. Mr. H. S. Fawcett advised the use of Bordeaux mixture in an experimental way.—"The Monthly Bulletin" of State Commission of Horticulture, California.

CURING LEMONS.

On this subject, Mr. G. Cushway, Sandgate, writes:—

"I have just read the account by Mr. C. Ross, our Instructor in Fruit Culture, on the curing of lemons, and, seeing he has mentioned the orchard at Helidon that I planted and cultivated so successfully for fourteen years, a few hints as to the management of the above may not be out of place, and, indeed, may be of benefit to many lemon-growers. Regarding the curing of lemons, I always cut them when about 2½ in.

in diameter, even if they were as green as grass. I then placed them in kerosene tins as carefully as if they were eggs, for a bruised lemon is a spoiled lemon; the slightest abrasion of the skin affords an entrance for the spores of blue mould. Handle them carefully, and the loss will be almost *nil*.

"When I had filled the tins, I took them over to the house and gently placed them in trays holding one layer. The trays were made of the ordinary fruit case split in two. I then stacked them on the veranda for a few days to sweat or put them straight away, as was most convenient, in the cellar. My cellar was dug under the house, about 6 ft. deep, and fitted up with saplings as shelves to place the trays upon; and without any further attention they cured a beautiful colour with a skin like a piece of kid and full of juice. Should the market not be good enough at the time, I simply kept them until it improved, and could do so from three to four months. I sent them to market in new cases, stencilled with name, &c., and the prices were always satisfactory. To produce good fruit that is always marketable, the trees need a little care and attention. We cyanided such trees as needed it every year to keep the fruit perfectly clean, for my experience is that a lemon that needs brushing is not a good keeper, and I may say that a dirty tree cannot produce clean, good keeping fruit.

"I fertilised every year, and the best fertiliser was found to be meatworks manure, with sulphate of potash added to make a complete manure. In cutting lemons, I always cut the fruit with a long stalk to the first joint, and found that the new growth invariably produced fruit. The length of stalk was cut off before placing the lemons in the tin. I may say there is practically no loss of fruit either from blue mould or fruit fly, the latter being beaten by cutting before the lemon ripens.

"Mr. Ross says the trees were perfect in shape, very healthy, quite clean, and carrying heavy crops of fruit. They had been pruned to a flat top 8 to 10 ft. high, with a spread of branches 25 to 30 ft. in diameter, and well furnished with fruiting wood from the top to within 1 ft. of the ground."

[We are very pleased to publish Mr. Cushway's letter, corroborating as it does all that Mr. Ross stated in his paper on lemon-curing in the December issue of the Journal.—Ed. "Q.A.J."]

THE RUTHERGLEN FLY.

(RHYPSROCHROMUS SP.)

This pest has again made its appearance in the Stanthorpe orchards, and the following notes by Chas. Ross, F.R.H.S., Instructor in Fruit Culture to the Department of Agriculture, will be found acceptable.

The fly is very destructive to potatoes and other ground crops, and preventive treatment should be applied upon such crops before the tree

fruits are ripening. Concerted action should be taken on its first appearance. It attacks cherries, peaches, plums, apricots, and grapes, which become literally covered with the tiny bugs, introducing their beaks into the fruit, thereby sucking out the juices, causing the latter to shrivel and dry up. Peaches especially become quite leathery in texture.

Many preventives have been tried, with more or less good effect; but the best of all, so far as at present is known, is a mixture of half benzole and soft water. The wash must be continually stirred whilst it is being applied through the finest of nozzles, so as to cause a mist spray. Although expensive, it seems to be the only thing to instantly kill the insect without injuring the fruit.

Quibell's mixture has been used with good effect, but it leaves a tar flavour on the fruit; and it should be applied to ground crops and wherever the insect is found in the egg or larval stage.

The insect is apparently immune to all other strong solutions that have been tried in Victoria.

The following recommendations, however, should be persistently put into active operation, viz.:—

(1) Suppress all weed growth, and cart away or bury all rubbish during the first four months of vegetative activity in the trees. The most important thing is to destroy the eggs and larvæ.

(2) Whilst in the larval stage a large proportion can be destroyed by the application to the soil of 1 oz. of sulphate of iron diluted in 1 gallon of water.

(3) Gas lime and acetylene gas refuse have also been found useful when dug into the ground.

(4) When first observed on weeds or ground crops, either destroy the host plants or spray with some sticky or slimy solution that will impede their movements if it does not kill them.

A POSSIBLE MARKET FOR ROSELLAS.

From almost the earliest days of farm settlement in Queensland, the Rosella has been grown for sale, and has ever since found a market for limited quantities for the purpose of jam-making. As the bark contains a quantity of excellent fibre, it was expected that this portion of the plant would also be largely utilised, but, as in the case of all bast fibres demanding large quantities of water for retting, nothing was ever attempted in the way of producing Rosella fibre. Lately, a communication was received by the Department of Agriculture from a Southern gentleman, who has come to Queensland to point out to farmers the great value of the Rosella if grown on a large scale, and to advocate an extension of the cultivation of the plant, "now that," as he says, "a certain and profitable price is to be obtained."

He proposes to establish depôts in Brisbane and other coastal towns in the North, when a reasonable quantity of this fruit may be obtained, and permanent centres for handling and treatment of the crop. He says that he is prepared to offer 2d. per lb. for fresh fruit delivered at the factory in Brisbane, which price will be the basis of contracts in other places where receiving depôts will be established. He trusts that farmers will realise that in the Rosella, at the price set down, they have a crop which will give a profit "eclipsing many which growers now handle."

It is estimated, on the basis of returns possible to get in other countries (and there is no reason to think that our yield would be any less), that from 4,000 to 7,000 lb. per acre of fresh Rosella can be gathered. Even supposing this estimate to be much exaggerated, he holds that there is still a sound margin of profit in it.

It is claimed that in some of the American States this fruit will give the grower from £25 per acre upwards, and prospective growers are assured by this gentleman that, if the article is forthcoming in sufficient quantity, there need be no fear of a glut, as the demand is practically such as to allay any fear on the score of over-production.

Buying centres, in the event of the scheme being carried out, will probably be established at Bowen and Cairns, or any places where inducement offers of a supply of fruit, in addition to Brisbane.

We have no information on the subject beyond what is here given, but we may point out that the Rosella plant will yield in the season from 2½ to 4 lb. of fruit. The seed is set in rows from 5 to 6 ft. apart, and 4 ft. apart in the rows. If planted 4 x 5, there will be 2,178 plants to the acre, which, at an estimate of 2 lb. of fruit per plant, would yield 4,356 lb. The value of this at 2d. per lb. would be £36 6s. If the maximum of 7,000 lb. of fruit per acre, as mentioned by the proposer, were reached, the value per acre would be £58 6s. 8d. It must, however, be remembered that each fruit must be cut off separately, and sent to the depôt fresh and free from stalk. Whether the labour conditions in this State would admit of the cultivation, harvesting, and marketing the crop, to ensure so large a profit, is a matter which would only be settled by experience. If the result of experiments should show that it can be done, then farmers will have another and a very profitable string to their bow, even if it should take 50 per cent. of the value of the crop to harvest and market it. Meanwhile, we can neither advocate nor deprecate the scheme until further definite information reaches us.

SWEET POTATOES IN AN ORCHARD.

A North Coast orchardist, who is going in largely for citrus fruit-growing, having planted a considerable area on which sweet potatoes had been growing, but had not been dug, is anxious to get rid of them; but, although he has mowed down the vines and ploughed and harrowed the ground several times, still the vines persist in growing, and naturally so. Only continuous work will get rid of them. The matter having been

referred to Mr. C. Ross, Instructor in Fruit Culture, that gentleman says:—

"Some orchardists would be glad to have a dense mass of sweet potato vines all ready to plough under for providing humus—the very substance that most fruit lands are short of. Why is it desired to grow cowpea when a fine green crop is now available? If nitrogen is required, then use a nitrogenous fertiliser in conjunction.

"Do not adopt such an ill-advised method of getting rid of the crop by applying an arsenical mixture in any form.

"Your object should be to bring every portion of latent plant food into a soluble condition, to be readily utilised by the trees, and not to poison what food is already there. The arsenical particles may never leach out of the subsoil, and there are already too many deleterious substances in some subsoils needing correction without adding to the trouble. To mention a few only, acidity is caused by bad drainage, copper, antimony, chlorinated magnesia, salts of iron, and other minerals, common salt, &c.

"To succeed with either a small or large orchard, continuous and thorough surface cultivation is absolutely necessary from the start. A perfect soil mulch, 3 in. deep, should be kept up all the year round, and, if this operation is performed in a proper, workmanlike manner, as it ought to be, neither a weed or sweet potato can exist."

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1914.

Date.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
	Rises.	Sets.	Rises.	Sets	Rises.	Sets.	Rises.	Sets.
1	4·56	6·46	5·21	6·42	5·41	6·20	5·57	5·47
2	4·57	6·46	5·21	6·42	5·41	6·19	5·58	5·46
3	4·58	6·46	5·22	6·41	5·42	6·18	5·58	5·45
4	4·59	6·46	5·23	6·41	5·42	6·17	5·59	5·43
5	4·59	6·46	5 24	6·40	5·43	6·16	5·59	5·42
6	5·0	6·47	5·24	6·39	5·44	6·15	6·0	5·41
7	5·1	6·47	5·25	6·39	5·44	6·14	6 0	5·40
8	5·1	6·47	5·26	6·38	5·45	6·13	6·1	5·39
9	5·2	6·47	5·27	6·37	5·45	6·12	6·1	5·38
10	5·3	6·47	5 28	6·37	5·46	6·11	6·2	5·37
11	5·4	6·47	5·28	6·36	5·46	6·10	6·2	5·36
12	5 4	6·47	5·29	6·35	5·47	6·9	6·3	5·35
13	5·5	6·47	5·30	6·35	5·47	6·8	6·4	5·34
14	5·6	6·47	5·31	6·34	5·48	6·7	6·4	5·33
15	5·7	6·47	5·31	6·33	5·49	6·6	6·5	5·31
16	5·8	6·47	5·32	6·32	5·49	6·4	6·5	5·30
17	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·29
18	5·9	6·47	5·33	6·30	5·50	6·2	6·6	5·29
19	5·10	6·47	5·34	6·30	5·51	6·1	6·7	5·28
20	5·11	6.47	5·35	6·29	5·51	6·0	6·7	5·27
21	5·12	6·46	5·35	6·28	5·52	5·59	6·8	5·26
22	5·13	6·46	5·36	6·27	5·52	5·58	6·8	5 25
23	5·13	6·46	5·37	6·26	5·53	5·57	6·9	5·24
24	5·14	6·45	5·37	6·25	5·53	5·56	6·9	5·23
25	5·15	6 45	5·38	6·24	5·54	5·54	6·10	5·22
26	5·16	6·45	5·39	6·23	5·54	5 53	6·10	5·21
27	5·16	6 44	5·39	6·22	5·55	5·52	6·11	5·20
28	5·17	6·44	5·40	6·21	5·55	5·51	6·11	5·19
29	5·18	6·43	...	...	5·56	5·50	6·12	5·18
30	5·19	6·43	...	...	5·56	5·49	6·12	5·18
31	5·20	6·43	...	...	5·57	5·48	...	...

PHASES OF THE MOON.			H.	M.	
4 Jan.	☾	First Quarter	11	9	p.m.
12 „	○	Full Moon	3	9	„
19 „	☽	Last Quarter	10	30	a.m.
26 „	●	New Moon	4	34	p.m.
3 Feb.	☾	First Quarter	8	33	p.m.
11 „	○	Full Moon	3	35	a.m.
17 „	☽	Last Quarter	7	23	p.m.
25 „	●	New Moon	10	2	a.m.
5 Mar.	☾	First Quarter	3	3	p.m.
12 „	○	Full Moon	2	18	„
19 „	☽	Last Quarter	5	39	a.m.
27 „	●	New Moon	4	9	a.m.
4 Apr.	☾	First Quarter	5	41	a.m.
10 „	○	Full Moon	11	28	p.m.
17 „	☽	Last Quarter	5	52	„
25 „	●	New Moon	9	22	„

Horticulture.

FRIENDS OF THE GARDENER.

Very few practical gardeners are fully acquainted with the injurious and beneficent insects and larger animals which abound in all cultivated plots, and particularly in the flower and vegetable garden. For how often do we hear, "Oh! there's a spider; kill it!" or it may be a toad or a centipede or a bi-spotted coccinella or adalia (ladybird) or a lace-wing fly or a lizard. None of these should ever be killed by the gardener, as they are absolutely harmless to all plants, but deadly enemies of caterpillars, slugs, beetles, aphides, wire-worms, &c. One of the most valuable insects for the destruction of caterpillars, and particularly of the cabbage moth, is the ichneumon fly, which, if magnified, bears a remarkable resemblance to a wasp or bee. Some varieties of this fly deposit their eggs in the caterpillars or the pupæ. The resulting maggots feed on the soft parts of them until the caterpillar or chrysalis is about to undergo a change; but the chrysalides cannot effect this owing to the injuries received from the maggots, and they consequently die. The larvæ of the lace-wing fly are most voracious. They devour vast numbers of aphides, including American Blight, in a very short time, and will even attack large caterpillars. As to spiders, although their webs and nests give an untidy appearance to bushhouses, greenhouses, &c., they should never be destroyed, as they live on all kinds of moths, flies, wasps, and mosquitoes. The tarantula is equally valuable. Our Australian tarantula is a kind of leaping spider which pounces on its prey, as does also the "trapdoor spider." Our centipedes are—some of them—very large, and a nip from their powerful forceps is not only very painful but often more dangerous than the bite of a black snake. Such creatures, although feeding on insects, caterpillars, worms, slugs, &c., are not desirable tenants of the garden. A case occurred in the Executive Gardens, Brisbane, of a gardener being bitten on the little finger by one of these about 5 in. long, and the wound did not heal for twelve months. But there are centipedes and centipedes. The slim red centipede, whose body is not much thicker than a thread, is harmless, and does great execution amongst the insects.

The lizards, which frequent gardens in numbers, are very active assistants in destroying beetles and many insects injurious to garden plants, and they are especially fond of white ants when they can find a broken tunnel exposing these pests to their attacks.

As for toads, no bushhouse should be without a few toads. They are ugly, certainly, but perfectly harmless, and will touch nothing but living food. So quick are they in seizing their prey, such as cockroaches, that the eye can scarcely follow the motion of the tongue as it darts out. The toad neither bites, stings, nor ejects venom, and thus is even more harmless than the house fly. It is nocturnal in its habits, although it will sometimes in wet weather venture out to forage. As stated, the toad will only touch living food. If its favourite dish—a cockroach—

were to stand perfectly motionless before a toad, it would be safe from attack; but the instant it moved even a feeler it would be absorbed as if by magic. Toads dispose of enormous quantities of food. In twenty-four hours the amount they consume equals four times the stomach capacity—that is to say, that in the time mentioned the stomach is filled and emptied four times.

We have, in Queensland, two more good insect hunters—one, the brilliant-eyed, flat-tailed gecko, which often frequents rooms in a dwelling-house. It is a very pretty little reptile of the lizard order, and is perfectly harmless and even friendly. All night long the gecko hunts for moths and other insects. The other is the "mantis"—the so-called "praying mantis"—which is especially fond of blow flies. When it catches one, it holds it in its front feet and first eats out the fly's eyes. But the mantis itself is much esteemed as an article of food by the gecko. We once saw a praying mantis catching flies on the table. Unluckily, a gecko happened to be on the prowl just under the edge of the table, and as the mantis approached the edge the gecko caught sight of it, suddenly seized it by the middle, and that was the end of the poor mantis' hunting expedition.

