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Agriculture.

RICE-GROWING.

As there appears to be a recrudescence of the rice-growing industry in the North, the Department of Agriculture, in order to afford every facility for farmers to again take up this branch of agriculture, has purchased the ricemill, huller, and polisher which were worked successfully about the year 1909 by Mr. W. Heck, who owned a sugar-mill on Pimpama Island. The machinery was capable of turning out half a ton of dressed rice per day, and has been so well cared for that it is equal to doing as much good work as when first installed at Pimpama.

At Cairns, in times past, a good deal of rice was grown, and a ricemill was installed, which did good work, about the same year.

To-day Mr. Keane, Mareeba, is one of the rice-growers of the North, and Mr. N. A. R. Pollock, of Tolga, has also embarked in this industry.

The Department of Agriculture, being desirous of assisting any new industry giving promise of success, is sending the necessary machinery, on loan, for the benefit of prospective growers at and around Tolga, about 64 miles from Cairns. The Department has a large quantity of seed for distribution, all of the Mountain Rice variety, and incidentally for growers, from Cairns to Mareeba. At Mareeba, Mr. Keane has been very successful in rice-growing, and has distributed a quantity of paddy (seed rice) to his neighbours. This action of the Department should, and no doubt will, in the near future, result in an extended cultivation of rice. We have, in Queensland, not only the rice trade of the State to supply,

but also an excellent market for the product in British New Guinea, which annually imports large quantities of rice (Java-grown, or, at all events, not white-grown). This lucrative trade should be commandeered by Queensland, and, with our soil and climate, rice produced by white labour should be able to compete with that grown in black-labour countries.

Some years ago we published several articles on rice-growing, and this is an opportune time to give all possible information on the subject, since the Department has obtained the necessary machinery for turning out a marketable product equal, if not superior, to any imported grain.

We have pointed out that if the farmers of Queensland would take up rice-growing in earnest, there is a large market awaiting them in Papua. In corroboration of this, we find in the "Papuan Courier," 31st August, the following statement as to the rice shortage in Samarai:—

"There has been a shortage of rice here for some time, and the position became more acute on account of the southern steamer cutting out a trip. It was expected that this would be relieved by the arrival of the 'Wakefield' with a consignment, but unfortunately she brought no rice at all for Samarai. Owing to the urgency of the matter it was deemed advisable to send the 'Wakefield' straight back to Port Moresby, to bring along a shipment, and she left here on Monday morning with that purpose."

Why should there be any shortage of rice in Papua, when there are districts which we ourselves have visited, all along the southern and south-eastern coasts of the Territory, eminently adapted to the growth of Upland rice? and, furthermore, this country is so well watered that swamp rice could well be produced provided sufficient native labour could be relied on. It would well pay Queensland farmers to grow rice for sale in Papua, with benefit to that country, in the matter of freight charges alone. There are scarcely any tropical products such as coffee, tobacco, vanilla, cocoa, cotton, spices, rubber, &c., which cannot be profitably grown in that country. Tea, also, should succeed well in the mountainous districts, especially at Sogeri.

In September, 1909, Mr. F. W. Peek, Loganholme, wrote a paper on rice-growing which may be considered a good text-book for present-day growers. Mr. Peek's paper, which we reprint, dealt with rice-growing in the Logan district, but it is equally applicable to the Cairns, Mareeba, Tolga, Yonngaburra, and other agricultural districts in that part of Queensland.

Many people are possessed with the idea that rice can only be grown in tropical swamps. This is too common an error. Large areas of the State are eminently adapted to rice culture, and very paying returns have been received—especially at Cairns, in the North, and in the Southern coast districts—by those who cultivated what is known as Upland or Mountain rice. There is no more trouble in growing rice than in growing wheat. Swamps and irrigation canals are not wanted. The land can be ploughed and prepared as for wheat, and the crop harvested in the same manner.

Here follows Mr. Peek's paper, which is as applicable to rice-growing to-day as when written in 1909, entitled—

RICE-GROWING IN THE LOGAN DISTRICT, AND ITS PREPARATION FOR MARKET.

INTRODUCTION AND EARLY CULTIVATION.

In writing up this article (by special request), I will endeavour to make the information contained as intelligible as possible to the ordinary farmer and agriculturist. Of the value of rice there can be no two expressions of opinion, as this cereal forms the chief food supply of over one-half of the entire human race, and certainly there is not another product or cereal that, commercially or economically, obtains the same value as rice.

The varieties of rice to be obtained from the various countries where rice forms one of the staple crops for food supply, are innumerable, running into several hundred varieties, particularly where it is grown largely, as in India, China, Japan, Siam, West Indies, and in other parts of the world, and it has been found that local names have been given to rice of the same variety and quality. For general purposes and distinction, rice has been classified into three distinct varieties or classes. These are known to us as the "Aus," or upland rice; the "Aman," or swamp rice; and the "Boro," another swamp rice, or a variety requiring inundation, warm climate, and rapid growth, and producing a large coarse grain, but which, so far as I have been able to ascertain, has not been tried or cultivated in Queensland up to the present. The portion of the Logan district where rice was extensively cultivated is known as Pimpama Island, which is situated in the south-eastern portion of the State, in 153 degrees east longitude and between 27 and 28 degrees south latitude, and is approached from Brisbane by means of the South Coast Railway, one of the prettiest views in the Logan district, dotted from base to summit with its settlers' homes and splendidly laid out farms. The dark-green patches of sugar-cane, bananas, maize, and other crops, strongly contrasting with the rich red volcanic soil visible here and there, make a picture of agricultural industry both pleasing and effective, and one of which the district is justly proud.

What is known as "Pimpama Island" is the land lying between the Logan, Albert, and Pimpama Rivers, which are connected by a series of creeks and swamps with a long frontage to the Pacific Ocean or Moreton Bay, containing several thousand acres of rich coastal land, interspersed with large areas of ti-tree swamps, the water of which is brackish and undrinkable. The soil cultivated, and which has proved itself best adapted to the growth of rice, is of a sandy, loamy nature in appearance, but containing in a remarkable degree the constituents most suited to the nature and requirements of the plant, being easy of working, although slightly tenacious in wet or showery weather, but of very shallow depth in some places. Layers of decomposed marine shells are found in rather large quantities, pointing out that the lands were once ocean-washed, and the receding waters have left valuable deposits of lime and other constituents in the soil, which, together with the rich humus formed by

the decaying foliage of scrub vines, palms, ferns, &c., of rank tropical growth, have left these patches of soil of varying area between the swamps most suitable for rice culture.

The value of the land averages from £2 10s. to £6 per acre without improvement, and very little, if any, remains unalienated, it being so close to Brisbane, and the Logan district being one of the first settled districts of the colony, all the best lands were early availed of for cultivation. Who first introduced the rice seed of commercial value to Queensland appears to be undecided; but our late State Botanist, Mr. F. M. Bailey, has described a species of wild rice (*Oryza sativa*), a native plant of North Queensland, growing in the swampy lands there, as being

PLATE 34.—RICE LAND, PIMPAMA ISLAND.

indigenous to this State; also, the Chinese have grown rice rather extensively on the North Queensland river banks, particularly near Cairns, in patches for many years past, and which has met with a ready sale when placed on the market.

But it is to Mr. A. J. Boyd, the present editor of the "Queensland Agricultural Journal," that the credit is due of the introduction, in 1869, of rice-growing in the Logan district—he having procured the seed and planted it as an experimental crop at his sugar plantation, Ormeau, which he then had at Pimpama. The seed was one of the Japan varieties, with which he met fair success as regards the growth and result. Since that

time, from the seed Mr. Boyd raised and distributed, other settlers have taken up the matter of rice-growing at various times and in a fitful manner, the largest local planter some fifteen years ago being Claus Lahrs, an enterprising German settler, who planted at Pimpama Island two or three varieties of the China and Japan rices, but, owing to the seed not being tested or acclimatised, he met with but indifferent success. He even went so far as to incur the expense of erecting a mill for dressing the paddy (as rice in husk is termed), but after a few years he gave it up, partly because of the machinery, not being of the best description for dressing the rice, doing its work imperfectly, but also because the rice grown was not the best variety for table use or suitable for the home market. So the industry, so far as the manufacture was concerned, was allowed to lapse. The farmers since then have still kept on planting the rice, which they have cut and used for fodder for their horses and stock, using the seed saved from the crop reaped for re-sowing the land. The consequence has naturally been that the crop had deteriorated with successive plantings, through the same seed being used without change. But three things of great importance had been learned. These were: 1st. The suitability of the soil and climate of the Logan district for rice culture. 2nd. The proper time at which to sow the seed to ensure success. 3rd. The best system of planting and after-treatment of the crop. The value of rice has also been thoroughly tested as green feed for horses and stock, who eat it greedily and keep in splendid condition when fed upon it. The greatest difficulty in rice culture has been found in procuring the right seed, there being such a large variety of each kind, both with their distinctive flavour, colour, and quality, as well as in the facility with which the crop can be handled and harvested (as I will explain further on) and in the requirements of the merchant, who has his prejudices in favour of certain kinds, which more or less best suit the tastes of the consumer. This has now to a certain extent been overcome, and our farmers are now prepared to carry out this important branch of agricultural industry on sound business lines and with up-to-date methods.

PREPARING THE LAND.

Rice, like every other cereal and vegetable, to ensure good results, must have a certain amount of attention and care in preparing the land, although the question of drainage does not enter so largely into consideration as regards rice as with other cereals, and it, of course, greatly depends as to which variety of rice you intend to cultivate, but stagnant water should be avoided as detrimental. The variety I intend this article to illustrate is the Aus, or upland rice. I have tried the Aman variety as an experiment, but with small success, the chief fault of the latter being the necessity of it being submerged continuously with not less than 2 to 3 inches of water, and when the crop ripens, the difficulty of harvesting, owing to the grain being so brittle that at the least touch it leaves the ear with a consequent loss of seed. The variety of rice now grown most extensively in the Logan district is known as the "White Java," which gives a length of straw from 4 to 6 ft., with a good flag, besides a grain of good length, fairly plump, and good cropper, and, so

far, seems fairly free from disease or rust. Other varieties now being tried are the China, Kobe Japan, Batavia River, and Italian Upland, of which the White Java and the Italian Upland have been obtained through the medium of the Agricultural Department.

