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Agriculture.

THE COTTON INDUSTRY IN QUEENSLAND.

The following remarks on this industry by the Minister for Agriculture (the Hon. W. N. Gillies) will doubtless be read and appreciated by both existing and prospective cotton-planters. The figures given show clearly that this crop is one which can be safely engaged in with the almost certainty, given seasonable conditions, of a very profitable return. The quantities of cotton supplied to the Department for ginning and marketing on behalf of growers have regularly increased since the year 1914, and prices obtained by them have also risen from about 1½d. to 4d. per lb., and in all probability the suppliers this season will obtain 5d. or very little less for their cotton. Mr. Gillies said:—

“The history of the values received by farmers for cotton on the farm show a consistent upward tendency during the last few years; and it is evident that the crop, if profitable at values obtainable in May, 1914, is more so now. In 1914 the farmers received 1.65d. for cotton on the farm; in 1915 they obtained 2.54d.; in 1917 the sum of 3.58d. was paid; and last year 4d. a lb. The tenders in hand for the crop that is now being ginned indicate that the amount payable to farmers will be very close to 5d. per lb. for cotton on the farm; and upon 1,000 lb. of seed cotton to the acre, which should be realised upon a properly cultivated farm, the return, if 5d. is the amount to be paid, will be £21 6s. 8d. Should it be a fraction less than 5d., the difference will not be great. I strongly advocate the planting of this crop, particularly in view of the dry seasons we are now experiencing and the fact that Queensland should be able to supply the needs of Australia and, that accomplished, to export to Europe, as it does with butter and cheese.

“There is no doubt of the possibilities of cotton-growing here and of the quality produced. America is showing a tendency to keep her cotton at home, and the demand from Europe is immense. Therefore, there does not appear to be any fear whatever that the value to the farmer will fall below a profitable price, in comparison with other crops, for some years to come at least, if ever; and the Minister is so satisfied with the prospects that he is sure that the value to the farmer for the 1920 crop will not fall below that of 1918.

“The planting season is now beginning, and the Department of Agriculture will supply seed to anyone who wants it. Early application is, therefore, recommended, especially from residents on the Downs, who should plant in the early spring so as to get the crop off before the winter.

"In evidence of the excellent market for raw cotton existing in Australia, it may be pointed out that, in 1916-1917, at the middle of the war, there were imported into the Commonwealth 282 tons of raw cotton or 653,600 lb., mainly from China and Hongkong, all of which could have been produced in Queensland. This cotton was principally used in the manufacture of woollen goods for strengthening and consequently cheapening the latter. With the increase of the population of the States of the Commonwealth in the near future, the demand for cotton for these and other purposes in which cotton largely figures will naturally increase; and, with proper encouragement, there seems to be no reason why the manufacture of cotton goods should not be a prominent industry in Australia. At present there is much competition amongst merchants for the purchase of the annual Queensland cotton crop. Why, then, should we be under the necessity of exporting the raw material at considerable expense, only to receive it back in a manufactured state, when such manufactures could as easily be turned out locally as in the case of woollen goods?"

It is unfortunate that very dry weather conditions prevailed after the earliest cotton was sown last season, resulting in the failure of much of the seed to germinate. Had it done so, the plants could have thriven notwithstanding continued dry weather. There is, however, yet time to plant, even as late as November, and on the coast Department; and the Department will supply seed gratis to farmers who wish to make a second planting.

Under ordinary circumstances as to rainfall and a proper preparation of suitable soil, the grower may reasonably expect to raise 1,000 lb. of seed cotton per acre; and during the season 1907 there are authenticated records of yields up to 2,000 lb. per acre, the price then ruling being 1½d. per lb., as against the present price of 4d. per lb. This surely should be encouragement to farmers to plant a few acres, particularly as the acclimated varieties of cotton are easier to pick than those formerly grown.

QUEENSLAND COTTON IN LIVERPOOL.

Mr. D. Jones has received the following letter from Messrs. Brown, Rakeford, and Co., cotton brokers, Liverpool, to whom he had sent some samples of Queensland cotton:—

"We have had the pleasure of visiting your Mr. A. E. Bidmead and discussing the Australian cotton with him. This cotton coming here in any quantity, and regularly, would command a very ready sale. The Brisbane cotton, we consider, is worth to-day about 23d. per lb. This is a clean bright cotton, and would be suitable for spinners who use American cotton. The Nikenbah (Maryborough) is far superior to the Brisbane as regards length, and we consider it worth from 25d. to 25½d. per lb. These prices are based on the American Futures, and July position to-day is worth 21.75d., so that the former would be worth about 175 on, and the latter about 350 on. As the Futures market advances and declines, so the value of this cotton advances or declines. We enclose a *pro forma* account sale, giving charges that would be incurred if the cotton was sold in Liverpool ex warehouse.

"We have taken the bales to weigh 500 lb. per bale gross. When cotton is put into warehouse, the least rent that is charged is fourteen days. The charges in this account sale are based on the rates ruling to-day. We should be very pleased to handle any consignment that you may get of this cotton; and, as we have handled what is known as "outside growths" very freely for many years, we feel sure that we could sell this cotton for you easily, and at a satisfactory price.

"Outside growths are generally known as any grades except Indian, American, or Egyptian."

QUEENSLAND COTTON CROP OF 1919.

Since the Department of Agriculture installed a cotton-ginning plant on the premises in William street, and undertook to deal with all cotton grown in the State delivered at the gin-house, on the basis of an advance to growers and a participation in all profits from the sale of the lint, the price paid to them has risen from 1½d. per lb. to 3d., 4d., and during 1919 to 5d. per lb. There has been considerable competition amongst buyers not only in Queensland but in the Southern States for the whole of each season's crop, the price regularly increasing. Tenders for the current year's crop have been received, and the successful tenderers were Messrs. Henry Bull and Sons, of Sydney, at 1s. 6d. per lb.—a price which may be considered as very satisfactory. The same class of cotton, as will be seen from an article in this number of

the "Queensland Agricultural Journal," can easily be sold in Liverpool at from 23d. to 25½d. per lb., less freight, cartage, storage, commission, &c., &c.; so that the price now obtained locally is highly satisfactory. So the producer, if he harvests an average crop of 1,000 lb. of seed cotton per acre, obtains £20 16s. 8d. gross per acre. He delivers his crop at the Department's store, and at once receives an advance of 2d. per lb. When the raw cotton has been ginned, baled, and marketed—the cost of which amounts to about 1d. per lb.—the balance of profit is paid to the growers, which, for this season's crop, amounts to 5d. per lb., including the advance of 2d. per lb. already paid.