Unfortunately, the gardener unwittingly destroys thousands of his insect friends as well as enemies by the use of poisonous sprays for the destruction of pests, and also by his ignorance of the beneficent ones, which he is not able to distinguish from those that are injurious.

As for our bird friends, ignorance of their value is really culpable, because their work, either for the benefit or the reverse to cultivators of the soil, is carried on to a large extent by daylight, and an intelligent observer would soon learn to distinguish between his friends and foes.

A knowledge of these things should be instilled into the pupils of the State Schools. They are taught the elements of agriculture. Why not then explain to them what birds and insects are aids to the farmer?

TANNING SKINS.

The Sydney "Town and Country" gives the following as a "lightning tanning process":—

The lightning or sulphuric acid process is the quickest method of tanning wallaby, rabbit, and other skins, and is a very simple one. Pour five or six quarts of boiling water over two quarts of bran, and then strain the infusion. Make an equal quantity of salt water, by adding to blood-warm water as much salt as will dissolve. Mix the bran and salt water, and to each gallon of the mixture (when no more than lukewarm) add an ounce of sulphuric acid (H_2SO_4). Immerse the skins in the liquor, stirring them occasionally till tanned, which will be in about twenty minutes. When tanned, rinse in clean water, and hang out in shady place to dry. Pull and stretch them well while drying. By sufficient pulling they can be made quite white. Dry skins should be soaked in warm water before tanning till they are quite soft, and all flesh and grease should be well cleansed from them.

Tropical Industries.

KAPOK.

Some interest appears again to be taken in the subject of the cultivation of kapok in Queensland. One or two inquirers have asked—

WHAT IS KAPOK?

Kapok is a floss produced in pods on a tall tree which may be seen in some gardens in North Queensland. The floss is extensively used

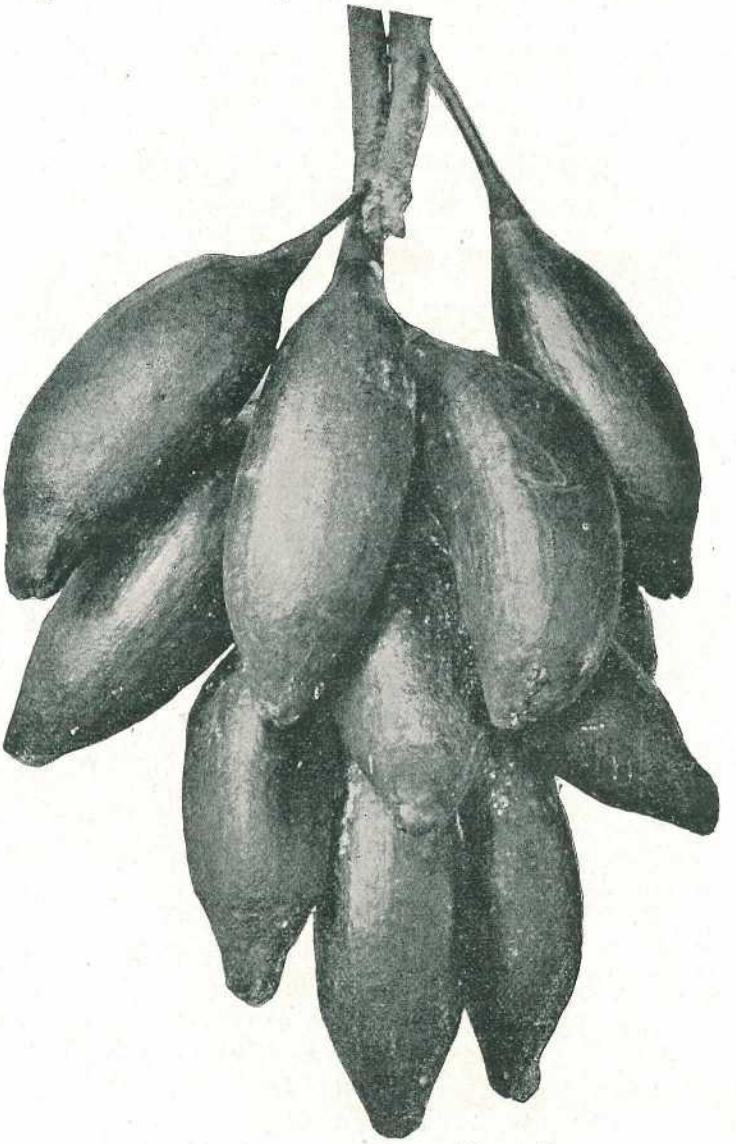


PLATE 3.—CLUSTER OF GREEN KAPOK PODS.

for filling pillows, cushions, mattresses, duvêts, and similar articles. In Java there are over 50 plantations where kapok is produced as an auxiliary crop. On some, however, it is the principal crop, and about 40,000 bales of the floss are exported annually to Holland, Australia, China, and America, Australia taking something like 8,000 bales of 80 lb. each. Of this quantity Queensland manufacturers take (according to the Government Statistician) over 5,000 bales, or 445,167 lb.; so that it will be seen that there is a local market for a considerable quantity of the product.

Another question is—

WILL IT PAY TO GROW KAPOK?

Mr. M. Saleeby, Chief of the Fibre Division, United States Department of Agriculture, Manila, in a bulletin (No. 26) on kapok, points out that the annual yield of clean kapok from a tree of normal growth and under 7 years of age may be placed at 350 or 400 pods. Trees between 7 and 10 years should average 600 pods or more. Reckoning that 230 pods produce 1 kilo (about (2⅕ lb.) of clean fibre, a hectare (about 2¼ acres) containing 280 trees ought to yield 95,000 to 110,000 pods, which, at the rate of 230 pods to 1 kilo (2¼ lb.), will yield 410 to 480 kilos (922 lb. to 1,080 lb.) of clean kapok per year. From the 7th to the 10th year, a hectare (2½ acres) should produce about 640 kilos (about 1,440 lb.). The clean kapok averages from 55 to 65 per cent. of the weight of the seed. A tree which yields 3 kilos of clean kapok during the year yields also about 6 kilos of seeds. The value of kapok for the highest grades has gradually risen from 27 centavos (13½d.) in 1900 to about 80 centavos (3s. 4d.) in 1907; and in 1912 the value continued to advance, reaching its maximum of 90 centavos (3s. 9d.) per kilo of 2⅕ lb. towards the latter part of the year.* This gradual rise in the value of kapok is accounted for by the continual increases in the uses made of it, which was in turn caused by a more general knowledge of its superior qualities and its suitability for several purposes heretofore unknown. The chief market is Amsterdam, Holland, which is a distributing centre for most of the European countries using the product, such as Great Britain, Germany, France, Belgium, and others. These countries are said to use, for the most part, the higher grades of kapok. Australasia and the United States come next to Holland as buyers of kapok, and these consume chiefly the medium and lower grades. Kapok, like other fibres, is usually sold under four grades, the difference in price between each two successive grades ranging from 9 to 13 centavos per kilo. The price of kapok imported into Queensland is from 8d. to 9d. per lb.

The fine, silky fibre is used for filling cushions, pillows, mattresses, &c., and, owing to its great elasticity, all these articles filled with it will, after pressure is taken away, resume their previous dimensions. In other words, kapok does not get matted with use, as is the case with all other filling materials.

* These prices indicate a duty on exported kapok, of which we have no information. Kapok comes duty free into Australasia.

BY-PRODUCTS.

The most valuable product of the kapok tree is, of course, its floss. Next to this in value and importance is the seed, which has also become an article of trade; 20 per cent. of its total weight consists of the oil

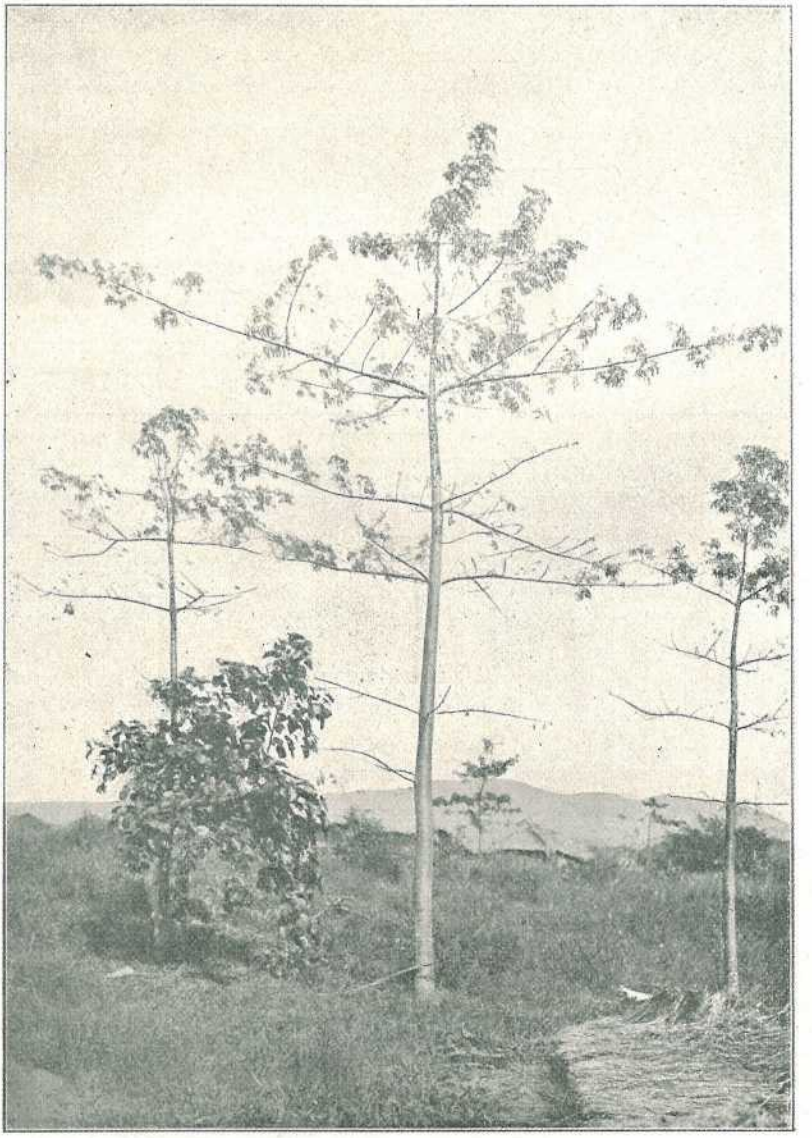


PLATE 4.—FIVE-YEAR-OLD KAPOK TREE AT LA CARLOTA EXPERIMENT STATION, OCCIDENTAL NEGROS.

content, and the value of the seed in Manila market is about 3½ centavos per kilo. On this basis a hectare of land planted to kapok under 7 years of age will yield 800 to 900 kilos of seed per year, valued at 28 to 31·50 pesos. From this it would appear that an acre of kapok carrying

about 150 trees should yield a cash return, at the quoted Queensland wholesale price of 9d. per lb., of floss £19 16s., and of seed £3 3s. 1d., or £23 per acre.

At one time an obstacle in the way of production of kapok by white labour was the want of machinery to separate the seed from the floss;

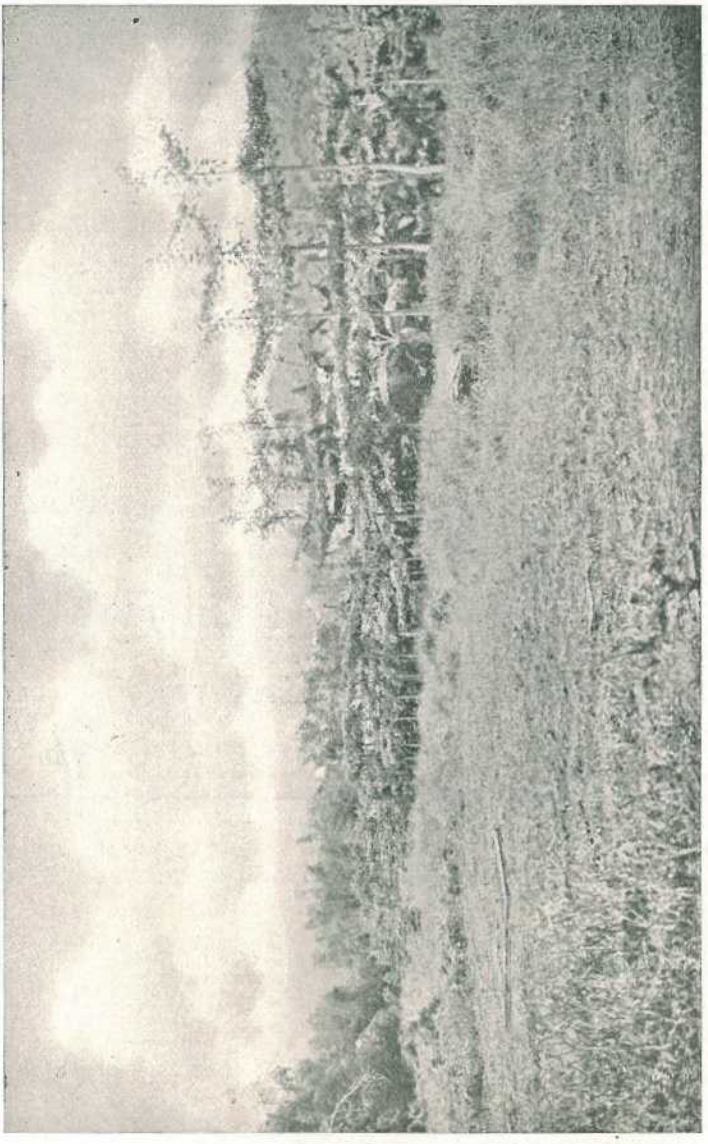


PLATE 5.—ROW OF SIX-YEAR-OLD KAPOK TREES AT BATAAM.

but Mr. Saleeby, in his pamphlet, shows that this drawback has been eliminated, as suitable machines of large and medium capacities are now available.

The principal steps (he says) in the kapok industry which claim the attention of the prospective producer and upon which depends his ultimate success are:—First, the judicious selection of a location having

a suitable soil and climatic conditions; second, the necessity of raising kapok on a large scale or in localities of sufficient propinquity; third, the adoption of the proper cultural methods by which kapok can be most conveniently and economically raised; and, fourth, the use of modern machinery for cleaning and baling the product, as well as the exercise of judicious methods in the handling of it prior to and after cleaning.

In conclusion, Mr. Saleeby says that " several communications have recently been received by the Bureau of Agriculture, Manila, from a number of manufacturers in the United States, who are desirous of handling the Philippine product, and who have quoted prices ranging from 65 to 90 centavos per kilo, laid down in New York or San Francisco. These facts, together with the facility of raising kapok in the Philippines and its freedom from any dangerous enemies or disease, should recommend to the attention of Philippine planters as well as Philippine buyers and exporters the advisability of building up this industry, and endeavouring to supply the larger part, at least, of the American and Australasian markets."

As far as Australia and New Guinea are concerned, the climate of North Queensland is eminently adapted to the cultivation of the tree, especially in the neighbourhood of Cooktown, where a few trees are found growing laden with pods and the ground is strewn with quantities of this valuable fibre, all going to waste. The same may be said of the country around Townsville, Rockhampton, and Gladstone. As for New Guinea, there are avenues of these quaint-looking trees at Rigo and other places, all over 7 years of age, and all in full bearing; yet nothing is done with the product in spite of cheap and abundant labour.