In preparing the land for planting, ordinary methods need only be adopted—that is, to first plough, leaving the soil to lie for a week or so, to aerate and sweeten; then crossplough and harrow, bringing the soil to as fine a tilth as possible. The best time in this district for planting (and I should think it a suitable time for all districts south of Rockhampton) is at the end of September or at the beginning of October, when we get the first rains. In cultivating for rice on hillsides or sloping land with a natural rapid drainage, it would be advantageous to slightly terrace the land crossways to the fall of the hill, leaving an open catchment drain on the higher side, blocked at each end to conserve the rain water, because even so-called upland rice must have a certain amount of moisture, and by the construction of the above drain, or dam so to speak, the gradual percolation of the conserved water will have the desired effect of helping to supply the necessary moisture, which would be about 20 to 30 in. of rainfall spread over the period of growth. This rainfall has produced very good crops of fair yielding grain.

SOWING THE SEED.

In sowing the seed we have to be determined as to our requirements —if for cropping for grain or for fodder purposes only. There are three systems: Broadcast chiefly for fodder purposes, planting in drills, and transplanting from nursery beds. In the first instance—*i.e.*, sowing broadcast—it will take a bushel (60 lb. of paddy)* to the acre, the seed being harrowed and treated in the same manner as oats or wheat in the after cultivation. But the plan most generally adopted, and by far the best, is planting the rice in drills 2 ft. 6 in. or 3 ft. apart, and about 10 to 12 in. between the plants, which may be done successfully with an automatic seeder. By this method, about 35 to 40 lb. seed to the acre are required. It ensures the crop being more even and not so patchy as when sown broadcast, and allows a better chance of going through the crop with hoe or cultivator to remove any weeds that may have made their appearance before the rice has got fairly started. The system of planting in nursery beds and transplanting out is adopted chiefly in planting swamp rice or the Aman variety; but, as this system of planting entails a lot of labour, I do not think it will ever come into active operation in this State. The mode of operations with this variety is briefly as follows:—Beds are prepared according to the area to be planted; a bed about 20 ft. long and 6 ft. wide will be amply large enough to grow plants for a quarter of an acre, the beds being well made and enriched, so as to produce vigorous plants. Sow the seed and rake in carefully, watering at certain intervals. Care must be taken to keep the plants growing. When the plants are about 6 in. high they are ready for transplanting to their permanent beds, which is done by making holes about 10 in. to 1 ft. apart in the rows and 2 ft. 6 in. between the

* Unhusked rice seed.

PLATE 35.—HARVESTING RICE.

rows. But, as before pointed out, this is a most tedious and costly mode of planting, and the labour involved is a serious item for consideration. You might as well try to transplant a field of oats or wheat, and expect to get a profit. So that it will be easily seen the planting in drills is at once the most economical and systematic, besides being the one most generally adopted.

HARVESTING THE CROP.

This was a difficult matter to undertake with the rice formerly planted in the Logan district, the China and some of the Japan varieties being so brittle that when ripe the least touch caused the grains to drop off with a consequent loss of seed. This has been happily overcome to a certain extent by the better variety planted. Not only does the White Java give better facility for harvesting, but the straw is of a better colour and quality, of a good length, averaging from 4 ft. to 5ft., and in good land even 6 ft. is no unusual length; and no more fairer or gratifying sight to the farmer's eyes can be imagined than the rich appearance of a rice field ready for harvesting: this is whilst the stalks have still a bronze-green appearance, the heads have turned a golden brown, about half-way down, and appear what a wheat farmer or an inexperienced person would deem three-parts ripe. The heads of rice, heavy with grain, have a graceful, drooping appearance; as many as thirty to forty heads have been produced from a single grain planted—the product weighing from 10 oz. to 14 oz. By cutting some varieties of rice in this state, the loss is not so great as with over-ripe grain. The cutting is begun in the morning as soon as the dew is off, the rice being bound up into very small bundles, ready to be threshed as soon as possible (which will be explained later on). Rice is never left stooked in the field, but is treated as quickly as possible.

The usual method pursued in harvesting is to cut with the ordinary sickle or reaping-hook, although where large areas are now being planted it is thought that the latest inventions of wheat-harvesting machinery could be used most effectively. A slight alteration in the reaper and binder might be required in the way of lighter and broader wheels on the rich soft rice lands, but otherwise I see no difficulty in harvesting. At all events, it is the intention of the writer to induce some firm to make a trial at next harvesting as an experiment, and if successful a machine will doubtless be obtained on co-operative lines for the use of the district. After cutting with the sickle, the rice is gathered into bundles and carted into the barn or shed, or, if not sufficiently dry, is left for a day or so to ripen; but this is not often the case, experience having taught our farmers the right time to cut, and it is generally taken to the barn at once for stripping or threshing.

THRESHING THE RICE.

Where there are large quantities, this can be done with the ordinary flail on a threshing-floor, but other system are in vogue where only small quantities are grown. One plan of threshing is by driving four forks into the ground, about 4 or 5 ft. apart in width and 10 or 12 ft. long, placing two long saplings lengthways and two crossways. Over these a

sheet or tarpaulin is placed to hang and form a sort of long trough. In the centre, resting on the cross pieces, a rough kind of ladder is placed, and the bundles of rice are then beaten over the bars of the ladder, which causes the grain to drop into the bag. Some farmers merely nail a few strips across a box or wooden trough, and beat the rice out on this by handfuls. After the grain is beaten from the straw (it is then known as paddy), the next operation is the winnowing. This is done in an ordinary sieve by letting the grain fall on to a sheet in a light breeze, the sieve being held up at a little distance; its weight causes the sound grain to fall on the sheet, whilst the light grain, bits of straw, &c., are wafted away to one side. The paddy is then carefully collected and placed in the sun, spread out for a few days to get thoroughly dry, when it is bagged and stowed away in a dry barn, or else taken away to the miller for turning into the article of trade and commerce with which we are more familiar, and known as rice and not paddy. The straw, after the grain is threshed out, is spread out to dry or cure, or else it is fed to the stock. A great deal of nutriment remains in the stalk at the time of threshing, and I believe it would make up into a splendid ensilage if desired to be used when other feed is scarce. I should be pleased to hear the results if any of our enterprising farmers will give it a trial.

Milling the Rice and Preparing the Crop for Market.

This is a most interesting operation, and for the want of the necessary machinery the rice industry has lain dormant for several years in the Logan district. Every credit must be given to Mr. F. W. Peek (the writer of this article) for the energy and enthusiasm he has displayed in reorganising the industry, and the farmers, through the medium of the Logan Farming and Industrial Association, who took the matter up, believing that a great benefit would result to the district if only carried out in a systematic manner. The matter was ably discussed at their meetings. The Agricultural Department was written to for advice, and their assistance was given as far as possible to facilitate the objects sought to be obtained. It was from information supplied by the Department that the farmers were induced to co-operate in the purchase of a new and better variety of seed, a quantity of White Java—900 lb.—being purchased and distributed at first cost among the farmers; next, a small experimental patch was started, the Department supplying rice seed of other varieties, which are now being tested for their producing and milling qualities, the seeds from this source being again redistributed free of charge to those willing to grow them and still further test the various kinds submitted.

With the large increase of area planted, the want of a mill began to make itself felt. The prices offered for Queensland-grown rice were very low, principally owing to no local mills in Southern Queensland being established at that time. Again, the Department of Agriculture was appealed to, and the address was obtained of the latest up-to-date firm of manufacturers of rice-milling machinery. This was the Engleburg Huller Co., of Syracuse, U.S.A., who were promptly written to for information, and price-lists and catalogues were received from them. A

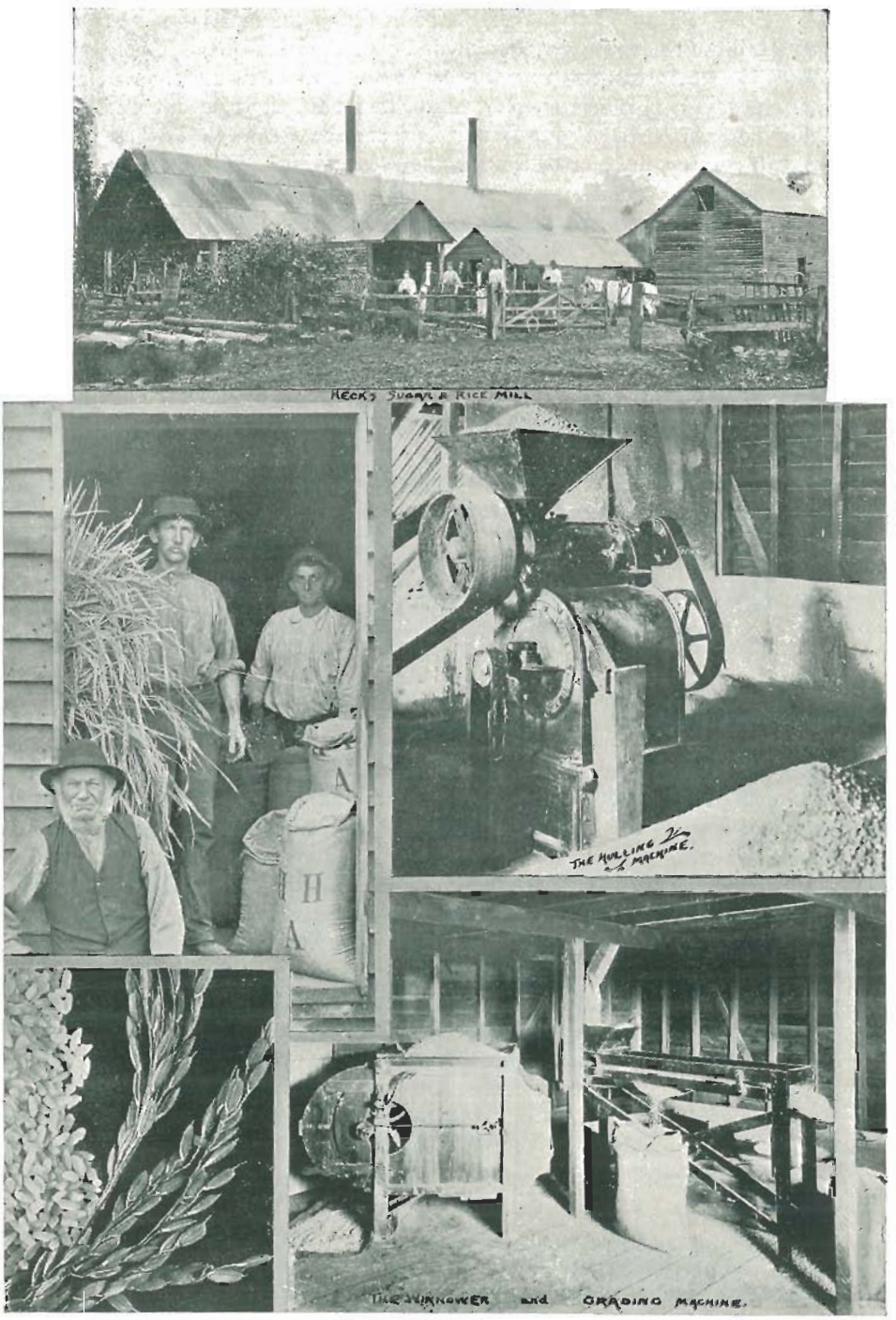

PLATE 36.—RICE MILL, PIMPAMA ISLAND.