Owing to the dry conditions prevailing during the early part of the season, much of the seed failed to germinate, with the result that the crop fell short of that of previous years, and the total amount of cotton sold to Messrs. Bull and Sons was 11,500 lb.—in value, £862 10s.

What is now required is an old mill. In 10 lb. of seed cotton there are about 3 lb. of seed, every particle of which is valuable. The husks form a useful feed for stock; the "meal," or kernel, yields oil; and when the oil is extracted, there is the oil cake for stock. Thousands of tons of these useful by-products of the cotton plant have been in past times, and still are, unsaleable.

THE UNITED STATES COTTON CROP FOR 1918.

The "Weekly News Letter" (published by the Department of Agriculture, Washington) states that the 1918 cotton crop, including lint and seed, was worth 2,067,000,000 dollars (£413,400,000) to the producers. This is about three times the value of the cotton crop of 1914, and is twice the value of the crop of 1913, which had the highest value on record. This computation has just been made, at the close of the cotton year, by the United States Department of Agriculture, Bureau of Crop Estimates, based on average monthly prices received by growers and on monthly marketings. The number of bales of cotton marketed was 12,041,000. The area under cotton in the United States at present is estimated at 33,960,000 acres, or 91.3 per cent. of 1918. The yearly losses of cotton in the United States—due to deficient moisture, excessive moisture, and other climatic causes—amount to 88 lb. per acre. This probably means ginned cotton, which is equal to 264 lb. of seed cotton. Other causes of loss are:—Plant diseases, insect pest, especially the boll weevil, deficient seed, and other causes, accounting for 121 lb. of cotton.

Notwithstanding all their drawbacks, the cotton-growers continue to plant year after year, and from all accounts come out well on the right side of the ledger.

In Queensland the cotton plant has few enemies, and happily no weevil. Given reasonable rainfall at planting time, subsequent dry conditions will not much affect the crop. The cost of picking is about the same as in the United States, and the growers have the great advantage of a certain market at a minimum of cost through the co-operation of the Department of Agriculture.

CORN-GROWING COMPETITION, 1919-20.

1. This competition, as in previous years, was open to all under the age of eighteen years who are residents of the State of Queensland.

2. Applications to be enrolled in the competition closed on 20th October last.

3. The area to be devoted to the planting of the seed maize is one-tenth of an acre, selected seed for which, 1½ lb. of Improved Yellow Dent, posted, free of cost.

4. Each competitor has absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; the plot not to exceed one-tenth of an acre. Yields will be calculated, when judging, on the basis of this area.

The following table shows the length the rows must be to give the exact area according as four, five, six or more rows are planted:—

No. of Rows Four Feet Apart.	Length of Rows in Feet.
4	272 ft. 3 in.
5	217 ft. 10 in.
6	181 ft. 6 in.
7	155 ft. 7 in.
8	136 ft. 1½ in.
12	90 ft. 9 in.
16	68 ft.

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts must be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield, and this officer will post them on to Brisbane.

6. *Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve uniform cobs of the maize from his crop, and forward them, with a letter of advice, to the Department of Agriculture and Stock, Brisbane. (The cobs should be packed in straw envelopes, commonly used in packing beer bottles, and then placed tightly in a case which should be labelled and branded with the initials of the competitor and the number allotted to his district).*

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection. *Unless this rule is observed, the competitor will be disqualified. The maize must be thoroughly dry and ripe when harvested.*

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competitor in failing to observe closely the rules of this competition becomes liable to disqualification.

10. The competition will close on the 30th June, 1920, and the prizes will be allotted thus:—

The competitors are grouped according to the following divisions:—

(1) The district supervised by—

Mr. E. W. Ladewig, Dairy Inspector, Beenleigh.

Mr. L. J. Kelly, Dairy Inspector, Harrisville.

Mr. A. K. Henderson, Dairy Inspector, Rosewood.

(2) The district supervised by—

Mr. C. C. Pickering, Dairy Inspector, care of Miss Macpherson, Victoria street, West End.

Mr. R. G. Ridgway, Dairy Inspector, Moray Bank, Moray street, New Farm, Brisbane.

Mr. L. J. Verney, Caboolture.

Mr. R. Winks, Dairy Inspector, Gympie.

Mr. J. A. Midgley, Dairy Inspector, Bundaberg.

Mr. W. S. Harding, Dairy Inspector, Esk.

(3) The district supervised by—

Mr. J. H. Barber, Dairy Inspector, Crow's Nest.

Mr. J. J. Carew, Dairy Inspector, Gatton.

(4) The district supervised by Dairy Inspector, Kingaroy.

(5) The district supervised by—

Mr. J. D. Ogilvie, Dairy Inspector, Clifton.

Mr. S. A. Clayton, Toowoomba.

Mr. J. R. D. Munro, Dairy Inspector, Warwick.

(6) The district supervised by Mr. D. Downs, Dairy Inspector, Gayndah.

(7) The district supervised by—

Mr. J. Cattanach, Dairy Inspector, Dalby.

Mr. R. S. Sigley, Dairy Inspector, Roma.

The Stock Inspector, Goondiwindi.

(8) The Central District of Queensland, including that supervised by Mr. L. Moriarty, Dairy Inspector, Rockhampton.

(9) The Northern district of Queensland, including that supervised by—

Mr. G. A. Smith, Stock and Dairy Inspector, Mackay.

Mr. J. P. Carey, Yungaburra.

11. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

District Prizes.—First, £5; second, £2; third, £1.

If there are less than six competitors, prizes will be allotted as follows:—

Four to five competitors (inclusive), two prizes, first and second.

Two to three competitors (inclusive), one prize only, first.

When only one competitor, he or she, will be debarred from participating in the District Prize, but will be eligible to compete for the Special Prizes.

NOTE.—It is in the interest of the entrants to encourage others to compete for the valuable prizes being offered.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

No prize will be awarded unless the yield of corn equals twenty bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

12. The aggregate points will be 100, and the judging will be based upon the following:—

(a) Quality of maize produced	..	..	..	..	15 points
(b) Yield of plot	..	..	..	..	75 points
(c) Notes and records of plot	..	..	..	..	10 points

13. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

W. N. GILLIES, Secretary for Agriculture and Stock.

Brisbane, 24th September, 1919.

DESTROYING NUT GRASS.

Mr. F. Lan. Nott ("The Grange," Woongarra, Bundaberg), in reply to an inquiry by the Director of Experiment Stations, H.S.P.A., concerning a coccid insect attacking nut grass, wrote as follows:—

"When starting the cultivation of cane on my farm, I was greatly troubled with nut grass, which was distributed over about 30 acres, which thrived in ratio to the cultivation, and I experienced great difficulty in raising payable crops of cane. Usually, the crop had to stand over and thus become a two-years' crop. This, I may say, always happened in what is known as the plant crop, but ratoon crops were usually cut at twelve to thirteen months. Naturally, the loss through this delay, compared with crops on the same quality of land free from the weed, was very great; also, the amount of extra cultivation cost was severely felt.

"I had come to the conclusion that I would throw the land out of cultivation, but at last obtained some coccid insects on some nuts from a locality where I had heard that a trial (and a failure) had been made for the eradication of this pest by this means.

"I started with spreading 'diseased' nuts at about 8 yards apart over four-fifths of an acre, and allowed these to remain without disturbing them for two months, when the land carried a beautiful crop of nut grass. I then ploughed it up and harrowed it to better distribute the parasite (which had considerably increased in numbers), and planted the land with lucerne, and watched the progress of the disease.

"Naturally, when the lucerne grew vigorously, little nut grass was to be seen. However, from observation I was satisfied that the parasites were behaving well. After about fifteen months I removed the lucerne, and expected to see, at least, a considerable return of the nut-grass plants, but very few came, and those few were all weak and eventually disappeared.

"As control, I had the adjoining land on three sides of a rectangular plot, and on the eastern side was a road, which effectually prevented the parasite from extending in that direction, but they spread to the south side.

"Since that time I have had splendid results from the treatment, and am sure that, if carefully applied, the results are well worth the time spent on the trial.

"The following are the cardinal points to be observed:—

1. See that there is a good crop of nut grass.
 2. Distribute the coccid as evenly as possible.
 3. After distribution, plant a cover crop, or, at least, do not disturb the soil.
- This last remark is important, as by cultivation the coccid is killed before the nuts.

"Up to the present I have eradicated the pest on 20 out of the 30 acres, the time taken being four years from the commencement. The most difficult part is to stop the plant from spreading around the fringe or boundary of the land, as the coccid cannot travel from one patch across a wide gap to another.

"During the first two years I kept a sharp lookout, as the remedy might have taken to other and desirable plants, but so far I have not seen it live and generate on any other plant. I do not think there would be any danger by its introduction, nor should there be any trouble in introducing the coccids, as they can easily be transported on the nuts.

"I know of one place in Queensland and one in New South Wales where it was tried, and both of these would report failures—failures which, in my opinion, were caused by expecting the insect to work miracles and by a want of knowledge of the life history of the insects. My experiments were carried out on red volcanic soil of a heavy nature, with a climate usually dry in spring. From the beginning of operations to the killing out of the nuts should not take more than three years. When the insect has been distributed, allow the land to go into grass, or put in a cover crop, but do no after cultivation for the time mentioned."

CO-OPERATION FOR FARMERS.

Some time ago we pointed out to farmers, especially to those just settling on newly acquired land, the many benefits which some system of co-operation in the work of clearing the land, planting, harvesting, and marketing the crops, and various other matters incidental to the farming business? In the past and, to some extent, at the present day, neighbour helped neighbour, and the help was reciprocated to their mutual benefit. Where this was not the case, each individual producer made use of animal power far in excess of what is absolutely required to effect the object in view. The same theory holds good with respect to clearing, fencing, stumping, and many other works on the farm. We see strong men toiling single-handed at a work which, with the help of a couple of neighbours, could be done in a quarter of the time, and without any of the exhausting labour otherwise required. As an illustration which will commend itself to all scrub farmers, let us take the work of burning off. Sometimes a lucky burn will leave very little after-work to be done, but often a very bad burn happens, and every stick of timber almost has to be handled. A man working alone must do a tremendous lot of axe-work to enable him to pile up the timber in heaps. He has to cut the logs into lengths such as his strength is equal to carrying. He will thus make but a small impression by the end of the day on a five-acre patch of badly burnt scrub. Now, suppose that he has a dozen neighbours all employed at the same work, or even on a different class of work, such as stumping, pulling or husking corn, digging potatoes, or planting some crop. If these men would all combine to assist each other, it is clear that the work of burning off would be enormously lightened. A tree which the individual would have to cut up small, to enable him to deal with it, would be picked up bodily by six men and carried off with ease, all the axework being saved. It might be argued that, while these men are helping their neighbour, the work on their own farms is at a standstill. So it is—for a day or two, but now those who assisted the first man are in their turn assisted to plant, gather the crop, bale their hay, or to do any other work which may be pressing, and, so far from their having lost any time, their own work is far more expeditiously done by the assistance thus given. Again, take the case of a man having ten acres of lucerne cut and just ready to cart in. Everyone knows the disastrous effect of heavy rain on lucerne hay lying in the field. Rain is threatening, and the individual works himself and his horses from dawn to dark, and then finds that he cannot save his crop; but the neighbours come along with their teams, and the whole is safely got in before the storm. This is the commencement of co-operation, and it is easy to see how it works beneficially to all concerned. Now we go a little further, and come to marketing. In the neighbourhood of towns it is a common thing for a man to yoke up a horse, or perhaps two, to cart in three or four bags of corn, some potatoes, cabbages, eggs, &c. This takes the whole day probably, and he expends sufficient labour on the business to perform double the work. His neighbours do the same thing. Now, if we count up the hours so lost by each individual, reckon the labour which all those horses and men could have got through in the day, and add to this loss the probable expenditure of a few shillings on creature comforts in town, we shall find that the sum total will amount to more than the profit on the goods sold. If all those men were to combine and send their produce to town in a couple of big wagons, in charge of two or three of themselves, the work would be equally well