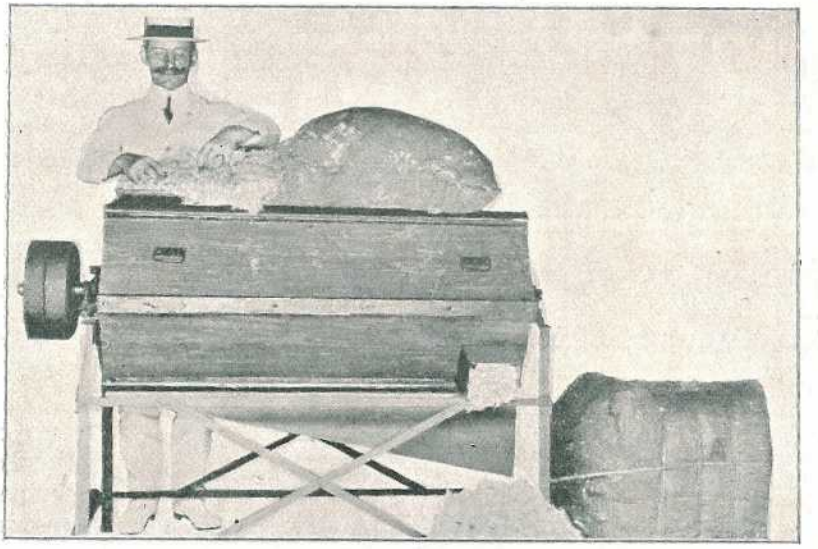
CLEANING MACHINES.

Mr. Saleeby gives the following information in his interesting pamphlet on machines regarding which he has any information of importance:—

1. *The Bley Machine,* invented by Mr. G. Bley, a prominent kapok planter of Java. This machine is supposed to be one of the best machines so far invented. It requires ½ to 1 horse power for its operation, and is claimed to clean about 217 kilos (over 500 lb.) of floss per hour. The machine obtained first prize at the Surabaya Fibre Congress and Exhibition, held in July, 1910.
2. *The Becker Machine,* invented by Messrs. Becker and Co., Surabaya, Java. This machine works on the general principle of the Bley machine, differing from the latter principally in having the cleaning chamber set perpendicularly instead of horizontally as in the Bley Machine. It is claimed that this machine cleans about 120 kilos (288 lb.) per hour.
3. *The Lienau Machine,* invented and manufactured by some English firm whose name could not be learned. This machine was imported into the Philippines by Mr. Felix Lienau, of Manila; hence the name given it here. It is built very much

on the same general plan as the Bley Machine, but is much smaller in size than the latter, and is not provided with a fan. It requires from ½ to 1 horse power for its operation, and will clean between 120 and 130 kilos per day of ten hours. Its simplicity of construction, the inexpensiveness of its operation, and its low cost (probably not exceeding 150 pesos (£30) without motor) would indicate that it can be operated to advantage on smaller plantations.

The illustrations are also taken from Mr. Saleeby's pamphlet on the Kapok Industry, No. 26, issued by the Bureau of Agriculture, Manila.



LIENAU KAPOK-CLEANING MACHINE. EXTERIOR

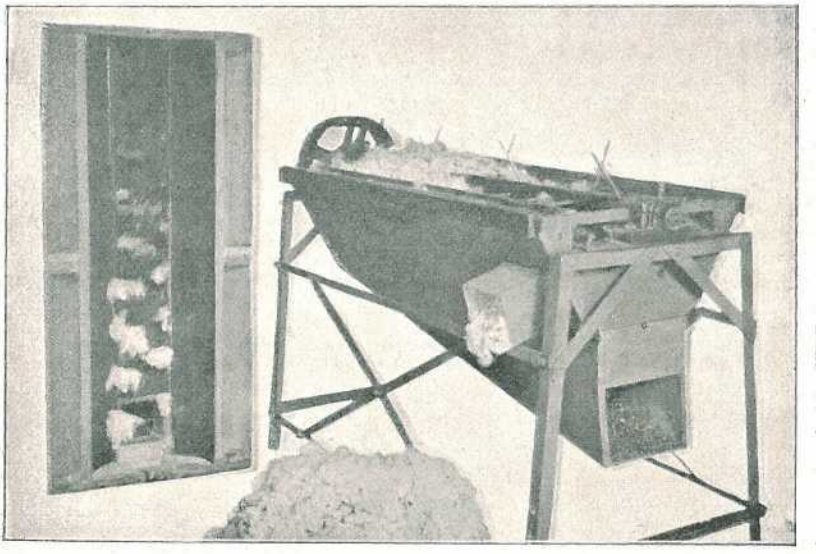


PLATE 6.—THE LIENAU KAPOK-CLEANING MACHINE. INTERIOR

IS ANOTHER RUBBER BOOM AHEAD?

A special correspondent of "Grenier's Rubber News" writes optimistically on the "Interesting Possibilities of the Near Future."

"It may sound," he says, "like the most ludicrous of paradoxes at a time when rubber depression almost defies description to say that we seem to be going full steam ahead for another boom. Paradox or not, it is a view which is held in certain quarters, and is a prospect which the born gambler would welcome. The fact is that just as, in April, 1910, when rubber was 12s. 6d. per lb. and people behind the scenes were talking of its going to 25s., the turn came and the slump has continued with a few breaks ever since, so now, when the wiseacres of Mincing Lane are prepared to talk of eighteen-penny rubber and general ruin, the upward movement may begin and have as long a run as the slump. Not being a prophet, I hesitate to say what I think may happen. But history has a knack of repeating itself, and if the boom of 1910 succeeded the slump of 1908 there is no reason why a boom in 1915 should not be the reaction from the depression of 1913. Of course it will be said the conditions are very different. To some extent the difference makes in favour of a new boom a year or eighteen months hence. The statistical position in 1908, due to American troubles, showed declining consumption, temporary though the decline was. The statistical position in 1913 shows an increasing consumption and declining visible stocks, notwithstanding vastly increased outputs. We have the extraordinary condition of things that rubber prices are falling or have fallen with the fall in the surplus amount available for consumption. Nothing could more forcibly illustrate the artificial character of the present situation than the fact that the world's stocks have gone down without prices going up. The idea of over-production meanwhile is the sheerest moonshine: every ounce of rubber brought forward has been taken up by the dealers, and it is worth repeating that no one pays even 1d. per lb. for an article he does not want. Of course the large quantities of plantation rubber coming forward rob the dealer and the manufacturer of any fear that supplies will fail. But supplies may yet fall short if prices continue so low that the bulk of the wild stuff from Africa and elsewhere is driven out of the market. Brazil and the plantations cannot meet the demand yet awhile unassisted, and if the shortage at present prices came suddenly there would be a panic and a boom before those who had been crushed out were able to resume operations. Hence the paradox may prove to be not a paradox at all, but a simple economic development.

"We are certainly passing through a remarkable time, and if they were not so pitiable we might almost be inclined to smile at the difficulties in which some of the leaders of the industry find themselves. There are as many views of what should be done to meet the crisis as there are people called upon to decide. When the boom was on, the great ones in the rubber industry thought themselves mighty fine fellows, and the world was inclined to regard them as heaven-sent leaders. But they did nothing to promote the huge profits which came to themselves and their companies, and, now that the wheel of Fortune has gone full round, they are convicted of having done nothing to stop its movement. . . .

Suggestions are floating about that, when the worst has been reached and many companies cannot go on as the result, the advocates of *laissez faire* will step in and acquire many excellent properties cheap. That would be Machiavellian finance with a vengeance! It would mean risking the solvency of some fine companies of the first class, in order to get possession of promising companies of the second class—which, after all, might not prove practicable. Of course there is much to be said for the maintenance of a free market, but it is reasonably contended that we have not got a free market now: the market is in the hands of half a dozen men as cute as any in the city of London. One of the humours of the situation is that certain well-known freetraders, who will not even listen to arguments in support of Imperial preference—to say nothing of protection—are among the most strenuous advocates of protective measures for the rubber industry in which they have big interests!''

WHAT IS REALLY WRONG WITH RUBBER?

We have frequent inquiries from subscribers, who have invested money in rubber shares in Malaya and Papua, as to the future prospects of the industry, a drop in price from 12s. 6d. per lb. in 1910 to 3s. 4d. and 3s. in 1913 giving some people cause to think that they have little hope of realising even Savings Bank interest on their venture. We have just received the latest '' Grenier's Rubber News,'' which contains an article under the above caption. It reads as follows:—

'' We gather from our own London correspondent and the home newspapers generally that all and sundry, from the smallest plantation shareholder to the rubber barons themselves, are busily engaged endeavouring to discover what is wrong with rubber. The influential Rubber Growers' Association, the membership of which includes a reprerentative of practically every rubber company of any importance and almost, without exception, all the lights in the rubber world at home, has met and appointed a representative committee, which for weeks has met in secret conclave and apparently has not succeeded yet in locating any vital disease. The Growers' Association committee, moreover, will probably go on sitting for some months to come and finally issue a lengthy report which will get us little or no further than we already are. The fact of the matter is they have quite made up their minds at home that, having regard to the fallen price, there must be something radically wrong with rubber, and there is hardly a single individual to be found who has the really very obvious position as we find it to-day fairly diagnosed. This is due to the fact that most people bought rubber interests on the strength of a high value for the commodity, failing entirely to adequately allow for the inevitable ultimate fall to a proper commercial level.

'' There has been no falling off in the demand for rubber, but as the supplies grow the consumers naturally are unwilling to pay for it at many hundreds per cent. beyond the production cost price. It is not a fall in consumption that has caused the value to decline, but actually

the increased production and hence the competition amongst the producers themselves in the selling of their goods in the market. To-day the demand for and the supply of rubber is more evenly balanced than it has been for many years, and instead of the demand stimulating the supply it is now the supply that is encouraging the demand. In other words, the price for rubber that has ruled during recent years has made the use of it impossible in a thousand-and-and-one directions, which with the progress of time and the lower cost of rubber are now becoming consumptive mediums. Every farthing or cent. per lb. that rubber falls in cost to manufacturers makes its use practicable for some new and probably some very extensive purpose. Thus the only thing that is really wrong with rubber, from the point of view of the industry as distinct from the particular concern of the company shareholder, is that the cost price of rubber to the manufacturer has been too high. In time it must come down to a proper basis.

" Whoever heard of a commercial article, in which there was no limit to productive possibilities, permanently being marketed at 100 per cent. profit? and that is still roughly the profit per lb. on plantation rubber allowing for the obliteration of extravagances which are obviously included in 'all in' production costs. We have no hesitation in saying that, if rubber during the past three or four years had been just a normal commercial article producing the normal rate of profit, its 'all in' production costs would at this date be no more than 1s. sterling per lb. and probably less. The simple fact of the temporarily profitable state of the industry has naturally encouraged risky and costly experiments and very many extravagancies which the high profits on production allowed and permitted to be ignored. These costs may or may not have a permanent good effect on the industry. We are not here disposed to discuss whether or no they have or otherwise been justified. Our immediate contention is that rubber could have been produced much cheaper than it has during the past few years, and that the time will come when it will really be produced cheaper and on a more economic and business-like basis.

" Having, in passing, commented upon the costs in the East, it is fair to say they only form part of a generally extravagant policy which has been a more or less common association with the plantation rubber industry since the boom of 1910, and through the free supplies of cash which that boom provided. The scale of costs at home is quite as bad; probably worse! The financing of the plantation industry ever since the boom has been a highly profitable game—first on promotions, and since then the many pickings which were cleverly arranged for at the time when estates were at a premium and those who wanted them were prepared to agree to almost any terms. Those pickings provide annuities and unearned increment to fortunate individuals at the cost of production, and while there is still a substantial profit on rubber they will remain, or be modified only gradually as modification becomes more and more necessary with the narrowing of the margin between the cost of production and the market value of the commodity. It will likely take years to weed out these internal diseases, for company shareholders are

still receiving very high dividends, and they will only begin to agitate about administrative costs when dividends become much diminished—that is, if they do so become. With rubber costing 1s.—it should cost no more—and selling at, say, 1s. 6d., possibly rather more, there should be no question about adequate dividend payments in the future. We use the word adequate advisedly, for the day of abnormal dividend payments has passed.

"We must look ahead to a reasonable return as given and expected on every normal commercial enterprise or industry. For the most part rubber is destined to provide substantial returns on the initial capital involved. The premiums paid for shares are no concern of the industry, nor have those premiums formed any part of the capital which has been sunk in the creation of the industry. Those who bought rubber interests at high costs simply paid cash profits to those who previously bought them low, and the rubber industry cannot be blamed for that. Those who are trying so hard to find out that there is something wrong with rubber had better carefully digest these several really elementary facts. They will discover that there is little else wrong with rubber or the matter with the plantation industry."

RUBBER PAVEMENTS.

For some time past there has been much talk of rubber being used for road paving, and the matter appears to be attracting attention of late in view of the low price ruling for the raw material, added to the contemplation of a great increase in the supply of rubber within the next few years.

At present there are in London three places where rubber flooring or pavements are to be found—viz., the courtyards of the Savoy and Claridge's Hotels, and the approach and exit of the Euston Railway Station. There can be no doubt that these pavements have admirably well served the purpose for which they were intended. Those at the two hotels, with the constant ebb and flow of vehicles of all descriptions, have stood the test of time. Originally of 2½ in. in thickness, the pavements, after a decade or more, have worn off in some places to half their original thickness. The paving at the Euston Station proves in a greater degree the wearing power of rubber. Over thirty years ago some of the rubber was laid under the arch of the station through which vehicles depart from the station, and, though worn out to 1½ in. in some places, the pavement is still serviceable and does not require immediate relaying.

We learn from papers to hand by last mail that a patented rubber preparation is now being laid on certain thoroughfares in London with a view to testing its suitability for the requirements of heavy traffic. We quite believe that a large quantity of rubber will be worked up in

connection with this matter during the next few years, but the "Stock Exchange Gazette" remarks as follows:—"It is scarcely surprising, perhaps, that an attempt should have been made to suggest that this new use of rubber will exercise a far-reaching effect upon the planting industry, but while there are some germs of common sense in this contention there is a tendency to carry the argument much too far. In the first place, the class of rubber employable for road-making purposes is of the roughest kind; such, in fact, as is hardly saleable for other purposes, and is consequently obtainable at a very low figure—approximately, we believe, about 1s. 9d. per lb. if ordered in sufficiently large quantities; and in these circumstances it is not to be supposed that the Road Board will send their agents to the Mincing Lane auctions to bid for, say, fine plantation crêpe to be used in providing a surface for the thoroughfares of London. The real significance of the development now in progress is that, if it gains as much popularity as is expected, it will provide a market for rough grades of rubber, thereby producing a considerable revenue which at present does not exist in any shape or form. Every planting company has a good deal of rough stuff which is quite unsuited to Mincing Lane purposes, though it possesses a good many of the qualities of the finer material, and is, in addition, exceptionally durable. On this basis we attach a good deal of importance to the new road-making process, but we are far from believing that it will revitalise the rubber-growing industry, or that it will stimulate the price of the more expensive grades of latex."—"Grenier's Rubber News."

NEW CANE PLANTER.