meeting of the farmers was called, and an endeavour was made to get a co-operative mill, but without success, the general opinion being that growing and manufacture were two different branches of the business, and that milling would be better undertaken by a local sugar-miller, who would have the necessary engine-power to work the rice-mill at times when the sugar season was over. This was eventually the plan adopted. Mr. Wm. Heck, who owned a sugar-mill on Pimpama Island, sent for and erected the necessary buildings and machinery as an adjunct to the sugar-milling industry. A neat weatherboard structure, the dimensions being 28 ft. long, 18 ft. wide, and 22 ft. high (two story), was erected on stumps to keep the floors dry—an essential in ricemilling operations—a floor being placed about 10 ft. high from the basement floor and extending the full length of the building. Upon this floor is erected the Engleburg Huller and Polisher, a neat little machine known as the "No. 4 size," and capable of treating half-a-ton of dressed rice per day. The paddy, being run into the hopper of the machine, falls on to a cylinder which revolves at high speed and most effectually "hulls"—that is, rubs off the cuticle or outer skin—and polishes the grain in one operation. The pollard or residuum from the rice (hulling and polishing) falls on the floor, whilst the grain itself descends to the lower or basement story of the building by means of a shoot which conducts it into a machine placed to receive it, and known as a grader, which is worked and fed automatically from the machine above. There are four sieves or sifters in this grading machine which separate the broken grains, and also the polished rice into first, second, and third quality, the rice being caught in bags or boxes placed to receive it. It is then ordinarily ready for market, but Mr. Heck added another machine to his mill, known as an improved winnowing machine; this machine, by a series of cogs and cranks, makes the rice pass through another set of sieves, and, at the same time, the wind from a rotary fan contained in the machine and driven at a high velocity clears off any impurities of husk, dust, &c., that may be with the rice after leaving the grading machine, and completes the milling operations by finishing the product in a perfectly clean and highly polished state. Samples of this rice were exhibited at the last National Agricultural Society's Show in Brisbane, and submitted to experts, who expressed themselves as pleased at the improved samples displayed, which were equal to any imported rice of the same variety and very little different from the best Japan.

THE RICE CROP—WILL IT PAY?

This is the question invariably put to the writer whenever advocating the growing of rice as one of the crops to be successfully undertaken in the coastal districts of this State.

In the first place, take the cropping. In ordinary situations, with only fair cultivation, from 30 to 40 bushels of 60 lb. of paddy can be obtained per acre, which is double the wheat yield, the average crop of wheat being from 15 to 20 bushels per acre. I know in some instances these quantities have been exceeded in both crops, but I give a fair average for comparison. The value of wheat per bushel ranges from

3s. to 3s. 6d., whilst the value of rice sold to the local mill averages from 4s. to 5s. per bushel delivered at the mills. Then dry rice chaff is of great value as a feed for stock and horses, and I feel sure, if placed on the market and once fairly tested, it would command a ready sale. The straw is less hard, and, when well dried, compares favourably with oaten straw, and a fairly low estimate would give (according to variety grown) from 3 to 4 tons per acre, of an estimated value of £2 to £3 per ton, or an average to the grower per acre of straw and grain of £15 10s. per six months' crop. Of course, in favoured districts two crops can be obtained in the year—that is, where frosts do not appear. Then the above figures would have to be doubled as a yearly income, but, in the Logan district, only one crop of rice is taken, to be followed by a late crop of some other kind, such as oats, &c. Of course, the greatest benefit is derived by the grower on a large scale if he does his own milling. A glance at the prices paid for paddy and the prices now obtainable for the finished product will be worth consideration. Taking the current prices of rice, at the time of writing, in the Brisbane market, duty paid, best Japan is £24* per ton. The commonest quality of imported rice, "Rangoon," fetches, duty paid, £19. This price gives a fair margin of profit to the local miller if he sells at £18 per ton. The samples being milled this season at the Pimpama Island mill are of very high grade, and closely resemble "Patna" in shape of grain, but slightly darker in colour. Taking then the local rice at £18* per ton market value, to produce which 1 ton 10 cwt. of paddy would be required (according to records taken at recent trials) to be milled, of a value of £12 9s. 9d.; this would leave a margin of £5 10s. 3d. I will add here that paddy rice is bought locally like wheat at 2,240 lb. per ton, deducting the cost of milling, the average of about £2 per ton leaves the miller a net profit of £3 10s. 3d. per ton. To this must be added the value of the pollard, which also is of great value as feed for calves, pigs, or poultry, when steamed and then mixed with separator milk. Its commercial value is certainly not less than £2 to £3 per ton.

The following is taken from the Brisbane "Observer" of 29th June, 1901:—

"We were to-day shown a sample of rice grown at Pimpama Island, Moreton Bay. It resembles Patna rice in shape of grain, but is darker in colour. Qualified experts who have seen the sample say that it is the first really high-grade rice that they have seen grown in this State, and as it can be marketed at from £18 to £18 10s., should command a ready sale. The commonest quality of imported rice, Rangoon, fetches £19, duty paid, here just now, while for Japan rice £24, duty paid, is asked by the distributing houses."

The price quoted for the mill such as I have described, and which is so constructed that it can be duplicated or extended at a very small cost is, for the No. 4 machine, with a capacity of not less than half-a-ton per day, together with grader, &c., about £130, delivered at Brisbane. Of

* £29 to £30 in July, 1917. The figures as here given by Mr. Peck were those ruling in 1901.—ED.

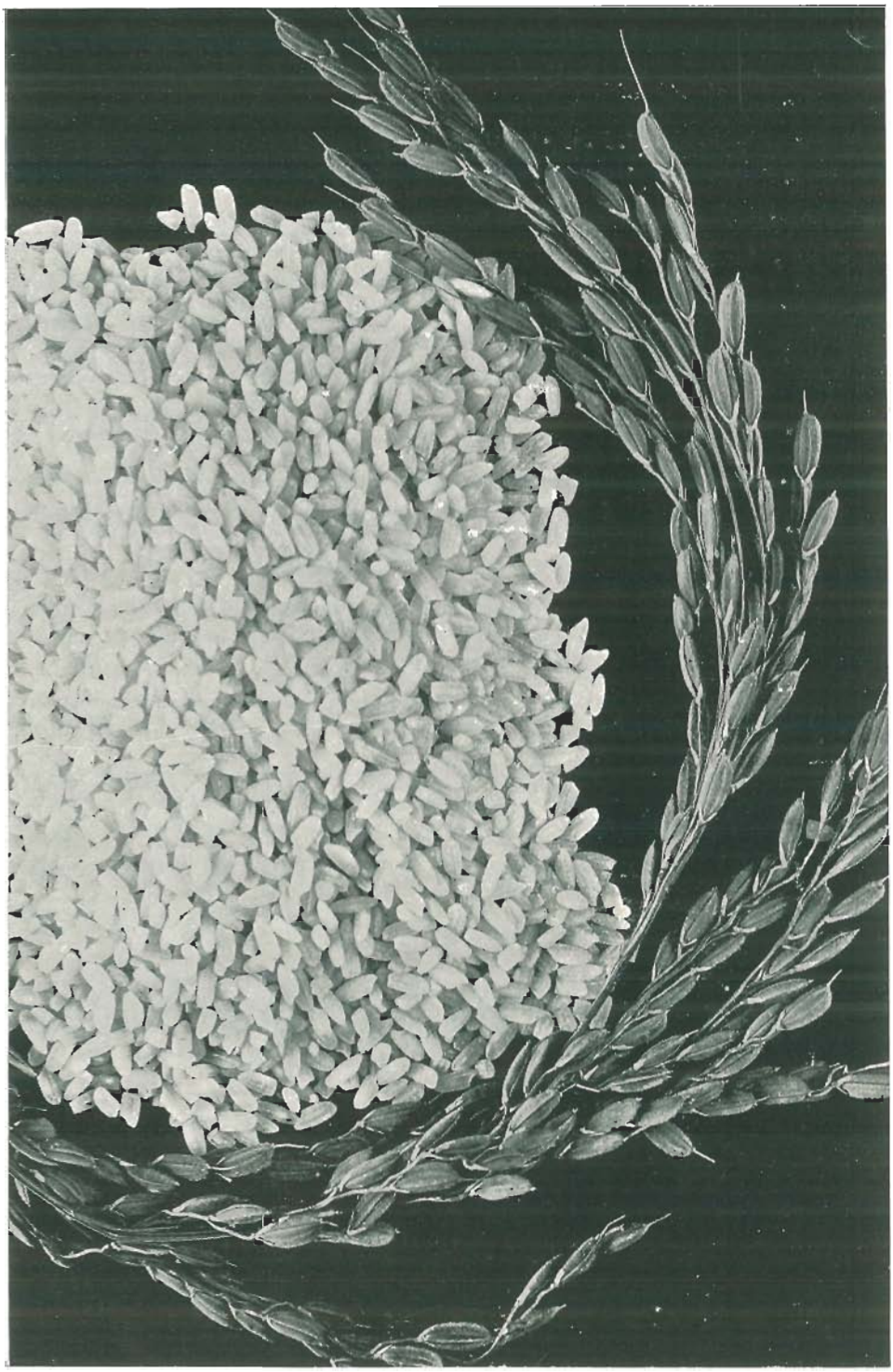

PLATE 37.—HEAD OF RICE AND HULLED RICE. (Natural Size.)

course, the buildings are extra, and the power required to drive the machinery; but worked in conjunction with any existing sugar-mill, or sawmill, &c., it would prove of great value to the district, and a source of profit on the outlay to any enterprising millowner.

FUTURE PROSPECTS OF THE RICE INDUSTRY.