done, and at a minimum expenditure of cash and labour. Why should every housewife collect a few dozen eggs, a few pounds of butter, honey, and other minor farm products which are her own particular province, and at the week's end drive to town with a cargo weighing, perhaps, a hundredweight? Would it not be far more profitable for all if these things were handed over to one individual to take to market and dispose of? There would be no middlemen's profits, no commissions to come off the returns, and thus there would be an end of what is not unknown to many farmers—namely, an account sales, with expenses piled up to a greater figure than the sale money, and a respectful request to the sender to remit the balance. Here, then, is where co-operation comes in again.

Some think that a co-operative store would be the panacea for the disabilities under which farmers labour in the matter of disposing of their produce and purchasing supplies. But it should be remembered that a store, to be a financial success, must be managed by smart business men. Farmers may be shrewd and intelligent enough, but they have not been brought up as business men—that is, as shopkeepers, financiers, bookkeepers, and commercial travellers; and however carefully a set of directors might think they were managing the business, they must, in the long run, go to the wall. Auction sales are thought to be fair and aboveboard methods of doing business. But here again the farmer is "euchred." The auctioneer may be a straight, fair-dealing man, anxious to get the best price for the goods he is selling. It is the buyers, over whose bids he has no control, who combine to keep down prices. What is easier than for a lot of professional buyers, all known to each other, to combine to offer up to a certain figure and no higher? The majority of farmers are in a far different position to the woolgrower. If, at wool sales, prices do not suit the seller, he can afford to withdraw his lots and store them. He is not in any immediate hurry. The wool is an excellent asset. It will keep, and money can always be raised on it. The farmer's goods are perishable. If they are not sold, he cannot raise money on many of them. The farmer himself is probably in urgent want of money to carry out some work or get in some crop. The buyers know all this, and thus are able to get the produce at a figure which will leave them a handsome profit. It is little they care for the farmers. The best plan for the farmers of a district is to organise themselves into a society. But they will say they have done this all over the State. There are farmers' associations and butter and cheese factories and creameries, many of these co-operative, in the State. Leaving out the work of these factories, there are the associations and societies. What have these done for the farmers? With the exception of a few, they have done nothing more than collecting subscriptions and holding an annual show, which latter would appear to be the sole aim and end of most farmers' associations. Now, these societies could do a vast amount of valuable work for their members, provided that those members also do their share of the work. They should act as agents for the farmers; they should have their own reliable agent in every considerable town, to whom they would consign the produce of various kinds entrusted to their care by the farmers. They could arrange sales and prices in advance, by which action farmers would have no need either to hawk their produce or, if unable to sell, to leave it to rot in the barn or town store. Then, again, the society could act as buyers for their district. Goods bought wholesale are always cheaper than goods bought retail. Thus the farmers could send in orders for twenty tons of seed potatoes instead of paying through the nose for one ton. It would be the same with all farm necessities, including sacks and implements of all kinds. There is no need to enumerate all the advantages this method of supply would bring in its train; they should be sufficiently obvious to all interested in buying in a cheap market and selling in a dear one.

There is, however, one thing which might be done by these societies, which, if well thought out and well carried out, would prove a blessing to many. We allude to the formation of a fund out of which farmers who require a small loan to tide them over a temporary difficulty could be assisted, and that with no loss of self-respect, for they could demand the loan as a right under certain conditions. There should be nothing of the land bank about this scheme. A little farther back we spoke of most men spending a shilling or two in town when bringing in their produce. Suppose that these shillings (which most can well afford or they would not spend them) were subscribed weekly to a fund operated upon by the president and committee of a farmers' association. In a district where 100 farmers are resident, if each were to subscribe, say, 1s. or 2s. weekly (the eggs would provide so much money and a good deal more, or they should do so, on a well-managed farm), these weekly deposits, to use a convenient term, would at 1s. per week produce £260, and at 2s. £520 in one year. For the first year after the formation of the fund, no borrowing should take place. The money would be placed out at interest for short periods, by which means the fund would be considerably increased. Now, when a farmer wanted a small sum, say from £5 to £25, he could borrow it for a short

term at low interest, and repay the principal and interest by easy instalments. The fund would thus take the form of a savings bank, in which the farmer receives interest on his money, and on which he can draw for an emergency on the most favourable terms, fair security being given for the repayment. Such a scheme appears to us feasible, but would naturally require careful elaboration, and could only be successful by the hearty co-operation of the farmers themselves. That the advantages of complete co-operation are not seen and seized upon by all our farmers is one of those things that "no feller can understand." See how easily it works out. A man goes into a shop to buy 1 lb. of tea. The price is 2s. Suppose he took a chest. Then the price is 1s. 8d. And so with all goods—the greater the quantity purchased the less has to be paid. What more need be said on this subject? The wise man can understand it, but how many of us are wise?

HOW A FLAX CROP PAYS.

The following particulars of a flax crop grown at Emerald, on the Fern Tree Gully line, 30 miles from Melbourne, which we take from the "Daily Mail," should be sufficient inducement to farmers owning suitable land and water in Southern and Western Queensland to make a trial of a few acres of linseed. It has long since been proved that the flax plant thrives well in this State, both on the coast and inland, producing seed and fibre, both of which products are in great demand in all countries.