The "Mackay Standard" describes a new cane planter, invented by Mr. W. Punzell. It consists of a box, made high in front, to hold the plants, and carried on two wheels, smaller but wider than the ordinary buggy wheel. The axle is made so that the box is fairly high from the ground, and attached to the axle is another V-shaped axle, on the apex of which is hung an ordinary swing plough, without the handles. The horses are attached to this plough. The plants are dropped through a leather conduit, and fall immediately behind the plough, through a space formed by placing another plate parallel to the plough's original side plate. Two horses are attached to the machine, which is fitted with a pole and cross bar. The assistant sits on a seat behind the box, and feeds the plants, whilst another man drives. At the demonstration given, each plant was laid perfectly in line, and as the machine passed on the earth fell in and covered them. Planting was only carried out one way. On the return, by the manipulation of a lever, the depth of the furrow was lessened to 7 in., and the next row was marked out. Following the same line then, the depth was altered to 10 in., and the planting proceeded as before. With three horses, however, enabling the 10 in. furrow to be

opened out in the one operation, planting could be carried out on both journeys, without the necessity for the marking out. For March planting, a shallower depth would suffice, and two horses could do the work.

The machine weighs about 2 cwt., without the plough, and it is claimed for it that even planting as Mr. Punzell was doing, on one journey only, it will plant two acres a day.

ANOTHER CANE PLANTER.

An improved cane planter, patented by Mr. G. Hing, of Pioneer Farm, Stockton, is thus described by the "Johnstone River Advocate," of 18th September:—

The cane planter is a plough, which is drawn under the dray, and so constructed that the two sides dig out a trench in the furrow at any depth, and a little distance behind the share there is a slot in the plates which allows the plant to lie on a ridge of loose soil, which is preferable to a hard bottom. The loose plants in the dray are handled by a boy, and thrown down a funnel, which is set in the bed of the dray. The plants pass below between the parallel sides of the plough. At the same time the plants are laid perfectly in line. The coverers attached behind completely cover the pieces. These coverers may be regulated to cover deep or shallow, and if they pick up any rubbish it is rapidly freed by lifting the plough handles without stopping the team. In the case under notice the plants were covered to a good depth to hold the moisture, but, by the raising or lowering of two chains which suspend the plough, the depth may be regulated to any degree. Besides, it may be done from the "pull" at the head of the plough. These cane planters may be attached to any dray, and, in the case when the dray has to go any distance for a fresh supply of plants, the plough may be secured by the chains and raised out of harm's way without disconnecting it from the dray, thus saving time. When the plants are obtained, it is a simple matter to put the plough into action. In the exhibition the drills were struck for the planter.

With this ingenious contrivance, it is possible to plant over 4 acres per day, with the aid of a boy sitting on a movable seat to feed the plants, and one man as driver.

In connection with the planter, we saw a manuring machine attached to the dray, and tried with success. The feed may be regulated, and the fertiliser passes into the furrow as fine as flour itself, caused by stirrers in the receptacle, which break any lumps, and keep the stuff moving to the feed pipe. The whole of this mechanism is worked from the axle of the dray by means of a sprocket wheel and chain.

Mr. Hing is to be complimented on the success of the cane planter, and several of our cane farmers have placed orders for this appliance. It is probable that other sugar districts will adopt them.—"Australian Sugar Journal."

Vegetable Pathology.

REPORT ON SOME OF THE DISEASES OF CITRUS FRUITS.

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

In continuation of a further investigation of the diseases and pests affecting citrus fruits, I left Brisbane on the 13th of October and toured part of the Blackall Range, including Nambour, Kureelpa, Mapleton, and Montville. I also visited Gympie for the purpose of giving advice on the sites, aspects, and methods of laying out and planting new areas to bananas, pineapples, and citrus fruits.

In the Blackall Range district are to be seen some of the best-kept and remunerative orchards in the State, but at the same time the successful grower is made to work all the harder by reason of his neighbours' heedlessness regarding pests.

With the exception of White Louse and Pink-wax Scales, Borers, Bugs, and Fruit Fly, other diseases and pests are not so general as imagined; and with the attentive man these pests were either non-existent or well under control.

The dangers of the propagation of all pests is a result of carelessness or unthriftiness of the man who has bit off more than he can chew on the one hand, and the gross neglect of the "one-tree" or backyard orchardist on the other. The mistake amateurs and even those who attempt to grow for profit often make is to plant a tree of every known subject instead of specialising in two or three directions only. The result of such a medley of subjects is that a feeding and breeding ground for the fruit fly is ever present. Those who persist in growing a few deciduous and other fruits, so attractive to the fly, in or adjacent to their commercial citrus grove may always expect fly attack. A few well-kept citrus trees in this district will return cash enough and leave a profit, after purchasing sufficient jam fruit for house supplies, than whole acres of peaches, plums, guavas, &c. Although the practice is to be condemned, if a few soft fruits are desired, the trees should be grown on a "dwarf-bush" system, and be close-netted in before the crop begins to colour. The following are some of the diseases and pests investigated, viz.:—

"COLLAR ROT" OR MAL DE GOMMA.

This disease originated in the Azores, and was first mentioned in 1832. Although widespread over the whole of Australia, Europe, and America, it is not very prevalent on that part of the Range I recently visited. I only noticed its presence in two orchards at Mapleton, but probably it exists in other places. The disease is of such a destructive nature that in Florida the annual damage is set down at £20,000; and in Italy, taking an average of sixteen years, the loss amounts to £25,000.

Wherever it gets a foothold, it is spread from tree to tree until entire orchards are devastated. The mysterious working of this disease in its initiatory stages is not always noticed, as it occurs at the collar, close to or beneath the ground. The surest indication is the appearance of drops of gum at the collar or elsewhere; the bark becomes discoloured and emits a disagreeable odour. Where no gumming occurs, some other disease is at work.

Since the discovery of the fungus parasite (*Fusarium limonis,* Briosi), this disease has become amenable to rational treatment. The exudation of gum, decay of the bark, unhealthy appearance of the foliage, and death of small shoots are all symptoms. The mycelium of the fungus permeates and destroys the living tissue, and McAlpine has found the reproductive bodies (conidia) in the gum drops; therefore, if this gum or any portion of diseased tissue is carried, by means of tools or implements, and deposited on a suitable medium or conveyed by any other means to a citrus tree, under favourable conditions for the growth of the fungus, there we may expect the disease to appear.

In addition to the contributory cause and conditions favouring disease, given in my report relative to the orange groves in the Maryborough district, I may add that any condition or treatment that tends to weaken the constitution of the tree will predispose it to the attack of the parasitic fungus. Therefore, it is necessary to maintain a vigorous growth by thorough cultivation and the judicious application of suitable manures. The need of good drainage cannot be too often reiterated; close and deep planting producing excessive shade must also be avoided.

The relative value of stocks upon which to work the different varieties of citrus fruits cannot be entered upon here, but at a future date I will discuss this matter more fully. I may, however, mention, *en passant,* that the seville stock (*Citrus bigaradia*) has been proved to be resistant so far as collar rot is concerned, but it has not been satisfactory as a stock in other directions on the Blackall Range. The sweet orange stock from seedling trees has been found to do best on high basaltic country. What is called the "common rough lemon" should not be ignored. This is the variety that has escaped cultivation, and is seen all over the country in a wild state. It is seldom or ever diseased under the worst of circumstances, and is now being sought after in the Southern States and West Australia for a stock. In Florida it is called the "citroned orange" (*Citrus aurantium indicum*). I have found that oranges budded to this stock do better on rolling, grey, sandy loams overlying clay and with yellow sand subsoils. I have come across oranges that have been worked upon the smooth-skinned lemon, but, as it is so subject to collar rot, it is the most unsatisfactory of all stocks.

TREATMENT.

There is a general remedy for bark and root diseases caused by fungi; and that is, to cut away every portion of the diseased wood as well as some of the apparently healthy tissue surrounding it, and all such portions should be immediately burnt. To prevent any further

spread or infection, the wounds should be dressed by washing or painting with one of the following antiseptic solutions, viz.:—

(1) Fifteen parts of sulphurous acid to 85 parts of water. Exposed roots may also be sprayed at the same strength.

(2) Paint with equal quantities of carbolic and olive oils.

(3) One part of crude carbolic acid to 1 part of water. If used as a spray for roots, it should be diluted in the proportion of 1 to 5.

(4) Coal tar has also been used with good effect upon the amputated part.

(5) The following is a good stock solution to use for many purposes:—Place 30 lb. of flowers of sulphur in a cask, and add sufficient water to form a stiff paste. Add 20 lb. of powdered caustic soda, and stir vigorously. The whole mass boils and liquefies. After violent boiling has ceased, add water to bring it up to 20 gallons. Strain it into a barrel that can be kept tightly corked.

One part of this stock solution is added to 1 part of water for covering wounds, and 1 part to 10 of water for spraying the roots. e

(6) Proper drainage is essential; and by exposing the roots and dressing with slaked lime, the development of injurious fungi will be arrested.

(7) Deep ploughing close to the trees should be avoided, as injury to the roots is favourable to the growth of fungi.

(8) Deep and close planting producing excessive shade is favourable to fungus growth, and otherwise produces an injurious effect upon the trees.

"ROOT ROT" (*PHOMA OMNIVORA*, n. sp.).

Two sickly trees in an otherwise healthy orchard were pointed out to me at Mapleton, which were apparently affected with Armillaria fungus at the root, resulting probably from being planted near old forest tree stumps. But the root rot seen in an adjoining orchard, also at Montville, is of a more deadly character than "collar rot," and it begins in the subsoil and spreads into the tree, which ultimately dies. When trees are badly affected, there seems to be no cure. Bad drainage and stagnant water, poisoning the roots, are very common causes; but it may also be the result of some deleterious substance in the subsoil, such as chlorinated magnesia, copper salts, antimony, or other poisonous minerals. This disease has often been confounded with Mal de Gomma, as it presents similar symptoms; but the distinction in this disease is that there is no gumming, and it is caused by a totally different fungus, called *Phoma omnivera*, n. sp.

A form of this fungus causes "Wither-tip," or what has for many years been called "Die-back" in Queensland, but has nothing to do with that disease, "Exanthenia," and is not known outside America. The very dark-green colour of the foliage so much desired by some growers

is a sure indication that the grove is on the verge of showing disease at the root.

The following treatment will be beneficial:—

(1) Good cultivation and manuring to encourage root action.

(2) Cut hard back and burn all prunings.

(3) Two pounds each of powdered sulphate of iron and fresh slaked lime chipped in the soil around the trunk and beneath the tree.

(4) Small holes made with a stick 10 in. apart and 6 in. to 30 in. round the tree, and Bordeaux mixture poured in at the rate of ½-gallon per tree and 3 lb. of slack lime hoed in a fortnight later.

LEMON BARK BLOTCH (*ASCOCHYTA CORTICOLA*, n. sp.).

Only one example of this disease was observed. The symptoms and effect of this fungus disease are so nearly similar to "Collar Rot" that, except for scientific purposes, a minute description is not looked for by the practical grower, and the same treatment as for Collar Rot will apply.

SCABBING OF FRUIT AND LEAVES.

I found the lemon, of all citrus fruits, to be the worst affected with what is called "Scab." Most of the fruit examined was so badly scabbed that it was quite unfit for market. Glen Retreat mandarins, to a more or less extent, were rendered unsightly from the same cause.

The primary cause of this disease is not easy to determine. Frequently bruises, insect punctures, or other mechanical agencies may so irritate the skin of the fruit as to induce a flow of essential oil, which, becoming oxidised, is converted into a resinous deposit, thus providing a congenial situation for the propagation of fungi. Mr. Tryon, in his researches, found a scarlet mite which he believed was the primary cause of scabbing. Most forms of scab appear to be associated with fungi, although animal and vegetable parasites stimulate the formation of corky tissue, giving the fruit a scabby appearance.

On both oranges and mandarins scab was very conspicuous on the leaves even when the fruit was not badly affected. No less than six different fungi have been discovered associated with scab on a single leaf. In the apple and pear there is a definite fungus known to produce it; but in the lemon various fungi may be associated with the disease, but may not actually cause it.

When the disease is of fungus origin or associated therewith, Bordeaux mixture is the best of all sprays to use, but should be applied and repeated before the disease has developed. Plant lemons on dry soil and in a locality where the rainfall is light during the blossoming and setting period.

"BLACK SPOT" OR ANTHRACNOSE (*PHOMA CITRICARPA*).

This disease was not found to be very prevalent, but sufficiently so to excite the utmost vigilance for keeping it under control. The fungus

causing the dark-brown sunken spots on the fruit, although slightingly spoken of as only a skin disease, is very rapidly spread, not only disfiguring the fruit, but inducing rottenness and decay, and the fruit falls a ready prey to blue mould. The fungus which produces the "Black Spot" has been named *Phoma citricarpa,* and is sometimes found associated with "Melanose," although on the Range I found it by itself. Any treatment having the effect of destroying the reproductive spores will be suitable:—

(1) Disinfect all cases or other receptacles.

(2) Destroy skins of diseased fruits.

(3) Attend to drainage.

(4) Spray with Bordeaux mixture as soon as fruit sets; repeat spraying at monthly intervals before fruit changes colour; also, spray the trees after crop has been gathered.

(5) Sprinkle ½-lb. of sulphate of iron about the feeding roots of each tree, or water this quantity in at the rate of 1 oz. dissolved in 3 gallons of water.

MELANOSE.

One of the most interesting facts in connection with this disease is that the sweet orange type is alone affected. There was only one instance of this trouble noticed, and that to a very serious degree, in an orchard at Montville. Melanose, or, to properly designate the disease, "False Melanose," may be described as follows:—Previous to the attack of the fruit it is to be seen on the young shoots and leaves in discoloured elevated spots, yellowish at first, becoming brown or even black as the blotches begin to swell, and, if looked at through an ordinary good lens, the skin will be seen to have broken up into a reticulated system like that of dried mud. The disease known as "Maori" may also occur on the same fruit; but the discoloration is not broken up in this fashion, but is uniform and continuous. Melanose, as known here, has been proved to be quite a different disease to that known in Florida. Therefore, Mr. McAlpine designates it as "False Melanose," and the fungus producing it is called *Cladosporium Brunneo-atrum,* n. sp.

The Bordeaux mixture and ammoniacal solution of copper carbonate are perfect remedies when properly applied. The summer strength of the former should be applied at intervals of three or four weeks after the fruit has attained the size of a pea.

As there is no injury to the trees to be feared by the use of the ammoniacal copper carbonate solution, it may be preferred. Use at the rate of 5 oz. to 50 gallons of water. A dressing should also be applied about a fortnight after the fruit has been gathered.

There is also another fungus which, for want of a better name, I have called "Running Bark" or "Web Fungus," which I have not seen scientifically described, but is well known amongst orange-growers in the North Coast district—happily not very prevalent. It is one of the most destructive froms of fungi, but, if taken in time, it is easily eradicated by a fairly strong solution of bluestone painted on the spot.

The disease appears in dull greyish streaks, which run together and form a network, the threads running up along the bark of the limbs, throwing out other threads on each side as it proceeds up the tree. Whatever part of the tree the mycelium of this fungus reaches, the living tissues are destroyed, and, if not checked, the death of the tree is certain.

MAORI.

This disease is very common in many parts of the country; but I only found it to a very serious extent in one orchard on the Range, and in this instance the crop, which was a very fine one, had been ruined from an export point of view. Maori is sometimes found on the same fruit with Melanose, and, the two being similar in appearance, are often confounded by the casual observer. On close examination the former presents the colour of a Maori's face, and is smooth to the feel, the discoloration is uniform and continuous, and is caused by a small mite which punctures the oil cases, from whence the oil exudes and spreads and dries on the surface; whereas Melanose is produced by a fungus, and appears as round, brown spots which run together in irregular curved lines, giving a streaky appearance to the skin, which is roughened and reticulated.