Like all other crops, rice has its enemies and diseases; it has a kind of rust, smut, &c., and in some parts of Queensland grubs will take the roots, but up to the present the grub has not caused any trouble in the Logan district. The rust has yet to be dealt with, and I think this will be accomplished by experimenting with various kinds of rice seed till we meet with a rust-resisting variety. It is probable now that under Federation the importance of rice culture will receive the attention it is worth. A large sum of money is annually expended in importing the product into the Commonwealth States, I would therefore advise all farmers to give rice a fair trial, especially as we are growing varieties that can now be classed as fairly successful on our coast lands, and where a fair average rainfall can be partly depended upon. The value of rice grown simply as fodder to cut green is great for stock feed, the stalks being sweet, juicy, and succulent, and giving a good return per acre, and all stock will eat it with avidity. The question of labour does not enter largely into rice cultivation; as I have pointed out, although a tropical product, there is every facility for cultivation by present mechanical methods—that is as far as the Aus or upland rice is concerned; the Aman or Boro varieties being swamp rices needing irrigation I have not yet heard of as being grown to any great extent, and they probably will not be for some time, if at all, owing chiefly to the heavy outlay required for a suitable water supply and an irrigation plant, which can be dispensed with in growing the beforementioned varieties of upland rice, which have proved most suitable for existing conditions and our present agricultural methods of cultivation and harvesting. Of this I am certain, that the rice is one of our coming crops which, together with coffee, will prove of great benefit to this State particularly, and a further source of wealth to our producers. The market for rice in Australia is a growing one, and it will take years before the supply overtakes the demand. Our farmers need not fear to grow the crop and invest in this industry, which will return a fair amount of profit for the labour and outlay required to produce an article which only requires care in selecting and planting the varieties to suit the market requirements. I am sure the efforts of our producers will be crowned with success, and I shall be pleased with the part I have taken in assisting the modern development of rice cultivation in Queensland.

REGISTRAR-GENERAL'S STATISTICS OF RICE PRODUCTION AND IMPORTATIONS FOR THE YEAR 1899.

Total area planted in Queensland	319 acres
,, quantity produced (paddy)	9,275 bushels
,, average would equal clean rice ..	320,617 lb.
The net imports of rice for 1899 were ..	9,283,933 lb.
Of the value of	£50,099

The above figures represent the position as to production and consumption, and would therefore be about 3·34 per cent. of the total requirements of this State only.

RECORD OF RICE CROPS FROM 1898 TO 1916.

Year.	Acres.	Yield. Bushels.	Average per Acre. Bushels.
1898	863 ..	38,133 ..	44·19
1899	319 ..	9,275 ..	20·03
1900	271 ..	6,870 ..	25·35
1901	205 ..	5,222 ..	25·47
1902	38 ..	1,093 ..	28·76
(Average.—Cairns, 30·16; Cook, 31·50; Port Douglas, 33·84)			
1903	49 ..	1,322 ..	27
1904	60 ..	1,638 ..	27·30
1905	33 ..	885 ..	26·82
1906	24 ..	772 ..	32·17
1907	14 ..	763 ..	24·50
1908	7 ..	270 ..	38·57
1909	— ..	— ..	—
1910	2 ..	22 ..	11
1911	15 ..	402 ..	26·80
1912	1 ..	27 ..	27
1913	5 ..	118 ..	23·60
1914	3 ..	66 ..	22
1915	1 ..	23 ..	23
1916 No rice planted.			

The return for eighteen years amounted to 66,901 bushels, or 3,716 bushels per annum of Paddy (60 lb. per bushel), or about 95 tons, which, at £24 per ton, is £2,280. Yet the net imports of rice in one year alone were to the value of £50,099.

[The total annual production of rice in the United States of America, which, in 1866, was 2,000,000 lb., has now reached 350,000,000 lb. It will take 8,000 large railway cars to handle the crop this season. Rice lands have risen from £2 per acre to £8 per acre; hundreds of miles of irrigation canals have been constructed. Rice has been the redemption of the prairie lands of Texas and Louisiana. In ten years the worthless lands of these two States will produce the world's demand in rice. An acre there produces 20 sacks, worth from 10s. to 16s. per sack. Where are the Queensland farmers in the race?—Ed. "Q.A.J."]

Pastoral.

ERADICATION OF THE CATTLE TICK.

OBSERVATIONS ON THE EFFICACY OF THE TICK-DESTROYING MIXTURES APPROVED BY THE QUEENSLAND STOCK DEPARTMENT, ACCORDING TO THE METHOD AND THE THOROUGHNESS OF THEIR APPLICATION.

The Queensland Cattle Tick (*Rhipicephalus annulatus Australis*) is a one-host tick—viz., it spends the whole of its parasitic life, approximately twenty-one days, on one animal. Its life-history, according to Tryon, is briefly as follows:—

The large fully distended ticks, so easily seen on badly infested animals, are the female ticks that have completed their twenty-one days of parasitic life. They are engorged with blood and about to leave their host and fall to the ground. On dropping on the ground, these fully-developed ticks seek a sheltered spot, and will, under favourable weather conditions, commence to lay eggs in three days. This operation is completed in from ten to twenty-one days, and the number of eggs deposited varies from 1,500 to 3,000. Under favourable conditions as to temperature and moisture, such as usually obtain in the coastal areas of Queensland, the eggs hatch in from twenty-one to forty-two days, and each egg gives birth to a very small young tick, or larva as it is called. The larva is much smaller than a pin's head, is light-brown in colour, and has six legs. It crawls up such things as blades of grass, twigs of trees, posts of fences, &c., and can live there some months, but without a host it is unable to develop any further and will ultimately die. Should, however, a cow or other bovine happen to rub against the grass, twig, or post carrying the larval ticks, the latter will attach themselves to some part of the body of the animal, pierce the skin, and commence to feed on its blood. About seven days after the tick, as a larva, obtains access to and attaches itself to a cow it moults and develops into the second stage. It is then called a nymph, and has eight legs. After a further seven days as a nymph it again moults and reaches the adult stage, the male and female then being about the same size. Only seven more days are passed on the cow, and during this time the female ticks gradually increase in size, and for about twenty-four hours before leaving the host they engorge themselves enormously with blood, then drop to the ground, and seek a suitable sheltered spot in which to lay eggs.

If only a small number of larval ticks (say only ten) attach themselves to a cow, it will be very difficult, or in many cases impossible, to detect their presence at this stage, even though a most careful examination be made with the aid of a tooth-comb and magnifying lens. However, the importance and the danger of such a light and unobserved

tick infestation must not be overlooked, as if the infested cow is not immune she will will probably die of redwater before the ticks are sufficiently grown to be readily detected. On the other hand, if the cow should be immune from redwater she might be sold, and if not treated or only imperfectly treated with tick-destroying fluid the purchaser might travel her a long distance by rail, and so carry ticks into clean country. If only five fully engorged female ticks developed from the ten larval ticks, and these on leaving their host found a suitable nesting-place, and the conditions were favourable for hatching, they might account for the distribution of some 10,000 to 15,000 larval ticks capable of setting up redwater amongst other members of the herd into which the cow was introduced, and, in addition, set up a new centre of tick infestation.

By thoroughly treating tick-infested cattle with dipping fluids containing ·2 per cent. of arsenic (8 lb. of arsenic per 400 gallons of water containing emulsifying agents), it is possible to either completely destroy or prevent the further propagation of the ticks. To get the best results from this treatment, cattle should be forced to plunge into and swim through a dipping tank so that the whole body is completely immersed in the tick-destroying fluid.

Dipping in a ·2 per cent. solution of arsenic, in which some soap has been dissolved to render the mixture more adhesive, has now been practised in Queensland for about twenty years, and when properly carried out the results have been highly successful. It has been abundantly proved that the most grossly tick-infested cattle can be completely cleansed of ticks by two dippings in such a fluid carried out with an interval of seven days between such dippings, and if the cattle thus treated are not exposed to reinfection they may be safely travelled into clean country. Of late years there has been a tendency amongst cattlemen to over-estimate the tick-destroying effects of arsenical solutions, and many wrongly claim that a solution of arsenic in the proportion of 7 lb. to 400 gallons of water, and even that 6 lb. of arsenic to 400 gallons of water will effectively destroy all ticks at one dipping, while a few stockowners show keen disappointment when they are informed that their dips so charged cannot be accepted as efficient for the dipping of cattle travelling into clean country.

Again, others wrongly claim that, using a similar solution, careful application by spraying is as effectual as by dipping.

A third common error is to neglect having dip samples analysed and to rely on the following very unreliable method of testing the strength of the dipping fluid:—Immediately after dipping remove from the cattle three of four ticks and place them in an empty box or bottle. If the ticks die in from one to two days the dip is too strong; if the ticks take from three to five days to die, the dip is of correct strength; if they are not dead within five days the dip is too weak.

With the object of correcting these errors and showing the absolute necessity for the most careful preparation of dipping fluids in accordance with the Government formula and of the thorough application of

same by dipping, we will give a brief description of the work of eradicating ticks at the Stock Experiment Station, Townsville:—

A spraying crush was erected with an overhead tank. The fluid used was prepared from an approved commercial dipping concentrate in accordance with the instructions on the label. All the animals were carefully sprayed, such portions of the body as the inside of the ears, the brush, under the arms and flanks receiving special attention, and the operation was not hurried. Seven days after spraying the same cattle were yarded, and examination revealed the presence of live ticks, including many fully engorged female ticks. They were then sprayed a second time with the same fluid and inspected after a further period of seven days, when live and fully engorged female ticks were again discovered on them. The dipping fluid used in the first two trials was discarded and a fresh fluid prepared strictly in accordance with the Department's formula was tried. The cattle received their third spraying with this material, but on examination seven days later we again found them to be infested with a few fully engorged female ticks. Other concentrates were then used with equally unsatisfactory results. From this period onwards spraying was repeated at fourteen-day intervals, and for some months afterwards a few adult female ticks were discovered when the cattle were inspected immediately before being sprayed. After five months of such treatment, aided by burning of the pasture, ticks were seldom seen; and, although spraying was continued at fourteen-day intervals, no ticks might be observed on the cattle for a month or two. Still, on rare occasions, when examining an animal before spraying, one would find a few adult ticks. Some of these were doubtless the result of accidental reinfestation, seeing that the property on one boundary is only separated from adjoining tick-infested land by a single line of fencing.

The following experiment will illustrate the usual result experienced by us from spraying tick-infested cattle:—

Three stud bulls from Warwick, in South Queensland, arrived at the Townsville Experiment Station on 20th April, 1916. On 1st May one bull was found to be tick-infested, consequently all three bulls were immediately sprayed. The fluid used in the spray contained arsenic in the proportion of 8·7 lb. to 400 gallons of water, with a very high wetting power. On 2nd May some fully engorged female ticks were removed from the infested bull; several duly laid eggs, which failed to hatch. On 3rd May other fully engorged female ticks were removed, several of which laid eggs, and these hatched on 28th June.

After twelve months of this experience the conclusion was drawn that spraying of cattle occupied too much time and was not sufficiently reliable to enable us to maintain the property absolutely clean: consequently, a dipping-tank was installed. The dip was charged with fluid prepared in accordance with the Department's formula, as follows:—

Commercial arsenic	8½ lb.
Caustic soda	4 lb.
Tallow	4 lb.
Stockholm tar	½ gallon.
Water	400 gallons.