The crop has yielded to the grower a gross result equal to £110 per acre. From 90 acres sown with flax, he cut 2,500 tons of green leaf, which yielded 300 tons of fibre. As the value of the fibre is £33 per ton, the gross return per acre was, as stated, £110.

[It would add to this interesting information an additional interest had the cost of production been given.—Ed. "Q.A.J."]

A MAIZE HARVESTER.

A notable invention (says the "Sydney Daily Telegraph") has recently been turned out by Mr. J. O. Smith, of Mount Russell, in the form of a maize harvester. The machine has been built to complete the operation of harvesting maize, to cut the stalk with the cob on it, and thresh the maize in one operation. It has a knife which operates on the principle of a binder, and will cut stalks as low as 6 in. from the ground. Fan beaters cause the stalk to fall on to a canvas elevator, and thence into the threshing drum. From there the stalk, grain, and cob core pass into the shaker box, and the maize sifted from the waste and dust, and passes into the elevator. It then travels into a box similar to the box on the side of a wheat harvester. The machine, which is of light draught, and can be operated by one man and three horses, is capable of treating 4 to 6 acres of maize per day. Mr. Smith is also the inventor of a maize dropper, the patent rights of which were bought by a machinery company. His latest machine should be of great service in harvesting maize under dry inland conditions.

A machine called a "Corn-shredder" was largely used in the United States of America nearly twenty years ago. When the stalks were well dried they were passed—stalks, cobs, husks, and all—through the machine, which delivered on one side the grains, shelled, sorted and winnowed, whilst on the other side it delivered the stalks, husks, and leaves in the form of a well-carded mass, which only required to be chaffed and mixed with some lucerne or cowpea chaff to form an excellent fodder for both cattle and horses.

TREATMENT OF COTTON SEED BEFORE SOWING.

In our last issue (October) we made mention of a method of treating cotton seed, before planting, to enable it to be sown by means of a seed drill. The fluffy fibre on the seed causes it to bunch together, and hence sowing has to be done by hand. The illustrations here given were not prepared in time to accompany the article explaining the process by which hand-sowing may be avoided. No. 1 shows the seed as it comes from the cotton gin or from the linting machine. No. 2 depicts the seed treated with puddled clay, which enables it to easily pass through the drill.

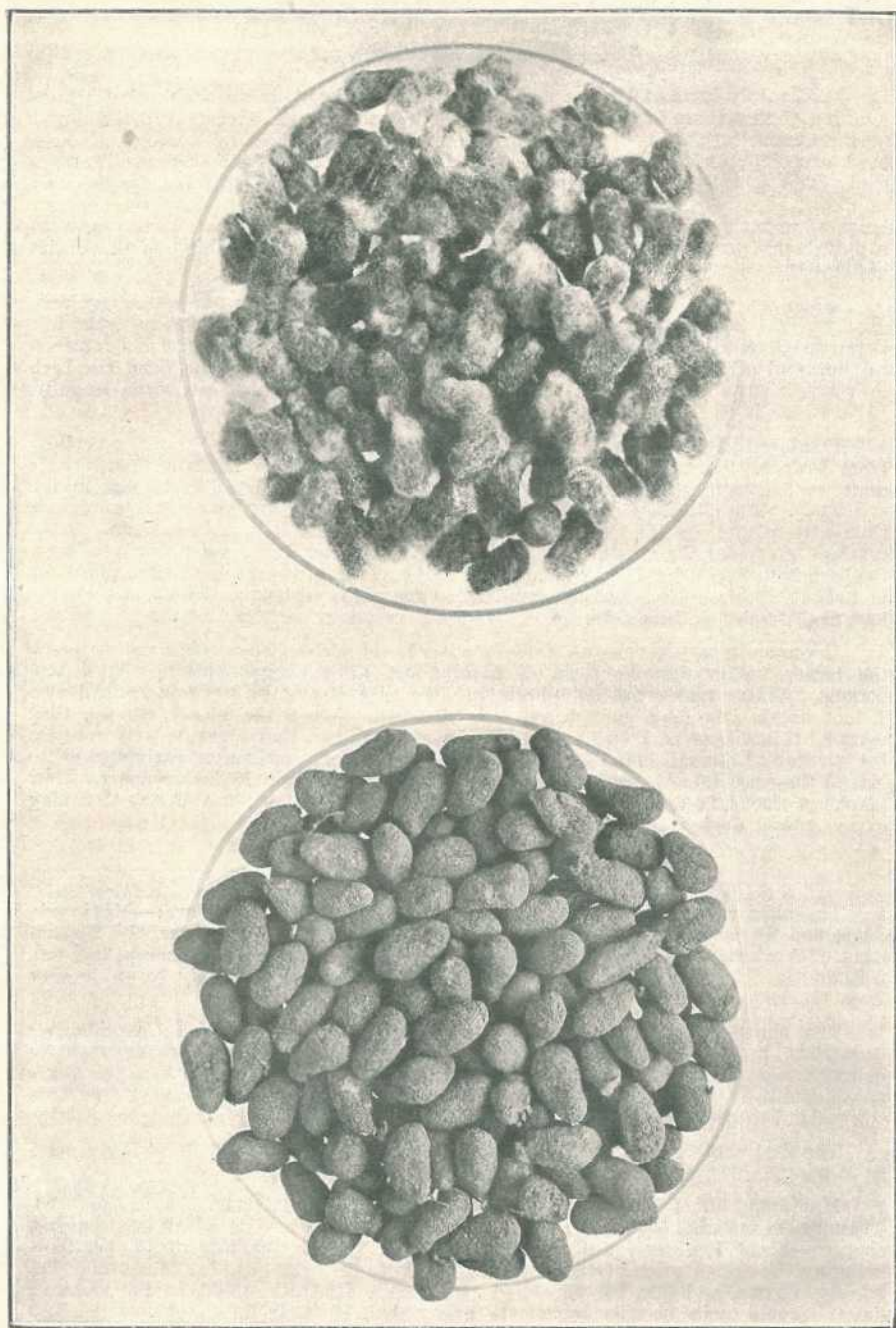


PLATE 26.