Flowers of sulphur dusted at intervals over the tree, beginning when the fruit is small, is a useful remedy for Maori; but the most effective preventive is 1 lb. of whale oil soap to 50 gallons of water sprayed on at intervals. If the two diseases appear together, a weak solution of the lime-sulphur wash is recommended whilst the fruit is small. This latter wash being both an insecticide and fungicide, is also very effective against several other diseases besides Maori and Melanose.

Amongst scale insects the most troublesome, if not the most destructive, to be found in this region are the White Louse (*Chionaspis citri*) and Pink Wax (*Ceroplastes ruber*), which are very widespread. Red oil and cyanide sprays at various strengths have been applied with more or less good effect, but in my opinion there are none so satisfactory, next to cyaniding, as either of the old-fashioned solutions such as the "Kero," "Resin-soda," or "Lime-sulphur" washes if properly made and applied. The Red Circular Scale (*Aspidotius coccinea*)—the most deadly of all scales—I was very pleased to note was almost non-existent. Borers in some instances are a serious trouble. The only way to cope with these is to follow them up, and, where a suspicion of sawdust is to be seen, either probe the cavity from whence it came, insert kerosene, block the orifice with hard soap, or catch the insert on the wing. This may be done by hanging a light over a dish of soapy or oily water just after sundown. A very good deterrent is tar water—1 lb. of oil of tar to 100 gallons of water. The moth and beetles avoid laying their eggs where the odour of tar is present.

A considerable loss has been occasioned by the depredations of the Orange Bug—Holy Bug (*Mictis profano*). As a description of this well-known pest may not be required, I simply give what I consider the best means of minimising the evil. The old recommendation for shaking the branches, inducing the bugs to climb down the stem, is a method that

does not appeal to the commercial grower. A simple and effective method is as follows. viz.:—Before sunrise or after sunset, or in cool weather when the bugs are not active, throw a gas-tight sheet (calico) over the tree and fumigate with hydrocyanic acid gas or strong tobacco fumes.

"Banana Scab" was noticed to a slight extent at Kureelpa and in some of the plantations on the eastern slopes. "Black Point" or Anthracnose was prevalent in several instances. This disease is most in evidence in the spring, and has been put down as the result of cold or wet. As certain fungi are always in connection with the two above diseases, a fungicide, such as Bordeaux mixture, applied when first seen, is the best remedy.

The season, in spite of certain drawbacks, has been a good one; and growers speak with satisfaction as to the quality, quantity, and the prices that have ruled for Citrus, Pineapples, and Bananas.

Considering the very large scope there is for inquiry and investigation, I have not been able to give a very detailed and exhaustive description of all the subjects that came under my observation during this tour, as any one of those touched upon would occupy a good-sized pamphlet; but from what has been written, and the advice offered thereon, it will be concluded how important it is for the grower to be on the alert and exercise his best judgment and energy for observing and suppressing all such troubles as may exist.

Before closing this report, I would like to draw attention to the subject of cincturing or girdling. This is an operation which has led to considerable success, not only on grapes, deciduous standard fruits, mangoes, citrus, but more particularly with relation to the navel orange. Many growers complain that this variety is not a good bearer or that it is erratic in its cropping. The navel orange, with its large foliage and large fruit, is a more ravenous feeder than most other varieties, and requires a stronger, richer soil with abundance of moisture and generous manurial treatment, together with the best of cultivation. Grown under such conditions, but yet proving an erratic bearer, the operation of girdling should be tried. The operation is performed as follows:—Choose alternately one-half of the branches in the secondary system of growth—*i.e.*, the branches not less than 1 in. in diameter on the first, second, or third forks—and remove a circle of bark about one-eighth of an inch wide, completely ringing the branch. The operation should be performed just as the flower buds begin to swell or when the sap is rapidly ascending to the head of the tree. The return flow of sap coming down by the outer bark is thus checked at the ring, and is absorbed by the opening blossoms, causing more profusion and helping them to set better. If adverse conditions cause the fruit to drop off whilst they are small, a second girdling will enable the fruit to hang better and bring it to maturity from seven to ten days earlier. Instruments for this purpose may be purchased at small cost.

The following references have been consulaed:—H. Tryon, D. McAlpine, N. A. Cobb, J. F. Moody, R. E. Smith, and O. Butler; Bulletin No. 4, U.S. Department of Agriculture; W. J. Allen, and J. French.

Entomology.

FRUIT CATERPILLAR OF THE BANANA.

BY E. JARVIS, Assistant Government Entomologist.

Whilst investigating a disease of Cavendish bananas at Cairns, last September, I had an opportunity of securing specimens of the caterpillars and pupæ of a small moth which during the past season has proved very destructive to green bananas.

This pest has remained unidentified up to the present, although the fact of its being injurious has been previously recorded by Mr. Tryon ("Natural Enemies of the Banana occurring in Queensland"); but, having lately bred the prefect insect from material collected whilst at Maria Creek, a brief account of its life-history and economy will no doubt interest banana growers.

NATURE OF INJURY.

The moth deposits its eggs at the base of a "hand" as soon as it is uncovered by the flower bract, the larvæ when hatched hiding between the tiny "fingers" and gnawing their surfaces, producing at first a slight discoloration, which at this early stage is practically hidden from view.

When the hand becomes half grown, however, the caterpillars, which are then of a size to permanently damage the fruit, gnaw irregular patches in the tender skin near the stem end of the "fingers."

A watery matter exudes from these wounds, which are soon repaired by corky tissue, at first pinkish in hue, but ultimately darkening to yellowish brown, and assuming the appearance of unsightly scabs that sometimes cover two or more sides of a "finger," and are raised slightly above the surrounding green undamaged surface.

In addition to this injury, the fully grown caterpillar sometimes eats through the skin close to the fruit stalk, making a large deep irregular cavity, and in such cases it is not unusual to find the affected "hand" worthless for marketable purposes, the majority of fingers being badly scabbed, and the spaces between them partially filled with webbing mixed with excreta of the caterpillars. Growers generally remove such "fingers" before marketing bunches, and Chinamen make use of them in some instances for pig feed.

DESCRIPTION OF LARVA.

General colour shining light yellow, more or less pinkish, especially on thoracic and hinder abdominal segments. Body marked with numerous pale greenish-brown tuberculate blotches, each enclosing a black dot, from which, in the majority of cases, arises a single brown hair. These blotches are larger close to centro-dorsal area than on sub-dorsal and ventral surfaces, and arranged in the following order:—Dorsal surface of 1st thoracic segment shining black with a narrow

yellow centro-dorsal line; a blotch on each side in line with spiracles, and a larger one just below it, both bearing two hairs; and a blotch on centro-ventral area immediately behind coxæ. 2nd and 3rd thoracic segments with a row of six blotches near frontal edge, the two dorsal supporting two hairs; two blotches on each side behind frontal row, the one nearest coxæ being lunate; and two behind coxæ. 1st, 2nd, 7th, and 8th abdominal segments with a frontal row of twelve blotches encircling body, and two behind dorsal blotches. 3rd to 6th segments with a frontal row of eight; one on each side of prolegs, and two behind dorsal blotches. 9th segment with a large centro-dorsal blotch, and eight encircling body. Anal segment with a very large triangular dorsal blotch supporting a number of hairs, and a large blotch on each side of prolegs. Head and first and second pairs of legs black; third pair of legs, prolegs, and ventral surface yellow. Greatest length, about 28 mm.

HABITS OF LARVA.

The larvæ appear to reside principally between the fruit stalks close to the "handle"—a situation of comparative obscurity and seclusion—and, as additional precaution against attacks of insectivorous birds, make use of their excreta by webbing the particles together to form loose masses amongst which they retire when not feeding.

DESCRIPTION OF PUPA.

This stage is passed on the side of the fruit, usually between the "fingers" near the "handle," the pupa being covered by a frail silken bag which is hidden from view under a mass of excrement.

The pupal shell is light reddish yellow, darker on eyes and on edges of segments, with a brown tubercle at the base of each wing on dorsal surface partly overlapped by the posterior edge of metathorax.

Spiracles brown and prominent. End of anal segment nearly black, the extremity abruptly pointed dorsally and furnished with hooks. Length, about 13 mm. (See sketch on plate.)

DESCRIPTION OF MOTH.

The perfect insect, which belongs to the family Pyralidæ, is new to Messrs. Lyell and Turner, two leading Australian lepidopterists; the latter authority, however, has placed it in sub-family Pyraustinæ. Its general coloration is pale yellowish brown, and the following description of the characteristic blackish markings on the upper surface will enable those interested to identify this moth:—

Fore wings with a conspicuous blotch on costa near apex, an inconspicuous acutely triangular transverse streak on costa near base, a large irregular blotch at centre of sub-costal area, and a row of seven minute spots on edge of outer margin (visible under pocket lens).

Hind wings with a conspicuous spot (nearer base and upper margin than centre) and seven minute spots on edge of outer margin.

In addition to the above-mentioned blotches, both wings are barred transversely in places with more or less indistinct detached blackish lines running from upper and hind margins towards centre of wings.

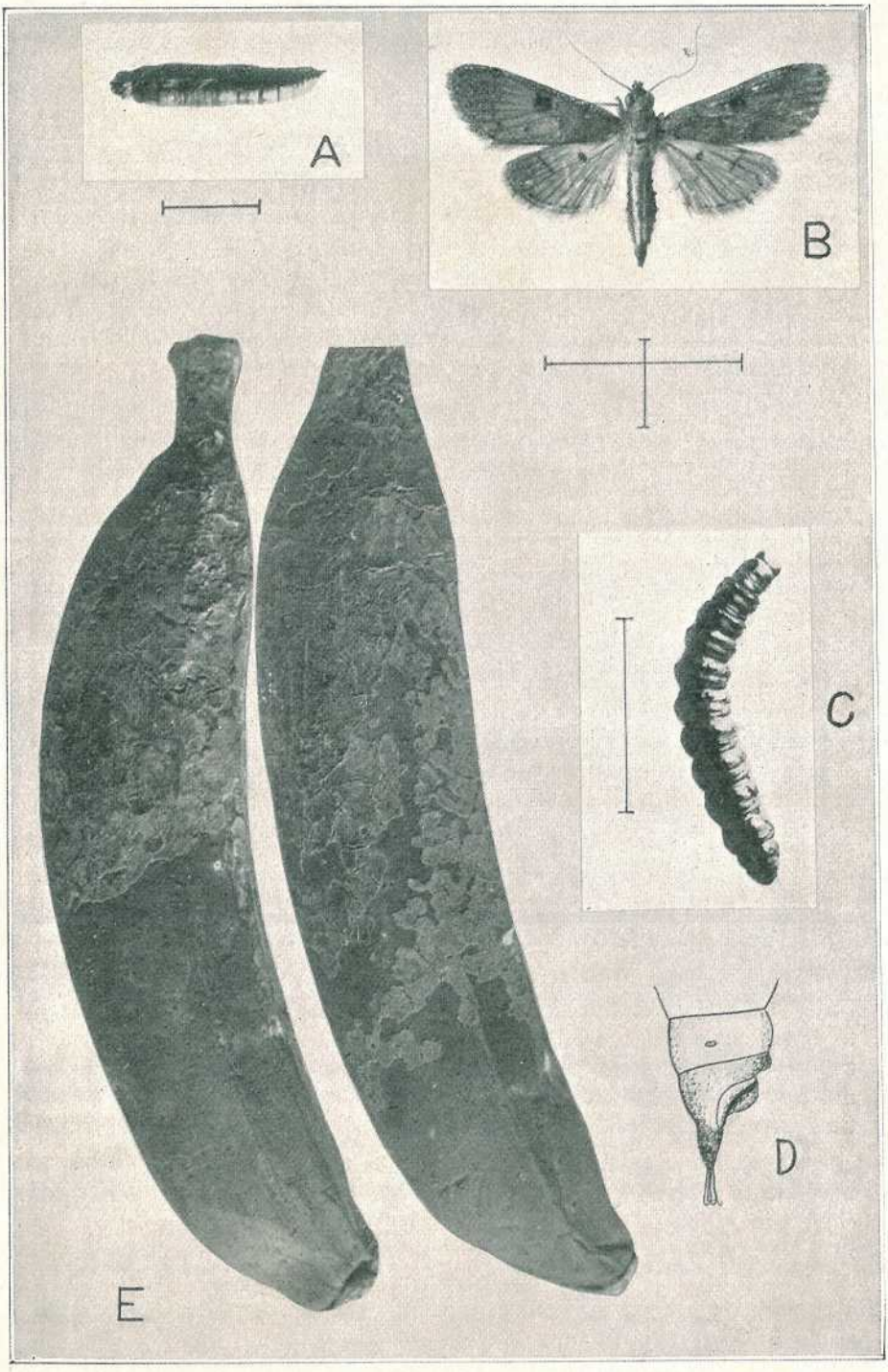


PLATE 7.—*A*, Pupa (magnified twice); *B*, Moth (magnified twice); *C*, Caterpillar (magnified about twice); *D*. Extremity of pupa showing projection; *E*, Injury to green fruit.

Dorsal surface of abdomen covered with silver scales, and anal segment tufted with dark brown. Expanse of wings—about 27 mm. in female, and 22 mm. in male.

CONTROL.

Natural Enemies.

Several of the larvæ collected were destroyed by a hymenopterous parasite, which Mr. A. A. Girault has named *Tumidicoxa regina-dentata*, Girault, new var.

Artificial control.

With regard to a means of preventing these caterpillars from damaging bananas, I think that spraying with arsenate of lead (1 lb. to 30 gallons of water) would be a cheap and effective remedy.

A knapsack spray pump and cyclone spray nozzle (costing in all about £2 10s.) would meet requirements, and it would certainly pay growers better to expend a few seconds in treating a bunch than to risk losing perhaps 50 per cent. or more of the fruit.

Two applications should be sufficient—one administered as soon as the "hands" are exposed, and another when the fruit is half grown. Inspector Selby has noticed that in the Cairns district this pest appears mostly just after moist weather in May and June, the grubs being very bad at the end of the latter month; so it would be well to commence spraying operations early in May, or as soon as the first signs of scabbing are noticed.

An attempt should be made also to discover the native food plants of this destructive moth, as the rooting out of such plants in the vicinity of banana plantations would be an additional means of control.

THE PRICE-CAMPBELL COTTON-PICKING MACHINE.

When the Government Bacteriologist (Mr. C. J. Pound) was in the United States, he saw a cotton-picking machine at work which appeared to have solved the question of rapid picking by machinery. Unfortunately, being engaged on other work connected with his mission, he did not obtain any particulars concerning it. It may possibly have been the machine which is mentioned as follows in "The Wealth of India":—

There has been a lot of talk from time to time about an efficient machine to pick cotton, but they seem to have evolved one at last, of course, in America. A couple of such machines have been recently tried in Texas on black soil—of something of the sort we have in the great cotton belt in India—and picked nearly 5 lb. of cotton per minute each. When compared, the cotton thus picked made a better showing than that picked by hand. Only one man is required to operate a machine, which can pick an acre an hour or at least 8 acres a day; and the rows so picked are said to compare very favourably with rows picked by hand.

Ornithology.

THE ECONOMIC VALUE OF OUR BIRDS.

We have frequently drawn attention to the indiscriminate slaughter of birds, amongst which a large majority are insectivorous, and hence of great economic value to the farmer and market gardener, by so-called sportsmen, who sally forth every week and on every holiday armed with pea-rifles, and ignorantly kill birds which should be protected from such vandals.