The dipping-vat at working level holds 2,800 gallons, and it was charged in the following manner:—

Two thousand gallons of water were run into the dip; 59½ lb. of commercial arsenic were mixed with 14 lb. of caustic soda in the dry state and placed in a 400-gallon tank with about 20 gallons of water, the mixture being stirred for a few minutes until the ingredients boiled and the arsenic dissolved. Cold water was then added until the tank was full, when the mixture was well stirred and run into the dip. Next, 50 gallons of water were run into the tank and heated to boiling point; 14 lb. of caustic soda and 28 lb. of tallow were then added and boiled together for three-quarters of an hour. After this, cold water was gradually added, heating was continued, but the fluid kept below boiling point. When the tank was half-full, 3½ gallons of Stockholm tar were added and the mixture well stirred. Heating was continued and water gradually added until the tank was full, when the mixture was thoroughly stirred and run into the dip. The whole of the dip contents were then thoroughly stirred and used for dipping cattle.

Since the dip was charged all cattle running in the paddocks have been dipped every fourteen days, with highly satisfactory results. This operation will, although the property is now clean, be continued every fourteen days indefinitely, since the work is easily and expeditiously performed and causes no discomfort to the animals treated, either in summer or winter, while it prevents any reinfestations of the pastures that might result if any cattle picked up larval ticks near the boundary fences.

The following experiment illustrates our experience of the tick-destroying effect of the departmental mixture when applied by totally immersing the cattle in a dipping tank:—

Three steers, heavily infested with ticks of all ages, were purchased for experimental purposes, and on the 16th April, 1917, they were dipped in a fluid containing 8·6 lb. of active arsenic to 400 gallons of fluid of a high wetting power. After dipping they were immediately placed in clean stalls and kept under careful observation for several weeks. On the first, second, third, and fourth days following dipping, careful inspection showed that considerable numbers of adult female ticks were becoming fully engorged and dropping to the ground in the usual manner. Many such ticks when fully engorged and about to drop were removed and kept under careful observation, with the results detailed in the table below. On the fifth day following dipping no live ticks were found on any of the animals, and although they were kept under careful observation for several weeks no more ticks were found on them.

Of the fully engorged female ticks removed, no less than seventy-three laid eggs which varied in quantity from very few up to a full complement. However, no eggs hatched.

TABLE SHOWING THE EFFECTS OF DIPPING ON THE MORE RESISTANT ADULT TICKS.

Experiment No. 1.—On 16-4-17 sixty live ticks were removed from three steers immediately after dipping and were kept under favourable conditions as to temperature and moisture.

Date.	Day of Experiment.	No. of Ticks Dead.	Total No. of Ticks Alive.	No. of Ticks Laying Eggs.	Eggs Hatched.	Temperature.
16-4-17	...	...	60	...	...	Room
19-4-17	3	7	53	...	...	,,
23-4-17	7	...	53	1	...	,,
24-4-17	10	49	4	1	...	,,
6-5-17	20	3	1	1		,,
12-9-17	...	...	...	...	Nil	,,
...	...	...	...	..	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Experiment No. 2.—On 17-4-17 eighty-nine live ticks were removed from three steers twenty-four hours after dipping and were kept under favourable conditions as to temperature and moisture.

Date.	Day of Experiment.	No. of Ticks Dead.	Total No. of Ticks Alive.	No. of Ticks Laying Eggs.	Eggs Hatched.	Temperature.
17-4-17	...	...	89	...	...	Room
19-4-17	2	1	88	...	...	,,
23-4-17	6	...	88	33	...	,,
24-4-17	7	...	88	37	...	,,
28-4-17	9	16	72	46	...	,,
28-4-17	11	..	72	47	...	,,
6-5-17	19	13	59	47	...	,,
15-5-17	28	12	47	47	...	,,
7-6-17	51	...	...	...	Nil	37°C.
15-6-17	59	...	..	...	...	...
24-6-17	68	...	...	...	Nil	...
19-9-17	...	...	...	...	Nil	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Experiment No. 3.—On 18-4-17 seventy-eight live ticks were removed from three steers forty-eight hours after dipping and were kept under favourable conditions as to temperature and moisture.

Date.	Day of Experiment.	No. of Ticks Dead.	Total No. of Ticks Alive.	No. of Ticks Laying Eggs.	Eggs Hatched.	Temperature.
18-4-17	..	...	78	...	...	Room
19-4-17	1	6	72	...	...	,,
23-4-17	5	...	72	9		,,
26-4-17	8	29	43	18	...	,,
28-4-17	10	...	43	19	...	,,
29-4-17	11	3	40	19	...	,,
4-5-17	16	13	27	19	...	,,
6-5-17	18	2	25	19	...	,,
12-5-17	24	6	19	19	...	,,
7-6-17	40	...	...	...	...	37°J.
15-6-17	48	...	...	..	...	,,
21-6-17	57	...	...	...	..	,,
26-6-17	59	...	...	...	...	Room
19-9-17	...	...	...	...	Nil	,,

Experiment No. 4.—On 19-4-17 thirty-eight live ticks were removed from three steers seventy-two hours after dipping and were kept under favourable conditions as to temperature and moisture.

Date.	Day of Experiment.	No. of Ticks Dead.	Total No. of Ticks Alive.	No. of Ticks Laying Eggs	Eggs Hatched	Temperature.
19-4-17	...	...	38	...	...	Room
26-4-17	7	20	18	3	...	,,
27-4-17	8	...	18	4	...	,,
30-4-17	12	7	11	4	...	,,
4-5-17	16	3	8	4	...	,,
6-5-17	18	4	4	4	...	,,
19-9-17	...	...	...	...	Nil	...
.	...	..	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Experiment No. 5.—On 20-4-17 sixteen live ticks were removed from three steers ninety-six hours after dipping and were kept under favourable conditions as to temperature and moisture. No further ticks available from steers on 21-4-17. Animals clean.

Date.	Day of Experiment.	No. of Ticks Dead.	Total No. of Ticks Alive.	No. of Ticks Laying Eggs.	Eggs Hatched.	Temperature.
20-4-17	...	...	16	...	...	Room
26-4-17	6	8	8	...	...	,,
1-5-17	11	..	8	2	...	,,
4-5-17	14	1	7	2	...	,,
10-5-17	20	4	3	2	...	,,
11-5-17	24	1	2	2	...	,,
19-9-17	...	...	...	...	Nil	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

CONCLUSION.

There is a very striking difference in the efficacy of tick-destroying fluid according as this is applied by dipping or spraying. Spraying is so unreliable that its use for treating tick-infested or suspected cattle before travelling into clean country should not be countenanced when a suitable dip is available. If spraying is unavoidable, the cattle should be sprayed as often as necessary and held in a clean place until they are proved by the most careful inspection to be clean, and the inspector examining same should be sufficiently experienced to realise the great difficulty of detecting the presence of a very limited number of ticks, more especially when the hair is long.

F. THOMSON, Assistant Bacteriologist.

F. KEOGH, Chemist.

GEORGE TUCKER, Deputy Chief Inspector of Stock.

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

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Ayrshire Herd Book of Australia

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH SEPTEMBER TO 26TH OCTOBER, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Auntie's Lass ...	Ayrshire ...	5 July, 1917	994	3·8	44·27	
Sweet Meadows ...	Jersey ...	8 Aug. ,,	582	5·9	40·65	
Netherton Belle ...	Ayrshire ...	17 July ,,	610	3·3	38·20	
Twylish's Maid ...	Jersey ...	26 Sept. ,,	680	4·7	37·68	
Hedge's Dutchmaid	Holstein ...	9 Sept. ,,	1,059	2·7	33·16	
Prim	,, ...	3 Aug. ,,	940	3·0	32·82	
Netherhall Queen Kate	Ayrshire ...	30 June ,,	879	3·2	32·81	
Lilia	,, ...	11 July ,,	794	3·3	30·59	
Nina	Shorthorn...	6 Sept. ,,	846	3·1	30·57	
La Hurette Hope	Jersey ...	22 Aug. ,,	492	4·7	27·25	
Miss Bell	,, ...	27 June ,,	524	4·4	27·14	
Confidence ...	Ayrshire ...	25 June ,,	633	3·7	27·0	
College Damsel ...	Holstein ...	12 July ,,	958	3·4	27·0	
Lady Mitchell ...	,, ...	26 Sept. ,,	683	3·5	26·11	
Lady Dorset ...	Ayrshire ...	14 Aug. ,,	616	3·4	24·47	
Lady Loch II. ...	,, ...	3 June ,,	575	3·6	24·26	
Thornton Fairetta	Jersey ...	30 June ,,	357	5·6	23·63	
College Bluebell ...	,, ...	28 June ,,	632	3·2	23·59	
Princess Kate ...	Ayrshire ...	28 June ,,	568	3·4	22·56	
Songstress	,, ..	1 Oct. ,,	465	4·0	21·83	
Buttercup	Shorthorn...	2 June ,,	599	3·0	20·91	
Miss Betty ...	Jersey ...	27 Mar. ,,	410	4·3	20·74	
Miss Security ...	,, ...	27 Mar. ,,	453	3·8	20·17	

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1917.

During the month broodiness has been very troublesome; in several cases as many as four birds from a pen were in the broody coops. Mr. E. A. Smith, unfortunately, had a casualty, and the dead bird has been replaced. The weather has been somewhat changeable, but on the whole the health of the birds is very satisfactory. Mr. J. M. Manson wins the monthly prize with his White Leghorns, the total being 161 eggs. As a matter of interest to poultry-breeders, the following details with regard to Mr. R. Burns's Black Orpingtons are given. "F" birds have laid as follows:—

	Eggs.		Eggs.
April 3 to April 16 inclusive	14	June 4 to June 5 inclusive..	2
„ 18 „ „ 25 „	8	„ 7 „ „ 12 „ ..	6
„ 27 „ May 2 inclusive ..	6	„ 14 „ Sept. 7 „ ..	86
May 4 „ „ 6 „ ..	3	Sept. 9 „ „ 14 „ ..	6
„ 8 „ „ 24 „ ..	17	„ 16 „ Oct. 25 „ ..	40
„ 26 „ June 2 „ ..	8	Oct. 27 „ „ 31 „ ..	5

And still laying.