TOP—COTTON SEED AS IT LEAVES THE GIN.

BOTTOM—SEED PREPARED FOR THE SEED DRILL.

MARKET GARDENING.

HERB-GROWING.

In the July issue of the Journal, 1917, we pointed out, in an article on "Herb-growing," that there is a steady market in Queensland, and, indeed, in all the States of the Commonwealth, for culinary herbs, and that the climate of Southern Queensland, especially on the coast lands, is eminently adapted for their successful cultivation. This is fully borne out by the success attained by herb-growers, particularly at Cleveland, where large quantities are being grown. Previous to the war culinary herbs were mainly imported from Europe, especially from France. That source of supply being cut off, buyers of herbs on a wholesale scale are looking to the States of the Commonwealth to supply the deficiency.

When we wrote in 1917, we quoted prices as furnished by Messrs. Laughland, Mackay, and Co., Australasia, Limited, Brisbane, in reply to an inquiry from this Department on the subject, and, seeing the many inquiries we have had from returned soldiers and others as to the possibility of deriving a decent income from the herb industry, we cannot do better than reproduce in this issue what we wrote in July, 1917, which is as follows:—

Previous to the war, culinary herbs were mainly imported from Europe, especially from France. That source of supply being cut off, buyers of herbs on a wholesale scale in Australia are looking to the States of the Commonwealth to supply the deficiency. The climate of Southern Queensland, especially on the coastal ranges, is eminently adapted to the successful cultivation of herbs. In districts where cost of carriage precludes the possibility of ordinary heavy crops being profitably produced, the herb industry particularly recommends itself to farmers on account of the smallness in bulk of its products when compared value for value with other products—such as hay, chaff, maize, potatoes, &c.

Herbs are generally easy to grow from seed. If plants can be obtained, so much the better. They may be sown or planted out at any time between April and August. Where plants are not obtainable, the seed should be sown in rows drawn 1 foot apart, just deep enough to cover the seed. When the plants are up, they must be thinned out to 1 foot apart. During the summer, they must be well watered, the surface of the soil being kept loose and mulched. In autumn or early spring, to extend the area, take up and divide some roots, planting them 18 inches apart. New plantings should be made every winter, in order to supply the place of any that may have died out during the summer.

A MARKET FOR HERBS.

The most useful herbs, and in greatest demand commercially, are:—Marjoram, Sage, and Thyme; and with reference to the wholesale prices for these, the Department of Agriculture and Stock has received from Messrs. Laughland, Mackay, and Co., Australasia, Limited, 235 Edward street, Brisbane, a letter in reply to an inquiry from the Department on the subject.

The above firm are desirous of purchasing the herbs named in considerable quantities, provided a decent sample can be offered, the buyers paying cash on delivery. At present supplies of such herbs cannot be obtained from Europe; hence an undoubtedly good opportunity is afforded to farmers and others in Southern Queensland to produce Australia's requirements in this line.

The firm quote prices which they paid in the past for rubbed, dried herbs, such as Marjoram, Thyme, and Sage, as follows:—

Marjoram, 50s. 9d. per cwt.; Thyme, 23s. 6d. per cwt.; Sage, 29s. 6d. per cwt. These prices are c.i.f. Australian ports. To them would have to be added local landing charges—about 10s. per ton of 40 cubic feet, and duty at the rate of 4d. per lb.—bringing the actual price of the imported article to 88s. per cwt. for Marjoram, 60s. 9d. for Thyme, and 66s. 9d. for Sage. The main difficulty would be the picking; but this could easily be done by female labour, as it is fairly light work.

THE CULTIVATION OF CULINARY HERBS.

SAGE.—Sage grows well in parts of Queensland, but does not like much heat. On the high coastal lands—as at Toowoomba, Warwick, Stanthorpe in the South-west, and Herberton in the North—it thrives well. It is easily propagated by

cuttings, and, if planted about 15 to 18 inches apart each way, will soon cover the ground and keep down weeds. The dried leaves find a ready sale. According to the labour available, the plants may be hand-stripped, or cuttings may be made two or three times a year.

THYME.—Unlike the Sage plant, Thyme is able to stand a good deal of heat. It requires the same treatment in planting as Sage. Along with other culinary herbs, it is largely imported in a dry state for flavouring purposes, being very largely used in the butchering trade.

MARJORAM.—Plants may be raised from cuttings planted, say, in April if the weather be mild; but a better plan is to divide old plants into as many single-stemmed plants with a root or two as possible. These should be planted in well-worked ground at distances of 18 to 20 inches apart each way. A couple of chippings with the hand cultivator will be all that is necessary to keep down weeds, as the plants soon cover the ground. Two or three cuttings may be made every year. There is a very considerable demand for the dried leaves. As in the case of Thyme and Sage, Marjoram requires a deep, friable loamy soil and a temperate climate, under which conditions it will grow to a height of 18 inches.

The leaves of herbs must not be dried in the sun or near a fire.

HERB-GROWING FOR WOMEN.

“Before the war Australia imported annually £10,000 worth of culinary herbs.” What a staggering piece of information is this, given us in a bright and practical article, by Miss Annie S. Evans, in a Melbourne newspaper recently. With all our natural advantages and opportunities for growing herbs, to think that we have been importing them at this rate. We have no excuse but ignorance and indolence. Some of us are ignorant, some are indolent, some are both.

When the continental market was closed and the shortage began to assume serious proportions, and the demand became greater than the supply, we knew for the first time where we obtained our herbs. Not only Germany, but France, Italy, and the Balkans supplied us.

One man—“out Ballarat way”—Mr. George Morgan, evidently is one of the few who has not suffered from the prevailing indolence, because for the last thirty years he has been a herb farmer. He has 16 acres under cultivation, which, we believe, is the largest farm of the kind in Australia. This year one firm alone is prepared to take his whole harvest. So here is an opportunity for the woman on the land!