The Bird Protection Court, Melbourne, has just issued the following bulletin on the "Economic Value of our Birds," by Professor F. Erasmus Wilson, R.A.O.U.:—

It is a well-known fact that Australia loses hundreds of thousands of pounds annually owing to the ravages of insect pests. These creatures attack our orchards, our cornfields, our forest reserves, and our pastoral areas, and for twenty-four hours out of every day are waging a deadly warfare against us. A competent judge calculated that the yearly loss to the United States, owing to damage caused by insects, amounted to £160,000,000 sterling.

In our papers we read of enormous plagues of locusts, of hordes of "take all" grubs devastating our grazing lands, of apple crops being ruined by the codlin moth, of valuable stock being killed by bot flies, and of the many other misfortunes that assail our primary producers, and are caused by insect pests.

Every year thousands of pounds are expended throughout the Commonwealth in buying costly machinery for spraying, &c., and vast quantities of poison are spread in an often futile attempt to keep in check this growing menace. Deadly maladies are carried about by the myriads of mosquitoes and flies that abound everywhere, while in some localities life is made almost unbearable owing to their presence.

Now Australia is extremely fortunate in that the majority of its birds live almost entirely upon an insect diet.

An insectivorous bird is by far the best weapon in creation with which to assail the insect world, both on account of the enormous quantity that it can despatch and also from the fact that it requires no payment for services rendered. All it asks for is the right of existence, and yet we in a thoughtless and foolhardy manner kill our birds which in reality are worth their weight in gold.

Mr. D. Le Souef, the well-known Director of the Melbourne Zoological Gardens, some years ago visited an enormous rookery of the straw-necked ibis in the Riverina, and in an article published in the "Victorian Naturalist" he tells us that the birds in this rookery would, at a conservative estimate, number at least 240,000.

He procured a few specimens, and found that the stomach of each contained about 2,000 immature grasshoppers. A simple calculation will show that this vast flock would account for 480,000,000 grasshoppers per diem. Yet, in face of this, people visit the breeding haunts of the birds and collect their eggs by the cart load. One party last year, having gathered more than it required, drove away and left about 4,800 eggs to rot on the banks of the swamp. In Egypt in olden days the ibis was held to be sacred and was not molested in any way, and it is regrettable that it should not be so at the present time, as surely no bird is more worthy of veneration.

The little tomtits and wrens that are so busy in your garden, searching almost everywhere amongst the plants, consume at least their own weight of insects every day, yet we permit our children to destroy them with their shanghais, and our would-be sportsmen fire charges from a 12-bore shotgun at them.

The black and white fantail or willie wagtail, as it is perhaps more commonly known, is an exceptionally useful bird, and, being of a confiding nature, performs good deeds even at your very doorstep, capturing hosts of flies and mosquitoes, and from time to time enlivening you with dulcet notes, "Sweet pretty creature." A near relation, the white-shafted fantail, is another bird adept in the art of catching flying insects, and, although so small of stature, is a mountain of usefulness.

Then, again, take our cuckoos, of which there are six kinds in Victoria, and consider the items of their menu. They are practically the only birds known to take and devour the familiar hairy caterpillars, and are, therefore, our only means of natural defence against these pests; also, they are very fond of the vine moth caterpillars; and a naturalist once removed from the stomach of a pallid cuckoo eighteen of these, each of which was about 2¼ in. in length.

One of the best known and perhaps most beneficial of our birds is the harmonious shrike thrush, that silvery-throated songster that we all love to hear. Apart from its ordinary insect-eating proclivities, it should commend itself especially to campers, as it includes in its bill of fare the dreaded bull-dog ant. Campers please note; and when next you "draw a bead" upon a harmonious shrike thrush, stay your hand and remember the sting of the bull-dog ant.

Another well-known friend is that dainty little sprite, the welcome swallow, who so trustfully constructs its plastered nest beneath verandas. What a potent engine of destruction is this mite. From morning till night it may be seen busily skimming hither and thither, gathering in the harvest of noxious flying insects, especially mosquitoes.

Out in the fields, ground larks, chats, robins, plovers, magpies, and others too numerous to mention, are working hard in our interests, yet every day many are ruthlessly destroyed.

In the more thickly-wooded country we find tree-creepers and sitellas eagerly searching the bark of trees for insect foes that are lurking

there. Lower down at the foot of the trees are scrub wrens, shrike robins and others also performing their quota of the work. Higher up, amongst the tree tops, are pardalotes, shrike tits, whistlers, cuckoos, &c., all eagerly bent on devastating the ranks of the enemy.

Near the edge of the wood our old friend the laughing jackass is busy devouring a fat juicy grub which later would have developed into a destructive beetle. Occasionally, when luck favours him, a meal is made of some dreaded reptile, and campers may have the pleasure of seeing a black snake being demolished by our jolly companion.

Near the pond gracefully walks the mudlark, which, besides destroying numerous insects, has a "sweet tooth" for the water snail which is known to be the intermediate host of the liver fluke, always a menace to our sheep industry.

In an orchard near by a flock of babblers is hard at work in search of the codlin moth, which the birds consider to be a toothsome morsel. A little brown flycatcher sits upon the wire fence, from time to time darting into the air to capture some passing fly or moth, and lucky indeed is the insect that escapes it.

Suddenly a kestrel swoops into the field, and a farmer friend seeing that it is a hawk immediately shoots it. An examination of its stomach, however, reveals the fact that it is a valuable insectivorous bird.

A big nest placed high up in a large gum tree next attracts attention, and proves to be the home of a pair of wedge-tailed eagles (eaglehawks). A visit to this is well repaid, for underneath it is found a great heap of bones and pelts of rabbits. The noble old wedge-tailed eagle, the largest of its kind in the world, repays twenty-fold for any small amount of damage that it may occasionally do in partaking of a stray lamb at times —in fact, there are very few authenticated instances indeed of this bird killing lambs. Some western district squatters will not allow eagles to be killed upon their estates under any consideration, as they deem them to be their best natural protection against the rabbit.

Even at night time the birds are still working, as it is then that the owls, frogmouths, and nightjars sally forth. Till the break of day these birds will be busily employed in capturing those insects that are nocturnal in their habits. From the stomach of an owl have been taken four large caterpillars, two spiders, three cockchafer beetles, three large moths, and a quantity of other insect remains too much digested to be recognised.

The numerous honey-eating birds destroy quantities of insects at different seasons of the year, and feed the young entirely upon them, yet at present we afford them protection only during the breeding season.

It will thus be seen that all over the Commonwealth there is a vast army of birds working in our best interests, and demanding as payment only the right of existence. It behoves every Australian who has the welfare of his country at heart to do all in his power to afford protection to our native birds.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

Order Myrtaceæ.

EUCALYPTUS Lhér.

E. rariflora, *Bail. sp. nov.* (Plates 8, 9, 10, 11) "Bastard Box" (Eidsvold). A tall tree not recorded as very abundant; branchlets slender of a pleasing red colour. Leaves very variable in shape, those of the flowering branchlets varying from lanceolate to oblong or even ovate, from 2—4½ in. long and ½—1 in. broad, or the ovate ones still broader on slender petioles of about 1 in. On young trees the leaves are almost orbicular, or sometimes obversely reniform, and mostly broader than long, but always slightly decurrent on the petiole from ½—3 in. long and ½—3½ in. broad, apex sometimes emarginate, texture thin, in the young leaves, almost membranous. (The petioles in these large leaves are often over 2 in. long.) Parallel nerves numerous, slender, branching at the top, where they join the intramarginal one, which is sometimes very close, at other times rather distant from the edge, the smaller veins forming a very delicate irregular reticulation. Oil dots numerous. Inflorescence composed of slender erectopatent panicles of usually few scattered pedicellate flowers; at times in umbels of 3 or 4 flowers. Operculum very short, scarcely exceeding 1 line, blunt or very slightly umbonate. Stamens inflected in the bud, the outer ones 1½ lines long. Anthers globular, opening in broad slits. Fruit (including the short pedicel) 4 lines long, about 2 lines diameter; rim rather broad. Capsule sunk, 4-celled, the valves not exserted. Seeds small, somewhat pear-shaped, dark brown and slightly rugose.

Hab.: Eidsvold and Mundubbera, *Dr. Thos. L. Bancroft.*

The present species is one of the most puzzling so far met with in Queensland; and it has only been through the indefatigable zeal of my friend, Dr. T. L. Bancroft, who collected so much information and such a complete suite of specimens, that mistakes have been prevented. The bark and foliage, as well as the flowers and fruit gathered at one stage of the tree's growth, would certainly lead one to believe it to be a species of Ironbark. Indeed, had the whole of the specimens been received from a less accurate collector, one might have doubted the specimens belonging to one species.

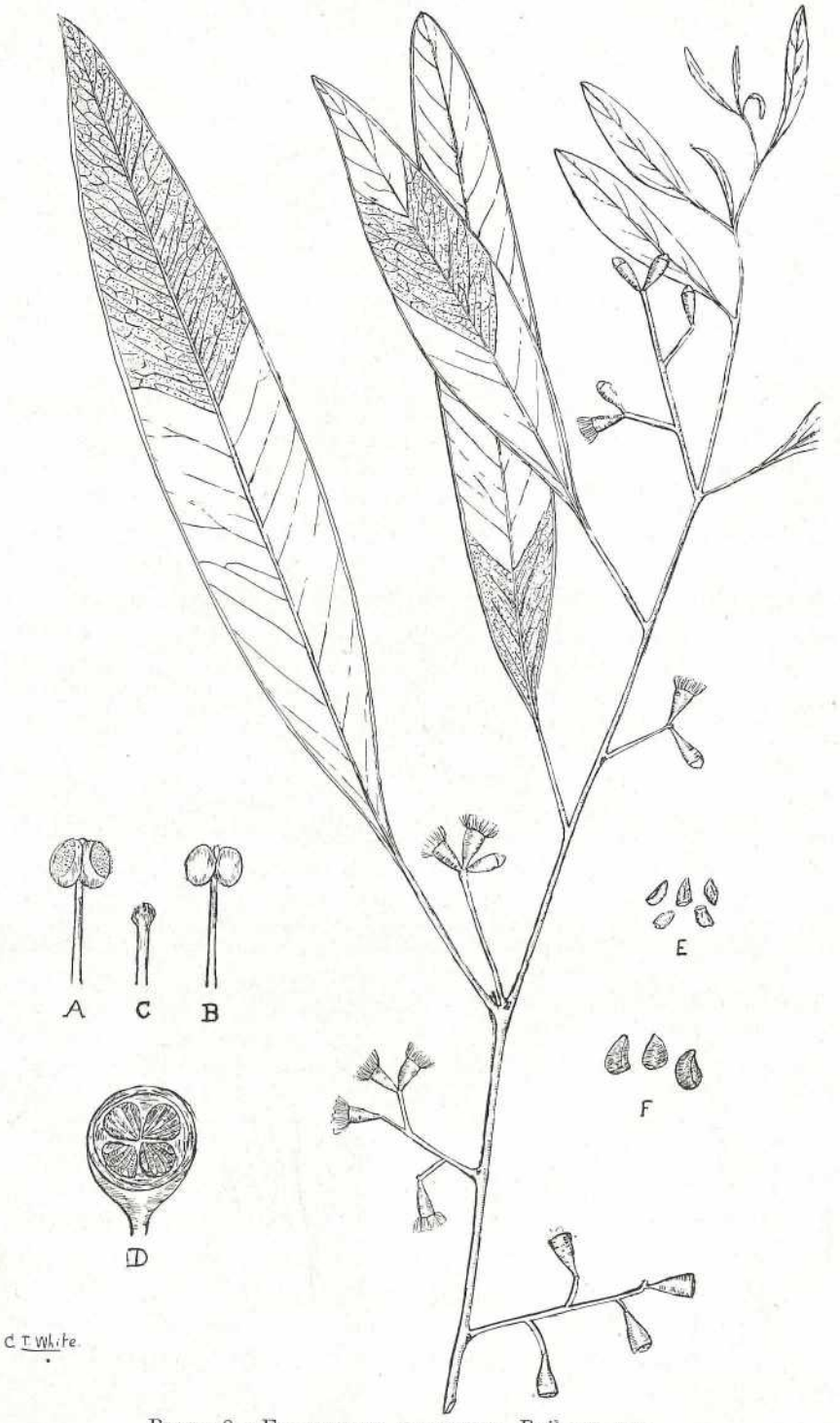


PLATE 8.—EUCALYPTUS RARIFLORA, *Bail., sp. nov.*
(A) Anther front view, (B) Anther back view, (C) Style and stigma, (D) Transverse section of the fruit, (E) Sterile seeds, (F) Fertile seeds.

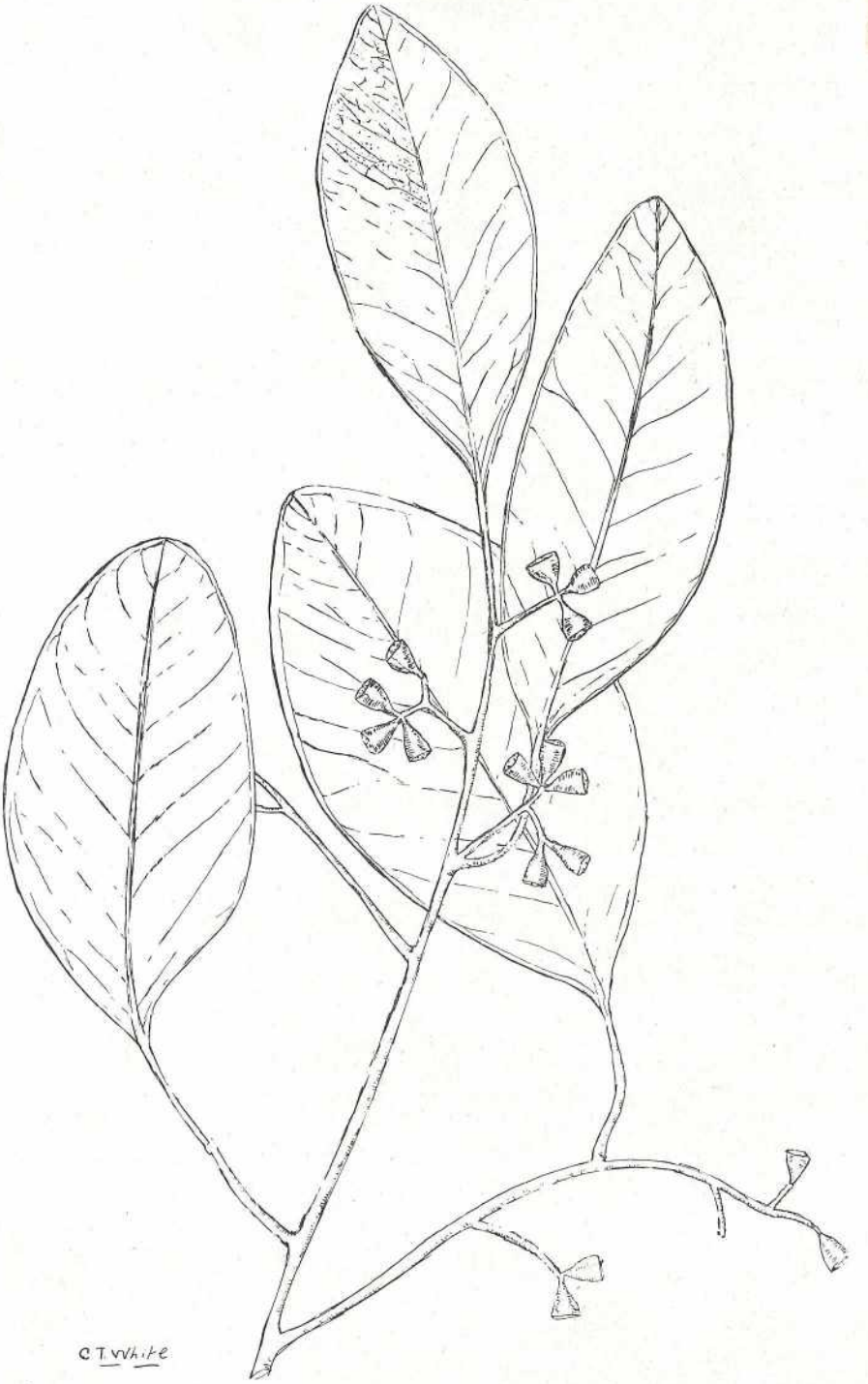


PLATE 9.—EUCALYPTUS RARIFLORA, *Bail. sp. nov.*

PLATE 10.—EUCALYPTUS RARIFLORA, *Bail., sp. nov.* Leaves from a young tree.