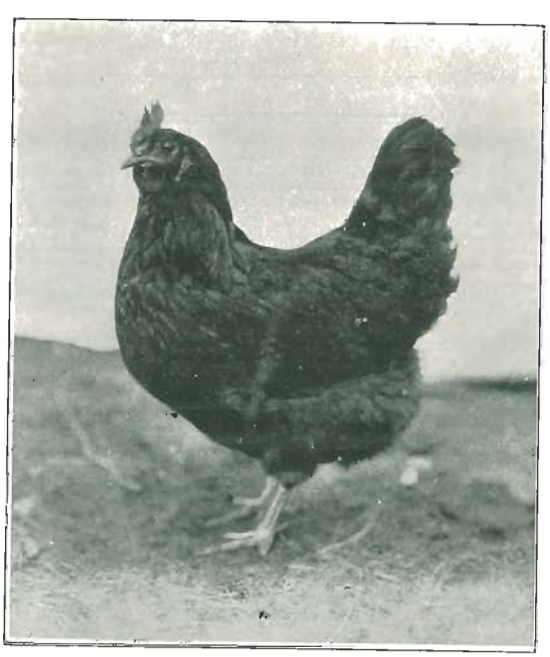

PLATE 38.—"F" BIRD.

The continuous laying of 86 eggs between 14th June and 7th September and the grand total of 201 eggs in 212 days, are both records. It is unfortunate that this bird's eggs are below the standard weight of 2 oz. In fact they average only 1¾ oz. In regard to this question of weights, the following table is of interest:—Mr. Burns's

"C" bird (total 158) and "E" bird (total 171) are full sisters to his "F" bird. The average weight of eggs for "C" bird is 2¼ oz. and for

PLATE 39.—"E" BIRD

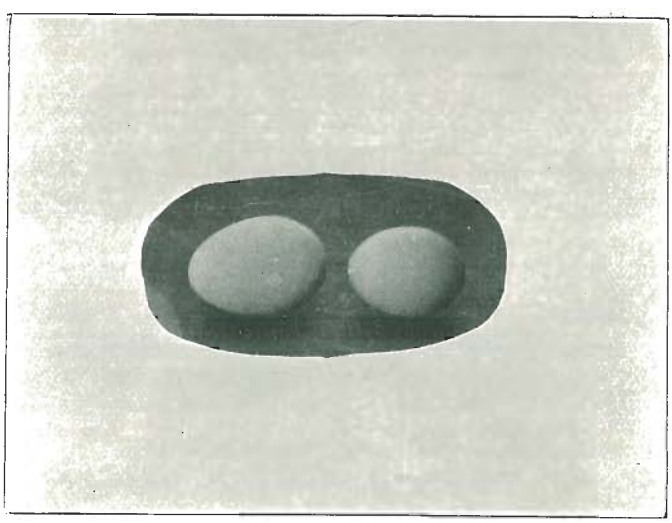

PLATE 40.—EGGS LAID BY "E" AND "F" BIRDS AT END OF OCTOBER. WEIGHT, 2⅜ OZ. AND 1¾ OZ., RESPECTIVELY.

"E" bird 2⅛ oz. Thus, in regard to the weight of egg material laid, these birds lie as follows:—

Bird.	No. of Eggs.	Average Weight of Eggs. Oz.	Total Weight. Oz.
C ..	158 ..	2¼ ..	355½
E ..	171 ..	2⅛ ..	363⅜
F ..	201 ..	1¾ ..	351¾

The record given above illustrates very forcibly the absurdity of merely buying eggs at a uniform price per dozen. Certainly a fairer

method would be to sell eggs by weight, and failing this the eggs should be graded. The following photographs show a parcel of ungraded eggs and then the same eggs separated into two grades. Unfortunately, the photograph does not show as much distinction as actually exists, but the smaller lot in the lower picture are distinctly smaller.

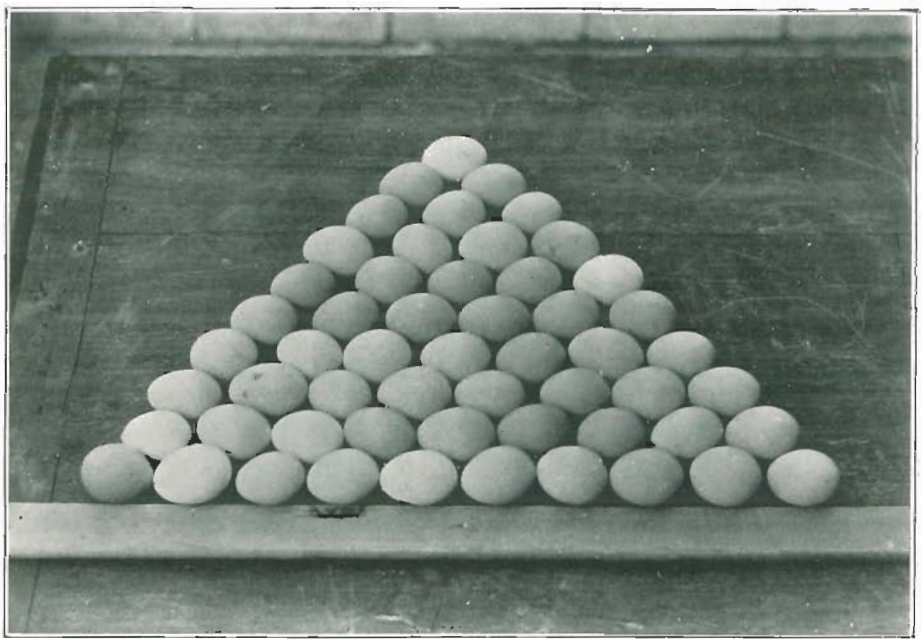

PLATE 41.—UNGRADED EGGS.

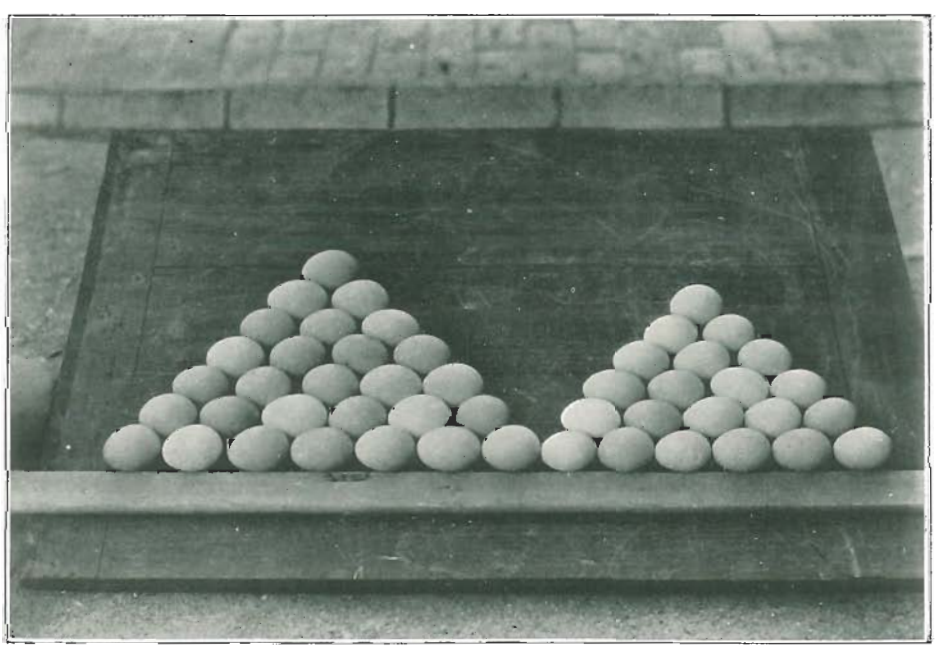

PLATE 42.—SAME EGGS SEPARATED INTO TWO GRADES.

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	October.	Total.
LIGHT BREEDS.			
E. Chester	White Leghorns ...	155	947
*G. H. Turner	Do.	133	838
G. Chester	Do.	147	826
W. Becker...	Do.	139	815
F. W. Leney	Do.	140	814
Chris. Porter	Do.	141	812
*J. M. Manson	Do.	161	803
W. R. Crust	Do.	132	796
Oakland Poultry Farm	Do.	142	789
T. A. Pettigrove, Victoria	Do. ...	127	782
Kelvin Poultry Farm	Do.	149	768
Moritz Bros., S.A.	Do.	118	766
T. Taylor	Do.	140	761
*J. Zahl	Do.	135	758
Quinn's Post Poultry Farm	Do.	127	745
*J. R. Wilson	Do.	132	744
*A. T. Coomber	Do.	139	739
A. Shillig	Do.	136	735
D. Fulton	Do.	135	732
J. G. Richter	Do.	124	731
*Mrs. J. R. D. Munro	Do.	137	716
T. B. Hawkins	Do.	116	716
A. H. Padman, S.A.	Do.	131	710
Mars Poultry Farm	Do.	111	692
*Dixie Egg Plant	Do.	147	688
*A. W. Bailey	Do.	107	686
C. Knoblauch	Do.	98	679
*T. Fanning	Do.	143	679
J. L. Newton	Do.	141	672
R. Holmes	Do.	117	667
F. Clayton	Do.	128	663
Mrs. W. D. Bradburne, N.S.W. ...	Do.	126	656
G. Howard	Do.	131	653
L. G. Innes	Do.	129	651
G. Williams	Do.	116	640
J. Holmes	Do.	135	636
E. Cross	Do.	119	634
Mrs. S. J. Sear	Do.	139	633
G. J. White	Do.	134	633
S. C. Chapman	Brown Leghorns... ...	139	626
*A. E. Walters	White Leghorns... ...	120	616
C. H. Singer	Do.	136	611
C. P. Buchanan	Do.	137	608
J. Ferguson	Do.	130	600
*C. C. Dennis	Do.	110	597
E. A. Smith	Do.	123	594
Miss M. Hinze	Do.	88	591
Mrs. J. Carruthers	Do.	107	588
*Dr. E. C. Jennings	Do.	135	545
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	140	884
W. Smith	Do.	130	826
*Mars Poultry Farm	Do.	145	816
A. E. Walters	Do.	117	814
W. S. Hanson, N.S.W.	Do.	122	755
*E. F. Dennis	Do.	141	751

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	October.	Total.
HEAVY BREEDS—*continued.*			
F. A. Claussen	Rhode Island Reds ...	106	736
Cowan Bros., N.S.W.	Black Orpingtons ...	105	684
Mrs. J. H. Jobling, N.S.W.	Do.	138	682
P. C. McDonnell, N.S.W.	Do.	110	671
D. Kenway, N.S.W.	Do.	111	668
H. Jobling, N.S.W.	Do.	116	654
*E. A. Smith	Do.	131	646
*Oakland Poultry Farm	Do.	117	621
King and Watson, N.S.W.	Do.	115	620
C. B. Bertelsmeier, S.A....	Do.	101	600
*Miss M. Hinze	Do.	125	587
E. Morris	Do.	113	587
R. Burns	S. L. Wyandottes ...	99	577
J. M. Manson	Black Orpingtons ...	113	565
*Kelvin Poultry Farm	Plymouth Rocks ...	94	557
C. C. Dennis	White Wyandottes ...	94	543
F. Clayton, N.S.W.	Rhode Island Reds ...	76	518
*F. W. Leney	Do.	81	484
Totals	...	9,122	50,227

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

DETAILS OF SINGLE HEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. H. Turner	121	132	155	149	128	153	838
J. M. Manson	143	134	117	128	130	151	803
J. Zahl	146	103	151	81	153	124	758
J. R. Wilson	143	124	119	133	105	120	744
A. T. Coomber	132	69	145	133	125	135	739
Mrs. Munro	158	107	111	109	89	142	716
Dixie Egg Plant	117	135	134	137	131	34	688
A. W. Bailey	36	114	135	136	132	133	686
T. Fanning	85	118	126	116	106	128	679
A. E. Walters	82	88	99	121	117	109	616
C. C. Dennis	115	89	48	111	115	119	597
Dr. E. C. Jennings	55	67	102	109	130	82	845
HEAVY BREEDS.							
R. Burns	123	106	158	125	171	201	884
Mars Poultry Farm	124	155	124	141	136	136	816
E. F. Dennis	139	128	141	153	154	36	751
E. A. Smith	111	104	66	113	118	104	646
Oaklands Poultry Farm... ...	145	87	89	80	141	79	621
Miss M. Hinze	108	90	87	99	112	91	587
Kelvin Poultry Farm	85	86	89	140	62	95	557
F. W. Leney	84	84	55	76	109	76	484

Botany.