This successful grower informed his interviewer that women could easily make a livelihood with herb-growing. But they must begin in a small way if they want to be successful growers. He suggests 100 cuttings as enough to start with, which can be added to every year. The first year's crop will be probably small, but the crop will increase every year. June or July are the months for planting in Victoria, and the best aspect is an eastern one. A clay or sandy soils the herbs flourish in, but a moist soil is also good. The land should be twice ploughed, then harrowed, the cuttings then put in fairly far apart, and set in a square formation.

The crop is cut when in flower, which is about November, and the cutting should be done with a hand sickle used close to the ground. Every leaf is used, even the siftings; there is no waste whatever. A hoe, a sickle, flail, and a few baskets are the only necessary requirements.

In taking slips they should always be cut, never broken.

Marjoram, Thyme, and Sage are particularly referred to here, for which there is always a large demand by merchants and butchers. Sage is the most expensive, and as the new leaf is best a fresh supply should be sent out every season.

A very comforting assurance is given that no animal, mice, or rabbits will touch the herbs, nor does any pest molest them. Sheep will carefully graze among the herbs without touching them.

We hope that some of our women readers will be diligent enough to give herb-growing a trial, and shall be glad to hear of their success.—“Weigel's Journal.”

JOURNAL OF TROPICAL AGRICULTURE, PARIS.

We have been asked to announce the resumption of publication of the above Journal, which was suspended in August, 1914, owing to war conditions in France. The present address of the publication is 27 Rue Lafitte, Paris. The Journal in the past dealt with many industrial matters of interest to Australians, especially in the tropics.

Pastoral.

WHAT IS A HOGGET?

In a case which came before a New South Wales District Court recently the case hinged upon the definition of the word "hogget." The report closed with:—"After hearing a number of expert sheepmen on both sides as to the definition of a hogget, his honour came to the conclusion that a hogget was merely a young sheep which might vary in age from six months to two years, according to the definition each man carried in his mind. It was evident, he said, that there was no universal definition of the term."

A well-known authority in New South Wales (Mr. E. D. E. van Weenen) has addressed a letter on this subject to the "Sydney Morning Herald." He remarks that it was evident that Judge Bevan had such faith in the expert evidence that he decided to accept all of it as regards the ages of a sheep during which it is entitled to the word "hogget." Putting aside the English definition of a "hog" or "hoggerel," as being a sheep a year old, also the question of teeth, Mr. van Weenen submits that custom in Australia has given the definition of the word "hogget" as a sheep from twelve to twenty months old at date of shearing. A young sheep after six months and up to twelve months old is called a weaner.

Another correspondent ("R.S.A.") writes:—"Referring to the dispute as to what constitutes a hogget, it may interest sheepmen to know that in New Zealand, where the writer has had many years' experience among longwool sheep, the standard for hogget is arbitrary. A lamb takes the name of hogget when it is weaned, and is known as such till the arrival of its first two permanent teeth. It is then called a two-tooth wether or a maiden two-tooth ewe. Does it not stand to reason that there must be some fixed standard? Otherwise transactions are always open to repudiation. Also a 'comeback' is classed as a crossbred. A buyer can always use his right to reject sheep he does not like."—"Leader."

In one of the earliest numbers of the "Queensland Agricultural Journal" it is recorded that the question "What is a hogget?" was answered by two graziers travelling in a railway carriage, one of whom remarked that he expected to get a good figure for his hoggets. When he left the train, one of the remaining occupants asked his neighbour, "What's a hogget?" "Well, I don't exactly know," was the reply; "but I think it has something to do with a pony when its mane is cropped." "Not at all," said the other; "a hogget is a young pig." A new passenger comes in, and it is resolved to leave it to him. "A hogget?" he sagely replied; "well, you'll have to excuse me, gentlemen, because I don't know anything about poultry."—Ed. "Q.A.J."]

SHEEP ON THE COAST.

In September last a demonstration of sheep-shearing, lamb-marking, drenching, and selection was given by Mr. W. G. Brown, Instructor in Sheep and Wool, of the Agricultural Department, assisted by Mr. Wilson, on Mr. Massam's farm at Beaudesert. Mr. Brown has long advocated the keeping of small flocks of sheep on the coastal lands, provided the proper conditions of feeding and general treatment are observed, and this demonstration was intended to show that sheep were a very profitable source of revenue to farmers on the coast. The practical demonstrations were preceded by a short address, in which Mr. Brown stated that Border Leicesters and crossbreds were the most suitable sheep for these districts. Mr. Massam's flock of 200 were of this breed and were looking remarkably well, considering the long spell of dry weather. The lambing (53 lambs from 58 ewes) showed a percentage of 91. The sheep had a full growth of wool, the fleeces, after ten months' growth, generally weighing 9 lb. Mr. Brown dwelt on the importance of checking the stomach worm by proper drenching, and said that all new sheep should be drenched before placing them on coastal farms.

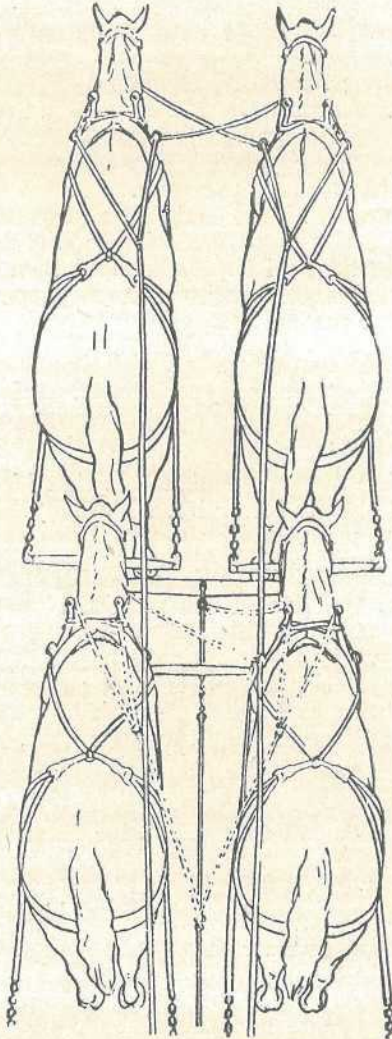
RECORD PRICE FOR QUEENSLAND WOOL.