Photo. *Dr. T. L. Bancroft.*

PLATE 11.—EUCALYPTUS RARIFLORA, *Bail.* BUTT OF TREE.

PLATE 12.—SORGHUM HALEPENSE, *Bail.* JOHNSON GRASS.

Order Gramineæ.

SORGHUM, Pers.

S. halepense, *Pers.* (Plate 12.) Johnson Grass, Means Grass, or Cuba Grass. The plant now brought under notice is a very peculiar form of a widely-spread grass, which may be at once known by its numerous fleshy root-stocks or stolens which are almost, if not quite, peculiar to the present variety. All species of the genus, or especially those of robust growth form strong clusters of roots which hold to the ground with a tenacity seldom equalled by other grasses; thus, when reading of this grass causing trouble to eradicate from a field where it was no longer wanted, it is thought that this feature is the one referred to. Such, however, is not the case, but rather the fleshy stoloniferous shoots, which in the work of eradicating break up into short joints, every one of which sprouts into a fresh plant, thus showing a more closely sown crop of the grass than the one it was attempted to clear off the field. Undoubtedly the grass now under notice has very high feeding properties, and even the very rootstocks, which in one sense we deplore, as a fodder are most certainly not to be despised.

Specimens of this grass (without roots or rootstocks) were received some years ago from the Johnstone River from Mr. W. C. Harding; from the specimens a few seedlings were raised and handed over to Mr. J. Liverseed, Manager of the State Farm, Hermitage; and the present plate is from specimens grown there. Further specimens have recently been received from Messrs. McIntyre Bros., Christmas Creek, Beaudesert, where it is said to be growing prolifically and is a good dry-weather grass. I believe it is indigenous to Northern Queensland and introduced into the latter district by Mr. Harding, who at one time resided not far from there.

Previously, no doubt, this grass has been confused with other forms of the species, as it cannot well be distinguished except by the thick fleshy stolons or rootstocks.

The two forms of the root of this grass here brought under notice, and as shown in the illustration, are rare among grasses, and gives me the opportunity of pointing out the absolute necessity, when exhibiting grasses, of showing complete specimens, including root and inflorescence, especially to those persons who still persist in cutting off the root and throwing it away, exhibiting only the inflorescence even when good specimens have been given them; and also of pointing out to collectors the need of sending full specimens when they require the name of plant sent for that purpose. In this case the matter would have been settled six years ago had full and complete specimens been available.

Specimens were handed over to Mr. F. Smith, B.Sc., who reports:—"Both the leaves and stoloniferous roots contain a hydrocyanic acid yielding a glucoside."

General Notes.

MENDING AUGER AND OTHER TOOLS.

BY COLORADO COLLEGE OF AGRICULTURE.

It often happens that good augers with the screws broken off are thrown away as useless. This should not be, for with a little work and small cost they can be made almost as good as new.

Take a file of suitable width, and cut a groove the width of the old screw about 3/16 in. deep, a little wider at the bottom than at the top (dovetail form). Then from a piece of steel cut a piece the shape of the screw, with a base that will fit neatly and tightly in the groove, then coat the edges with a tincture as follows:—

Equal parts of sulphur and any white lead with about a sixth of borax; mix the three thoroughly. When about to apply the preparation, wet it with strong sulphuric acid. After treating the blank screw with the preparation, press it tightly in the groove, lay away for four or five days, and then you will find it as solid as if welded. The job will not take a half-hour or cost more than 5 cents for material. The same process may be used for mending almost any broken tool without drawing the temper.—"Nor'-West Farmer," Canada.

THE DUST PROBLEM AS SOLVED IN ENGLAND.

The advent of motor-cars has effected a revolution in provincial and rural England which can scarcely yet be estimated fully. The dust nuisance, though seemingly a small matter, was rapidly creating a deep-rooted hostility that was seriously menacing development and even calling for reactionary legislation.

The problem has been solved in two ways. Firstly, where the traffic is extremely heavy, the roads have been relaid with tarred macadam, but this method is too expensive for general extension both in first cost and upkeep. The other method is watering or spraying. Watering is prohibitive in cost because of the rapid evaporation. Spraying with tar is effective, but very objectionable in hot weather.

But a method is in use to a rapidly-growing extent which combines the advantages of watering with that of tar-spraying at a reasonable cost, and eliminates the disadvantages of tar. It has long been known that calcium chloride attracts the moisture which is present in the driest atmosphere and retains that moisture tenaciously. A few years ago it was discovered that if a road was watered with a solution of calcium chloride the dust became impregnated with the calcium chloride, and the whole, instead of drying up, remained damp for from two to three weeks.

A modification of the process is to sprinkle the road with calcium chloride as a powder, the result being the same as the most perfect watering, without the expense of watering, except once in three or four weeks. Calcium chloride is a well-known article of commerce used largely in cold stores, and sells for about £5 per ton. The mixture for watering is about 1 to 5 of water, while the powder entails no expense except the cost of sprinkling every few weeks. Calcium chloride is odourless, and harmless to both man and beast.—"Pastoralists' Review."

A NEW REMEDY FOR CONTAGIOUS ABORTION.

In U.S.A., at the Vermont State Experiment Station, during the past year, the Science Department, after exhaustive experiment, have demonstrated that methylene blue is a remedy for contagious abortion. In their Bulletin No. 174, they give an account of 92 cows that were fed on it. They had all aborted before being tried with this remedy, but only one aborted subsequently. This remedy can be administered either in food or by capsule, and is said to exert a very great antiseptic effect on the blood, thus destroying the abortive germ, and without doing any apparent injury to the cow. Dose: One-third to one-half ounce given night and morning early in the period of pregnancy for seven days. Allow a week to elapse, then dose again for a week; then dose, one week in every month, till the birth of the calf. Cost of dosing a cow is about 3s. per week. The methylene blue should be obtained from wholesale druggists, pure, for about 15s. per lb.—"Exchange."

Answers to Correspondents.

WHITE PAINT FOR OUTSIDE FENCES, ETC.

W. WESTON, Townsville—

The following is a good substitute for white lead for the above purposes:—1 quart of skimmed milk, 3 oz. of fresh lime, 3 oz. of raw linseed oil, 1½ lb. of whiting. Put the lime into a clean bucket, add sufficient of the milk to slake the lime, add the oil a few drops at a time, stirring the mixture with a flat stick until the whole of the oil is incorporated with the mass, then add the remainder of the milk and afterwards the whiting, which must be finely powdered, and sifted over the mixture gradually, or it will go lumpy. One coat of this will do for some purposes, but two coats are required for good work. It should be strained through a hair sieve or coarse calico. The above quantity will be sufficient for 100 square feet, or 11 square yards.

DESTROYING TREES WITH SALTPETRE.

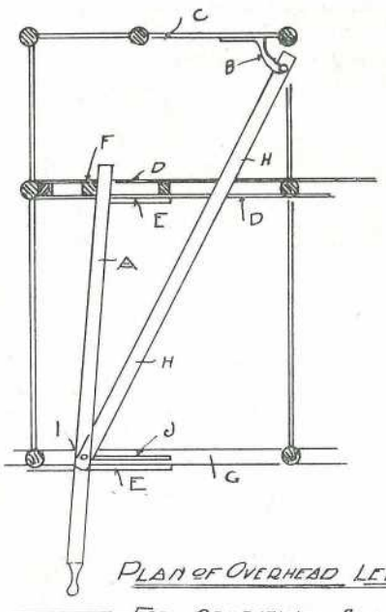
"SETTLER," Beerburrum—

If our correspondent will look up the November (1908) number of this Journal, he will find that heavy timber has been completely destroyed in Queensland by the use of saltpetre, applied as here described by a South African correspondent of the "Pastoralists' Review," and who writes:—

"I have seen many hundreds of acres of bush—large and scrub—completely destroyed with ordinary commercial saltpetre, but the trees were not cut down, as this entails much labour. A hole is bored in the tree in a downward direction to the centre. For large trees, a 1-in. auger is used; for smaller ones, ½-in. size is large enough. For large trees, 1 oz. to 2 oz. is the quantity used, and for smaller ones ½ oz. to 1 oz. A plug is put in the hole to keep rain from washing it out. The nitrate of potash is carried by the sap to the tips of the branches and to the rootlets. If the trees is a large one, say 2 ft. or more in diameter, very little difference will be noticed in the foliage for two or three months, then the leaves begin to fall, and it assumes a bare, wintry appearance. At the end of about six or eight months you pile a little brushwood round the tree and light it, and there is no further trouble. It will smoulder away to the remote ends of the roots, sometimes 30 ft. from the butt of the tree, leaving masses of valuable ash in all directions; while, if your bungalow is near to the clearing, you will hear a crash, which will sometimes startle you at night time, when the big trees fall, and when fallen they will continue to smoulder until every particle is converted into ash."

[We have had the same experience with big trees in the Logan district, but we added kerosene to the saltpetre. At Mapleton, near Nambour, North Coast Line, we saw a large tree, which had been treated with saltpetre, completely burnt out.—Ed. "Q.A.J."]

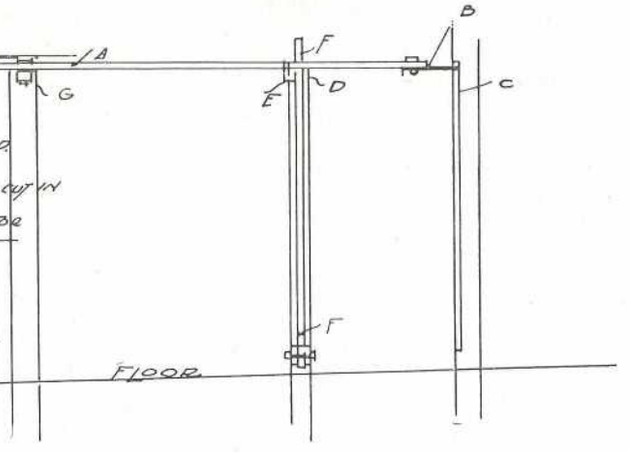
PLANS OF VARIOUS COWBAILS



PLAN OF OVERHEAD LEVERS FOR OPERATING BAIL AND GATE

REFERENCES

A LEVER 3×1 PINE RESTING ON DAND G
B WROT IRON QUADRANT BOLTED TO GATE AND LEVER H
C GATE HUNG TO POST
D 4×1½ PINE ON EACH SIDE OF POST
E 6×1 NAILED ON TO DAND G FORMING STOP FOR LEVERS
F 3"×2" BAIL SWORD SLIDING BETWEEN D.D.
G 4×2" PINE ON TOP OF POSTS WITH A SLOT CUT IN
H 3×1 LEVER BOLTED TO QUADRANT B. FOR OPENING GATE
I BOLT THRO A AND H RUNNING IN SLOT J
J SLOT CUT IN G FOR KEEPING LEVERS IN POSITION.

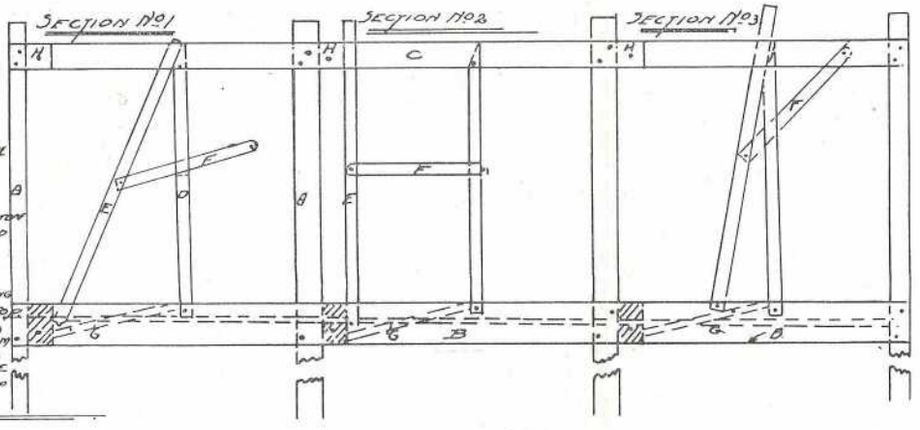


SECTION THRO BAIL

REFERENCES CONTINUED FROM RIGHT HAND SIDE

G IS A PIECE OF 2½×2" H°W° FIXED BETWEEN THE BOTTOM PLANKS EXTENDING FROM THE BLOCK MARKED H TO THE SAME BOTTOM OF THE POST MARKED D WITH A FALL FROM RIGHT TO LEFT OF 6" THIS PIECE WILL FORM AN INCLINED BOTTOM TO THE 2½ INCH SPACE ABOVE MENTIONED BETWEEN THE PLANKS AND BOLTED THRO AS SHEWN.

H REPRESENTS BLOCKS OF 2½×6" H°W° 2'0 LONG FOR THE BOTTOM AND 6" LONG FOR THE TOP PUT IN POSITION BETWEEN THE PLANKS AND BOLTED, THE BLOCK AT THE BOTTOM IS MEANT FOR THE BOTTOM END OF BAIL STICK TO BUMP ON, AND THE UPPER ONE TO PREVENT THE BAIL STICK CLOSING TOO TIGHTLY ON THE COWS NECK.



IMPROVED COWBAIL.

REFERENCES

A 3"×3" HARD WOOD POST
B 10×1 HARD WOOD PLANKS LET INTO POSTS A LEAVING A SPACE OF 2½" BETWEEN AND SECURELY BOLTED LEVEL WITH GROUND AS SHEWN
C 6×1 H°W° PLANKS LET INTO BOTH SIDES OF POSTS LEAVING SPACE OF 2½ AS IN THE CASE OF THE BOTTOM PLANKS AND BOLTED
D IS FIXED 3FT FROM THE BAIL POST BETWEEN THE TOP BOTTOM PLANKS AS SHEN AND BOLTED
E THE BAIL STICK IS OF 3×2 H°W° 6'3 LONG HAVING A LONG SHAPED MORTIKE NEAR THE CENTRE ABOUT 2" DEEP TO RECEIVE THE END OF BAIL CATCH THE BOTTOM END SHOULD BE CUT ON AN ANGLE AND FITTED WITH A SMALL WHEEL
F A H°W° BATTEN 3×3½ IS FIXED TO BAIL STICK WITH A BOLT LEAVING SUFFICIENT ROOM TO WORK EASILY THE OTHER END TO HAVE A NOTCH NEAR THE END TO CATCH IN POST. THE MORTICE
G HOLDING THE BAIL STICK SECURELY IN PLACE.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR DECEMBER, 1913.