AN INTERESTING LYCOPOD (CLUB MOSS) FROM NORTHERN QUEENSLAND.

By C. T. WHITE, Government Botanist.

Order LYCOPODIACEÆ.

LYCOPODIUM HIPPURIS, *Desv.* Spring Monogr. I. 44. Plate ???.

Description.—Shoots pendulous or erect with nutant branches, simple or repeatedly forked 1-2½ ft. long. Leaves spreading, of rather thin texture, the lower often deflexed, the higher gradually ascending, subulate-lanceolate, straight or subfalcate, 5-9 lines long and about 1 line broad, acute, entire, the base decurrent, the decurrent portion flat or longitudinally wrinkled. Sporophylla similar in shape to the barren leaves and nearly as long but the upper ones gradually becoming smaller.

Habitat: Saltwater Creek, Mossman River. *F. W. Barnard.*

Distribution.—Java and Philippines to Samoa. *V. A. V. Rosenburgh.*) A couple of years ago Mr. Barnard presented plants of this fine Lycopod to the Brisbane Botanic Gardens; the specimens are now in fine growth, and, when well grown, the species is undoubtedly one of the handsomest of our native Lycopodiaceæ. It is new to Queensland, and the above description and accompanying plate are presented, as the find is an interesting one both to botanists and horticulturists.

Lycopodium hippuris is given by Baker in the "Handbook of the Fern Allies" as a synonym along with *L. ulicifolium*, Vent. of *L. squarrosum*, Forst. The difference between these closely allied species is clearly set forth by Captain C. R. W. K. van Alderwerelt van Rosenburgh in his valuable work, "Malayan Fern Allies."

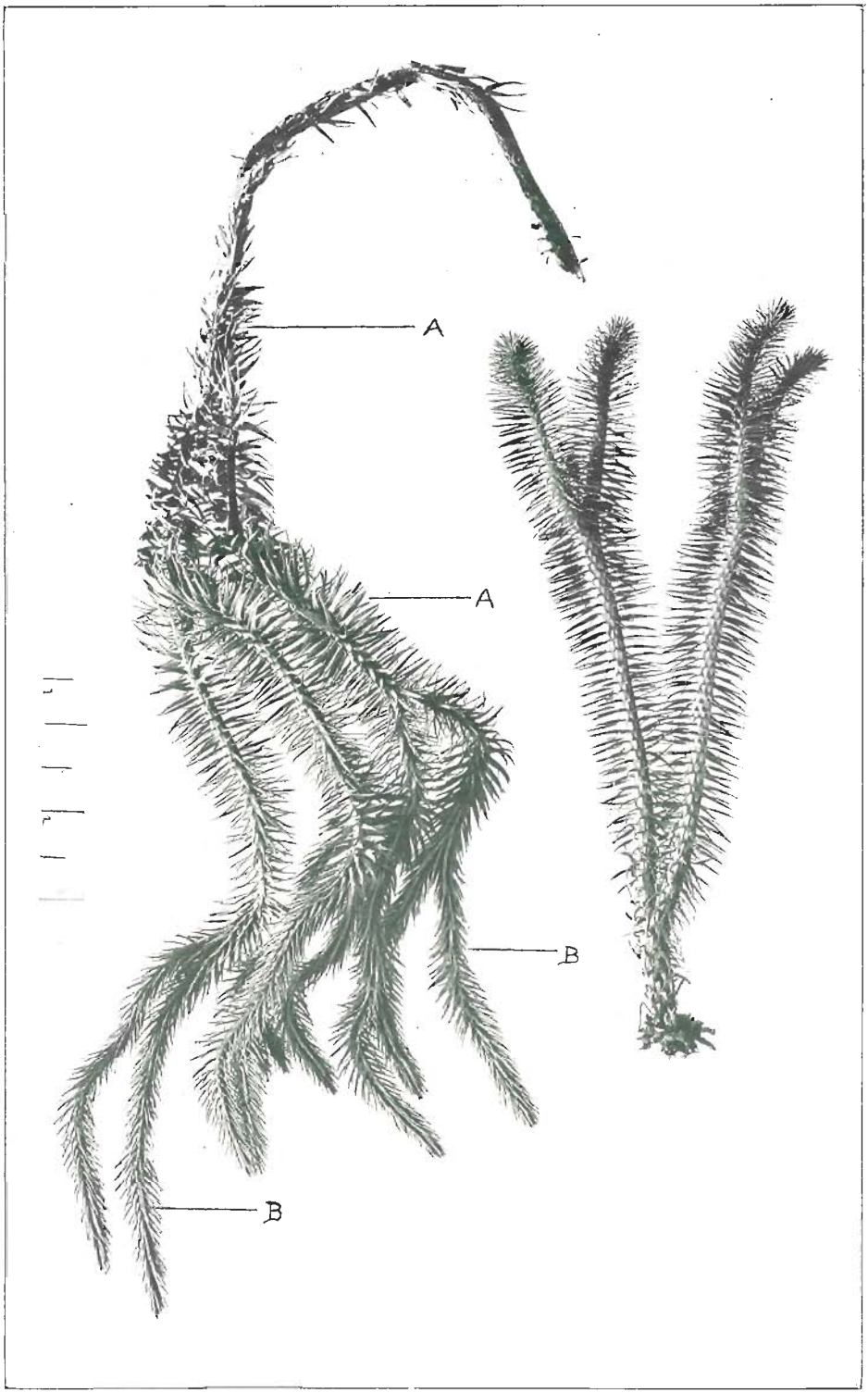

PLATE 43.—LYCOPODIUM HIPPURIS.
Left—An old pendulous shoot. Right—A young erect-growing shoot slightly nutant at the top.
A. Lower sterile portion. B. Upper fertile or spore bearing portion.

General Notes.

BREEDERS OF PURE-BRED STOCK.

In the November issue of the Journal, Mr. R. S. Alexander's stock was given as 1 male, Holstein F.H.B. of Queensland, and 2 males, Holstein F.H.B. of Australia. This should have been—

1 male; 2 females; H.F.H.B. of Australia.

SOCIETIES, SHOW DATES, ETC.

Landsborough.—Bald Knob Branch of the Queensland Farmers' Union. F. D. Young, secretary.

Proston.—Proston Progress and Farmers' Association. T. M. Stephenson, secretary.

Summit, Southern Railway Line.—The Summit Fruitgrowers' and Progress Association. B. Teale, secretary.

DRYING RHUBARB.

Experiments on an extensive scale are being carried on along all lines of drying at Iowa State College (U.S.A.). Many products are being experimented with, and as soon as results are obtained will be given to the public. So far, it has been shown that rhubarb, for instance, can be dried at home without injury to colour, flavour, or character, if the following plan is used:—

Select stalks as for immediate use; clean, peel, and cut into small pieces. Place on cheesecloth on a tray in the sun to dry. Do not let the rhubarb touch the metal. With a hot sun and little breeze, the rhubarb should dry thoroughly in about two days. If the weather turns rainy, and the atmosphere becomes saturated, apply artificial heat. This can be done in a cook stove drier if it is available. Place the trays in the drier and hold at a temperature of not over 100 degrees. Allow plenty of circulation of air. Do not dry until it becomes brittle. If no drier is at hand, hang the tray over the stove, high enough so that the temperature will not go above 110 degrees. Do not place in the oven. Circulation of air is needed to get the best results. An electric fan may be used to circulate the air. After it is thoroughly dry, put the dried product in clean sacks or other containers, and store in a clean, dry place.

When wanted for use, soak for sixteen to twenty-four hours, sweeten, and cook the same as fresh rhubarb. One ounce of the dried product makes a pint when cooked. Twenty pounds of fresh rhubarb makes 1 lb. when dried.

The Markets.

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

Article.		NOVEMBER. Prices.
Bacon	lb.	9½d. to 10d.
Barley	bush.	2s. 6d. to 3s. 3d.
Bran	ton	£6
Broom Millet (no supplies)	,,	£22 to £25
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£4 to £4 10s.
Chaff, Oaten	,,	£6 to £7 6s.
Chaff, Lucerne	,,	£4 to £5 10s.
Chaff, Wheaten	,,	£4 10s.
Cheese	lb.	9½d. to 10d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£7 10s.
Hay, Lucerne	,,	£2 10s. to £3 5s.
Honey	lb.	2½d. to 3d.
Maize	bush.	4s. 2½d.
Oats	,,	1s. 6d. to 2s. 6d.
Onions	ton	£25 to £27
Peanuts	lb.	2d. to 5d.
Pollard	ton	£6 12s. 6d.
Potatoes	,,	£15 5s. to £19 10s.
Potatoes (Sweet)	cwt.	4s. 10d.
Pumpkins (Cattle)	ton	£3 to £5 10s.
Eggs	doz.	5½d. to 8d.
Fowls	per pair	3s. 6d. to 7s.
Ducks, English	,,	3s. 6d. to 4s. 9d.
Ducks, Muscovy	,,	4s. 7d. to 6s. 6d.
Geese	,,	8s. to 8s. 6d.
Turkeys (Hens)	,,	12s. 6d. to 14s.
Turkeys (Gobblers)	,,	20s. to 25s.
Wheat	bush.	4s. 9½d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	5s. to 7s. 6d.
Cabbages, per dozen	1s. to 5s. 6d.
Cauliflowers, per dozen	1s. to 4s. 6d.
Beans, per sugar bag	1s. 6d. to 2s.
Peas, per sugar bag	4s. to 6s.
Carrots, per dozen bunches	1s. 5d. to 1s. 6d.
Beetroot, per dozen bunches	9d. to 1s.
Lettuce, per dozen	1s. to 1s. 6d.
Parsnips, per bundle	7d. to 10d.
Sweet Potatoes, per sugar bag	2s. 6d. to 2s. 8d.
Table Pumpkins, per dozen	6s. to 7s. 6d.
Marrows, per dozen	1s. to 1s. 6d.
Tomatoes, per case	1s. 6d. to 7s. 3d.
Cucumbers, per case	6d. to 1s. 9d.

SOUTHERN FRUIT MARKETS.

Article.	NOVEMBER. Prices.
Bananas (Queensland), per crate	7s. to 9s.
Bananas (Tweed River), per crate	14s. to 18s.
Bananas (Fiji), per crate	...
Bananas (G.M.), per crate	...
Guavas, per case	...
Lemons, per case	5s. to 10s.
Mandarins, per case	7s. to 14s.
Mangoes, per case	10s. to 12s.
Oranges (Navel), per case	11s. to 16s.
Oranges (Seville), per bushel case	7s.
Oranges (other), per case	8s. to 12s.
Papaw Apples, per half-bushel case	8s. to 12s.
Passion Fruit, per half-bushel case	10s.
Pineapples (Queens), per double case	8s. to 11s.
Pineapples (Ripleys), per double case	7s. to 9s.
Pineapples (Common), per double case	7s. to 9s.
Tomatoes (Queensland), per half-bushel case	6s. to 8s.
Cucumbers, per bushel	10s. to 15s.
Strawberries, per tray	1s. to 2s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	NOVEMBER. Prices.
Apples, Eating, per bushel case	20s. to 30s.
Apples, Cooking, per bushel case	10s. to 20s.
Bananas (Cavendish), per dozen	1d. to 5d.
Bananas (Sugar), per dozen	2d. to 5d.
Cape Gooseberries, per quarter-case	8s. to 10s.
Citrons, per hundredweight	11s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	4s. to 5s.
Grapes, per lb.	2d. to 7d.
Lemons (Lisbon), per case	5s. to 12s.
Mandarins, per case	5s. to 12s.
Mangoes, per case	2s. to 7s. 6d.
Oranges (Navel), per case	12s. 6d. to 14s. 6d.
Oranges (Seville), per hundredweight	3s. 6d. to 7s.
Oranges (other), per case	5s. to 10s.
Papaw Apples, per quarter-case	2s. to 3s.
Passion Fruit, per half-bushel case	12s. to 14s.
Peaches, per half-bushel case	3s. 6d to 5s.
Pears, per quarter-case	...
Peanuts, per lb.	2d. to 5d.
Pineapples (Ripleys), per dozen	1s. to 4s. 6d.
Pineapples (Rough), per dozen	6d. to 4s. 6d.
Pineapples (Smooth), per dozen	1s. to 3s. 6d.
Strawberries, per tray	1s. to 2s. 6d.
Tomatoes, per case	2s. 6d to 7s.
Watermelons, per dozen	7s. to 15s.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1917.

Animal.	OCTOBER. Prices.
Bullocks	£25 7s. 6d. to £30 15s.
Bullocks (Single)	£40
Cows	£14 to £20
Cows (Single)	£22 10s.
Merino Wethers	58s.
Crossbred Wethers	55s.
Merino Ewes	42s. 6d.
Crossbred Ewes	40s. 3d.
Lambs	39s. 3d.
Pigs (Bacon)	61s.
Pigs (Porkers)	46s.
Pigs (Suckers)	12s.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1917.	Oct., 1916.		Oct.	No. of Years' Records.	Oct., 1917.	Oct., 1916.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·76	15	4·10	0·47					
Cairns	1·78	34	7·21	7·13	Nambour	3·11	20	1·77	7·82
Cardwell	1·87	44	8·00	2·18	Nanango	2·33	34	1·97	5·87
Cooktown	1·13	40	1·28	2·94	Rockhampton	1·80	29	1·53	4·09
Herberton	0·94	29	1·19	0·85	Woodford	2·69	29	1·09	5·34
Ingham	1·56	24	1·95	1·15					
Innisfail	2·74	35	5·04	14·14					
Mossman	5·04	5	4·99	10·29	*Darling Downs.*				
Townsville	1·23	45	0·37	2·57					
					Dalby	2·14	46	1·22	3·57
					Emu Vale	2·45	20	2·72	2·45
Central Coast.					Jimbour	1·89	28	0·96	3·54
					Miles	2·03	31	2·78	2·19
Ayr	0·94	29	0·32	1·16	Stanthorpe	2·66	43	2·87	3·36
Bowen	1·09	45	0·54	1·21	Toowoomba	2·69	44	2·92	4·11
Charters Towers	0·70	34	0·70	0·42	Warwick	2·35	29	2·57	2·15
Mackay	1·99	45	0·82	4·04					
Proserpine	1·65	13	1·02	5·94					
St. Lawrence	1·79	45	3·13	6·15	*Maranoa.*				
					Roma	1·76	42	1·39	2·04
South Coast.									
					State Farms, &c.				
Biggenden	2·20	17	1·20	6·12					
Bundaberg	2·08	33	2·39	5·81					
Brisbane	2·70	66	1·58	3·39	Bungeworgorai	1·42	5	1·86	1·90
Childers	2·08	21	1·68	6·10	Gatton College	2·46	17	1·21	2·93
Crohamhurst	3·79	25	1·67	6·04	Gindie	1·36	17	0·05	2·39
Esk	2·42	29	2·86	3·06	Hermitage	2·06	10	2·39	1·92
Gayndah	2·38	45	1·51	6·71	Kairi	1·22	5	3·35	1·32
Gympie	2·76	46	0·56	5·59	Kamerunga	1·56	26	3·30	4·99
Glasshouse M'tains	3·00	8	1·55	5·67	Sugar Experiment Station, Mackay	1·69	19	...	6·08
Kilkivan	2·78	37	0·56	4·23	Warren	2·34	5	1·19	4·59
Maryborough	2·74	45	1·79	5·79					

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

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

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

1917.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·2	5·34	5·29	5·47	4·59	6·5	4·46	6·28
2	6·1	5·34	5·28	5·48	4·58	6·6	4·46	6·28
3	6·0	5·35	5·27	5·48	4·58	6·7	4·46	6·29
4	5·59	5·35	5·26	5·49	4·57	6·7	4·46	6·30
5	5·58	5·36	5·25	5·49	4·57	6·8	4·46	6·31
6	5·57	5·36	5·24	5·50	4·56	6 9	4·46	6·32
7	5·55	5·36	5·23	5·50	4·55	6·9	4·46	6·32
8	5·54	5·37	5·22	5 51	4·54	6·10	4·46	6·33
9	5·53	5·37	5·20	5 51	4·54	6·11	4·47	6 33
10	5·52	5·38	5·19	5·52	4 53	6·11	4 47	6·34
11	5·51	5·38	5·18	5 52	4·52	6·12	4·47	6 34
12	5·50	5·39	5 17	5·53	4·52	6·13	4·47	6·35
13	5·49	5·39	5·16	5·53	4·51	6·14	4·47	6·35
14	5·48	5·40	5·15	5·54	4 51	6·15	4·48	6·36
15	5·47	5·40	5.14	5·54	4·50	6·16	4·48	6·36
16	5 45	5·41	5·13	5·55	4·50	6·17	4·48	6·37
17	5·44	5·41	5·12	5·55	4·49	6·18	4·48	6·38
18	5·43	5·42	5·11	5·56	4·49	6·19	4·49	6·39
19	5·42	5·42	5·10	5·56	4·48	6·19	4 49	6 40
20	5·41	5·42	5.9	5·57	4·48	6·20	4·50	6·40
21	5·40	5·43	5·8	5·57	4·47	6·21	4·50	6 41
22	5·39	5·43	5·7	5·58	4·47	6·22	4·51	6 42
23	5·37	5·44	5·6	5·59	4·47	6·22	4·51	6·42
24	5·36	5·44	5·5	5·59	4·47	6·23	4·52	6 43
25	5·35	5·45	5·4	6·0	4·47	6·24	4·52	6·43
26	5·34	5·45	5·3	6·0	4·46	6 24	4·53	6·43
27	5 33	5·45	5·3	6·1	4·46	6 25	4·53	6·44
28	5·32	5·46	5·2	6·1	4·46	6·26	4·54	6·44
29	5·31	5·46	5·1	6 2	4·46	6·26	4·55	6·44
30	5 30	5·47	5 0	6·3	4·46	6·27	4·56	6 45
31	...	...	5·0	6·4	4·46	...	4·57	6 45

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

			H.	M.	
1 Sept.	○	Full Moon	10	28	p.m.
8 „	☽	Last Quarter	5	5	„
16 „	●	New Moon	8	28	„
24 „	☾	First Quarter	3	41	„

The Moon will be at its greatest distance from the earth at midnight on the 14th, and at its least distance on the night of the 30th.

1 Oct.	○	Full Moon	6	31	a.m.
8 „	☽	Last Quarter	6	14	p.m.
16 „	●	New Moon	12	41	„
24 „	☾	First Quarter	12	38	a.m.
30 „	○	Full Moon	4	19	p.m.

The moon will be furthest from the earth on the 12th, and nearest to it on the 28th.

7 Nov.	☽	Last Quarter	3	4	a.m.
15 „	●	New Moon	4	28	„
22 „	☾	First Quarter	8	29	„
29 „	○	Full Moon	4	41	„

The Moon will be furthest from the earth on the 9th, and nearest to it on the 24th.

7 Dec.	☽	Last Quarter	12	14	a.m.
14 „	●	New Moon	7	17	p.m.
21 „	☾	First Quarter	4	7	„
28 „	○	Full Moon	7	52	„

The Moon will cause an *Annular Eclipse* of the *Sun* on December 14th, but it will not be visible in Queensland. On the 28th there will be a *Total Eclipse* of the *Moon* between 7.38 and 7.55 p.m. It will be partly eclipsed for an hour and a-half before and after totality.

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

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

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

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

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

Farm and Garden Notes for January.

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

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

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

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

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

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

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

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

Watermelons and rock melons are still in season.

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

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

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

THE TROPICAL COAST DISTRICTS.

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

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

THE SOUTHERN AND CENTRAL TABLELANDS.

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

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

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

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

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

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