Article.		DECEMBER. Prices.
Bacon	lb.	9d. to 11½d.
Bran	ton	£5
Butter	cwt.	104s.
Chaff, Mixed	ton	£3 10s. to £5 15s.
Chaff, Oaten (Victorian)	,,	£6 to £7
Chaff, Lucerne	,,	£6 10s. to £7
Chaff, Wheaten	,,	£3 5s. to £5
Cheese	lb.	6½d.
Flour	ton	£9
Hams	lb.	1s. 3½d.
Hay, Oaten (Victorian)	ton	£5 10s.
Hay, Lucerne (Prime)	,,	£4 5s. to £6
Honey	lb.	2d. to 3d.
Maize	bush.	4s. 3d. to 4s. 6d.
Oats	,,	...
Onions	ton	£6 10s. to £9
Pollard	,,	£5
Potatoes	,,	£5 10s. to £10
Potatoes (Sweet)	cwt.	...
Pumpkins	ton	£5 5s.
Wheat, Milling	bush.	3s. 3d. to 3s. 7d.
Eggs	doz.	7d. to 1s. 2d.
Fowls	pair	3s. to 5s. 9d.
Geese	,,	5s. 6d. to 6s. 6d.
Ducks, English	,,	3s. 6d. to 4s.
Ducks, Muscovy	,,	4s. to 5s. 3d.
Turkeys (Hens)	,,	8s. to 12s.
Turkeys (Gobblers)	,,	22s. to 25s.

SOUTHERN FRUIT MARKETS.

Article.	DECEMBER. Prices.
Bananas (Fiji), per case	15s. to 19s.
Bananas (Fiji), per bunch	5s. to 14s.
Bananas (Queensland) per case	8s. to 13s.
Mandarins (Local), Emperors, per case	8s. to 9s.
Oranges (Local), Navel, per case	14s. to 16s.
Oranges (Other), per case	9s. to 10s.
Papaw Apples (Queensland), per quarter-case	3s. to 4s.
Passion Fruit (Queensland), per quarter-case	7s. to 11s.
Pineapples (Queensland), (common), per case	6s. to 10s.
Pineapples (Queensland), (Ripleys), per case	10s. to 12s.
Pineapples (Queensland), (Queens), per case	11s. to 13s.
Strawberries (Local) per dozen punnets (quarts)	18s. to 20s.
Tomatoes, per quarter-case	3s. to 5s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	DECEMBER. Prices.
Apples, Eating (American), per case	14s. 6d. to 15s.
Apples, Cooking (American), per case	12s.
Apricots, per case	3s. to 4s. 6d.
Bananas (Cavendish), per dozen	1½d. to 2½d.
Bananas (Sugar), per dozen	1d. to 3½d.
Cape Gooseberries, per quarter-case	5s. to 8s
Cherries, per quarter-case	4s. 6d. to 7s. 6d.
Citrons, per cwt.	...
Cocoanuts, per sack	13s. to 14s.
Custard Apples, per case	..
Lemons (Local), per case	10s. to 14s.
Lemons (Italian), per case	17s. 6d.
Limes, per case	...
Mandarins, per case	...
Mangoes, per case	4s. to 7s.
Oranges (Navel), per case	...
Oranges (other), per case	...
Papaw Apples, per quarter-case	1s. 9d. to 4s.
Passion Fruit, per quarter-case	2s. to 4s. 6d.
Peaches, per quarter-case	1s. to 4s. 6d.
Peanuts, per lb.	3d. to 3½d.
Pineapples (Ripley), per dozen	2s. to 5s. 6d.
Pineapples (Rough), per dozen	3s. 6d. to 7s. 6d.
Pineapples (Smooth), per dozen	6s. to 7s.
Plums, per quarter-case	3s. to 5s.
Rockmelons, per dozen	2s. to 9s. 6d.
Strawberries, per dozen pints	...
Tomatoes, per quarter-case	1s. to 2s.
Watermelons, per dozen	3s. 6d. to 12s. 6d.

TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1913.

Animal.	NOVEMBER. Prices.
Bullocks	£10 2s. 6d. to £12 10s.
Cows	£7 12s. 6d. to £8 10s.
Merino Wethers	24s. 3d.
Crossbred Wethers	19s.
Merino Ewes	18s.
Crossbred Ewes	20s. 3d.
Lambs	18s. 3d.
Pigs (Porkers)	...

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1912 AND 1913, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Nov.	No. of Years' Records.	Nov. 1913.	Nov. 1912.		Nov.	No. of Years' Records.	Nov. 1913.	Nov. 1912.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	2·16	11	1·21	1·11	Nanango	2·49	25	0·48	0·83
Cairns	4·32	25	Nil	1·54	Rockhampton ...	2·20	25	0·70	1·45
Cardwell	4·84	25	Nil	4·66	Woodford	3·08	25	1·03	2·52
Cooktown	3·32	25	Nil	1·60	Yandina	3·70	19	0·17	*
Herberton	2·63	25	2·04	1·87					
Ingham	4·44	20	Nil	1·07					
Innisfail	7·44	25	Nil	2·40					
Mossman	6·12	5	0·25	6·88	*Darling Downs.*				
Townsville	1·94	23	0·01	2·69					
Charters Towers ...	...	...	0·02		Dalby	2·60	22	0·47	1·98
					Emu Vale	2·72	17	0·81	1·59
					Jimbour	2·47	24	Nil	0·74
Central Coast.					Miles	2·33	25	Nil	5·19
					Stanthorpe ...	3·00	22	0·61	1·41
Ayr	1·34	25	Nil	1.51	Toowoomba ...	3·11	22	0·90	2·05
Bowen	1·36	25	0·01	1·60	Warwick	2·73	22	0·65	2·65
Mackay	2·52	25	0·07	3·03					
Proserpine	3·82	10	0·06	1·19					
St. Lawrence ...	2·04	25	2·25	4·20	*Maranoa.*				
					Roma	2·13	21	0·54	2·81
South Coast.									
Crohamhurst ...	4·47	20	0·31	4·21	*State Farms, &c.*				
Biggenden	2·45	14	1·06						
Bundaberg	2·38	25	1·83	3·14	Gatton College ...	2·71	14	0·42	2·59
Brisbane	3·62	62	1·64	3·69	Gindie	2·06	13	1·10	2·17
Childers	2·75	17	3·75	1·77	Kamerunga Nurs'y	3·22	23	0·01	...
Esk	3·01	25	1·28	3·80	Kairi	...	.	...	1·55
Gayndah	2·62	25	0·93	2·03	Sugar Experiment Station, Mackay	2·50	16	0·06	3·03
Glasshouse M'tains	...	...	...	4·38					
Gympie	3·00	25	0·71	2·28	Bungeworgorai ...	..	...	0·03	2·20
Kilkivan	2·62	25	0·68	1·22	Warren	...	...	0·70	...
Maryborough ...	2·75	25	2·82	4·07	Hermitage ...	2·81	7	0·64	2·65

* Incomplete.

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year and for the same period of 1912, having been compiled from telegraphic reports, are subject to revision.

Orchard Notes for February.

In order that the series of monthly notes that have appeared for some years past in the "Agricultural Journal" might be rendered of more value to our fruitgrowers, advantage is taken of the commencement of the new year to revise them and bring them up to date. At the same time the notes have been somewhat altered, as, instead of making them of a general nature, applicable to the whole of the State, they are, to a certain extent, localised, as, although the general principles of cultivation, manuring, pruning, treatment of fruit pests, as well as of the handling and marketing of the fruit are applicable to the State as a whole, there are many matters that are of interest to individual parts of the State rather than to the whole State; and, further, notes that are applicable to the Southern part of the State for one month are not always applicable to the North for the same month.

In order to carry out this idea, the State has been divided as follows:—

1. The Southern Coast Districts, south of the Tropic of Capricorn;
2. The Tropical Coast Districts;
3. The Southern and Central Tablelands.

This plan has met with such general approval during the past year that the notes will henceforth be published in accordance therewith.

THE SOUTHERN COAST DISTRICTS.

The earlier summer fruits, including grapes, will be pretty well over, but pineapples, mangoes, and bananas are in full fruit. The bulk of the main summer crop of pines ripens during the month, and growers are in consequence kept very busy sending them to both our local markets and canneries, and to the Southern States. The planting of all kinds of tropical fruits can be continued where necessary, though earlier planting of both pines and bananas is to be recommended. Still, if the land is thoroughly prepared—viz., well and deeply worked—they can be planted with safety, and will become well established before winter. The month is usually a wet one, and both tree and weed growth is excessive. If unable to get on the land with horses to keep down weed growth, use the scythe freely in the orchard before weeds seed, as by doing so you will form a good mulch that will tend to prevent the soil washing, and that when ploughed in later on will add a considerable quantity of organic matter to the soil, thus tending to improve its mechanical condition, its power of absorbing and retaining moisture, as well as to increase its nitrogen contents.

This is the best month of the year in which to bud mangoes in the Brisbane district. The bark of the stock to be budded must run very freely, and the scion, when placed in position, must be tied very firmly.

The bark of the scion should be slightly thicker than the bark of the stock, so that the material used to tie it keeps it firmly in its place. As soon as the bud is tied ringbark the stock just above the bud, so as to force the sap of the stock into the scion so that a union will take place quickly.

Where cyaniding of citrus and other trees has not been concluded, it may be continued during the month, as fruit treated now will probably keep clean and free from scale insects till gathered. If the trees have been treated with Bordeaux mixture, do not cyanide, as cyaniding should always be done previous to spraying with Bordeaux mixture.

If Maori is showing, spray with the sulphide of soda wash. Look out for Black Brand and also for the Yellow Peach Moth towards the end of the month in the earlier districts. Spraying with Bordeaux mixture is advisable in the case of both these pests.

Get land ready for strawberry planting, so as to be ready to set out runners next month. Some growers set out plants as early as the end of February, but March is to be preferred. Citrus and deciduous trees can still be budded during the month. Young trees in nursery should be kept clean and attended to; ties should be cut where necessary, and the young trees trained to a straight single stem.

THE TROPICAL COAST DISTRICTS.

As the month is usually a very wet one in this part of the State, very little work can be done in the orchard other than keeping down excessive weed growth by means of a scythe. When citrus trees are making excessive growth and throwing out large numbers of water-shoots, the latter should be cut away, otherwise they are apt to rob the rest of the tree, and thus injure it considerably. Many of the citrus trees will come into a second blossoming during the month, and this will produce a crop of fruit ripening towards the end of winter and during the following spring. The main crop, where same has set in spring, will be ripening towards the end of the month, but as a rule insect life of all kinds is so prevalent at this time of year that the bulk of the fruit is destroyed. Where there is sound fruit, however, it will pay to look after. If the weather is wet it should be artificially dried before packing, but if there are periods of sunshine, then the fruit can be cut and laid out on boards or slabs in the sun, so that the extra moisture of the skin can be dried out. Care will have to be taken not to sun-scald the fruit, or to dry it too much; all that is required is to evaporate the surplus moisture from the skin, so that the fruit will not speck when packed.

Tropical fruits of all sorts can be planted during the month. Budding of mangoes and other fruits can be continued. Bananas must be kept netted, as fly is always bad as this time of year.

THE SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of apples, pears, plums, peaches, and nectarines will occupy the attention of the Stanthorpe growers. The grape harvest will also extend right through the month. Every care

should be taken to see that the fruit fly and codlin moth are not allowed to spread, although the best work in fighting these pests has to be done during the months of December and January, as on the action then taken, if carried out systematically, the freedom of the later fruits from infestation mainly depends.

Handle the fruit carefully, and see that no fly or codlin moth infested fruit leaves the district. The grapes, ripening as they do when this fruit is over in the earlier parts of the State, should be sent not only to Brisbane but to all other parts of the State. For long shipment nothing can beat crates holding 6-lb. baskets. The fruit should be gathered some hours before packing, and be placed in the sun, so as to become thoroughly dry, and to allow the stems to become wilted, as this causes the fruit to hang on the bunch much better, and consequently to reach its destination in better order.

If parrots and flying foxes are troublesome, organised shooting parties or poisoning with strychnine are the best means of dealing with those pests.

The crop of grapes will be about over in the Roma and other inland districts. Citrus trees, when infested by Red Scale, should be cyanided. The orchard should be kept well cultivated after every rain, and when there is no rain, but water is available for irrigation, if the soil requires it, the trees should get a good soaking, which, if followed by thorough cultivation, will carry the trees on till the fruit is ripe.

Farm and Garden Notes for February.

FIELD.—The land intended for potatoes should now be ready for planting. Plant sound small potatoes, well shot, without cutting them. If large potatoes are cut into setts, there is a risk of their rotting, as the usual wet weather may be expected, with a hot, muggy atmosphere. Weeds will be very troublesome, and for that reason the sowing of lucerne should be deferred till later. Sow lucerne in deep rich soil, thoroughly worked and deeply ploughed. Cape barley, panicum, kafir corn, imphee, sorghum, and vetches may be sown; but it is risky to plant maize for a late crop, as early frosts would destroy the ripening grain. For an early winter crop, sow swede turnips and mangelwurtzels.

KITCHEN GARDEN.—Make preparations for good crops of vegetables for the early winter by ploughing or digging all unoccupied land, supplying well-rotted manure if needed. Chicken guano is also an excellent fertiliser, if prepared as follows:—

Spread a layer of black soil on the ground. Dump the fowl manure on to this, and pound it fine with the back of a spade; add hardwood

ashes, so that the compound shall contain—Soil, 3 bushels; fowl manure, 2 bushels; ashes, 1 bushel. Mix thoroughly, and a little before planting moisten the heap with water, or, better still, with urine; cover with old mats and let it lie till needed.

Most market gardeners will have cabbages and cauliflowers ready for transplanting. Do this during the month. In the pamphlet on "Market Gardening," issued by the Department, it is recommended to sow the seed from the middle of January to the middle of March, arranging the time, however, to suit early and late districts. For winter crops, the Drumhead type, of which Flat Dutch and Queensland or Florida Headen are good examples, and are the most profitable. The Savoy cabbage does well here. The best cauliflowers to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand. If the aphis appears, spray with tobacco solution.

Sow French beans, butter beans, beet, carrot, turnip, radish, cabbage, cauliflower, cress, peas. Should the weather prove dry after the January rains, give the plants a good soaking with water. Gather all fruit of cucumbers, melons, French and other beans, and tomatoes as they ripen, to ensure the continued production of the vines and plants.

FLOWER GARDEN.—Thin out and tie up dahlias. Keep the weeds down and never allow them to seed. Sow hardy annuals. This is the best month for sowing, as you will be able to keep up a succession of bloom during the succeeding months of autumn and winter. To ensure this, sow phlox, pansy, daisy, stocks, aster, nasturtium, hollyhock, candy-tuft, mignonette, sweet peas, dianthus, carnations, cornflower, summer chrysanthemum, verbenas, petunias, pentstamons, &c. Dianthus, sown now and planted out in March, will bloom during the whole year, if the dead stalks and blooms are regularly cut away.

Do not sow flower seeds too deep, as on the depth will depend greatly what results you will have as regards the seed germinating. It is easy to remember that seeds should be covered with fine soil to a depth equal to their own size; for instance, a pea is about one-eighth of an inch in diameter, therefore cover it with one-eighth of an inch of soil.