A feature of the wool sales in London on 24th September last was the record price of 100½d. per lb. obtained for twenty-one bales marked "Garomma" and twenty-one bales marked "Rosevale." Both consignments were superior combing scoured from Queensland.

The Horse.

A TANDEM HITCH FOR TEAMS.

In a recent issue of "The Percheron Review" (U.S.A.) is given detailed information regarding the use of the pulley equaliser to drive two or more teams tandem. In order to do this the method of "tying-in and bucking-back" illustrated in the accompanying sketch must be used. The lead team is the only one on which lines are used. The furrow horse from each of the remaining teams is "tied-in" to the



draw rod with an ordinary lead strap and his mate tied to his hame ring. "Bucking-back" is accomplished by fastening each end of a strap 10 feet long to the bit rings and extending it back over the top of the collar between the hames. A ring rides free on this strap, to which a single strap is fastened. The other end of this strap is attached to a ring on the draw rod. The hitch is so designed that when any team pulls forward the draw rod is pulled back, which tightens the buck strap and thus holds the team from going ahead.

Poultry.

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

In spite of the hot weather prevailing during the month, the laying has been good. Broodies have been somewhat plentiful, four of them being White Leghorns. The heavy breed group pens have been the most troublesome in this respect. G. Turner lost a bird, and has replaced it. The most notable laying for the month was by Fanning's pen of White Leghorns and E. F. Dennis's Black Orpingtons. The former finished up the month by laying 41 eggs in the last 7 days, and in the 30 days produced 20 possibles of 6 eggs. The Black Orpingtons laid 39 for the last 7 days, and scored 160 for the month. Several good sequences have been made. R. Holmes (E. bird) had a run of 67 without missing. E. M. Larsen's C made a run of 64, breaking on the 26th. R. Burns's D broke a run of 39 on the 2nd September and then finished the month without a break. The longest run in White Leghorns is by Manson's A bird, which has laid for the last 23 days.

At the request of competitors we publish the scheme we have adopted for judging birds for the "true-to-type" prizes. It is necessary to give a brief explanation of the principles which have guided us in elaborating the scheme for judgment:—

1. The main thing to be remembered is that birds are entered into the competition for test as to fecundity, with the ultimate object of using them as breeders. Hence all their characteristics have to be considered in the light of their possible transmission to the progeny.

2. To be true to type, the birds must not possess any but breed characteristics. For example, side spikes in single combs, or feathered legs in clean-legged varieties, &c., would be disqualifications. At the same time, any exaggeration of features, such as too large a comb in White Leghorns, would count against the bird just as much as a comb that was too small and erect. In the same way, medium values are required in many of the features, for it is fully recognised that the birds are for utility not show purposes.

3. Because the birds are to be used for breeding, stamina is considered of vital importance; hence it has been deemed necessary to score the birds for stamina independently of type and conformation. In judging for stamina, the general habits of the birds during four to six months' observation are utilised.

4. Each bird is judged separately, and the group of six birds finally classified as the aggregate of the six individuals. In this way a measure of the uniformity of the breeding is given.

5. For the type of the various breeds the standards of the Poultry Club of England have been taken as a basis, with the following modifications:—Exaggeration of points is not allowed: the general conformation of the body has to comply with that essential wedge shape which is characteristic of a good layer.

The scale of points adopted is as follows:—

No. 1. Type and Conformation—

Head—								Points
Comb	..	..	..	..	..	..	..	10
Skull	..	..	..	..	..	..	..	5
Ear lobes	..	..	..	..	..	..	..	5
Face	..	..	..	..	..	..	..	5
								25
Body	..	..	..	..	..	..	..	30
Size	..	..	..	..	..	..	..	25
Legs	..	..	..	..	..	..	..	10
Colour of plumage	..	..	..	..	..	..	..	10
Total	..	..	..	..	..	..	..	100

No. 2 Stamina—

Eye	..	..	..	..	..	..	..	15
Head	..	..	..	..	..	..	..	20
Legs	..	..	..	..	..	..	..	15
Heart and lung room	..	..	..	..	..	..	..	15
Digestive capacity	..	..	..	..	..	..	..	15
Observation general health and habits	..	..	..	..	..	..	..	20
Total	..	..	..	..	..	..	..	100

Disqualifications:—Showing alien blood. Inheritable characters, such as side spikes, feathering on shanks of clean-legged varieties, &c. Bodily deformities, including wry tail, squirrel tail, crooked toes, &c. Any competitor found guilty of faking will be disqualified and debarred from entering future competition.

Birds gaining 75 or more points in each of the above standards will be placed in the 1st Class. Any bird failing to obtain 50 per cent. of the points allocated for any one feature will be passed out. In classifying the pens, the following rule is adopted:—If all birds are Class 1, the pen is Class 1. If 1 of the 6 birds does not pass, the pen is Class 2. If 2 of the birds fail to pass, the pen is Class 3. If more than 2 fail to pass, the pen is Class 4. The classification is shown in the table of results. This year pens classed 1 and 2 will be eligible for the "true-to-type" prizes; but next year Class 1 only will be eligible.

The following are the individual records:—

Competitors.	Breed.	Class	Sept.	Total.
LIGHT BREEDS.				
*J. M. Manson	White Leghorns	2	154	797
*W. Hindes	Do.	1	145	773
*T. Fanning	Do.	1	163	771
*Dixie Egg Plant	Do.	2	148	749
*E. A. Smith	Do.	2	151	724
*Dr. R. C. Jennings	Do.	3	142	700
*G. W. Hindes	Do.	1	139	691
*Haden Poultry Farm	Do.	2	138	689
*Range Poultry Farm	Do.	1	141	672
*Quinn's Post Poultry Farm	Do.	1	149	659
S. McPherson	Do.	1	124	655
*B. Caswell	Do.	2	147	639
J. H. Jones (Toowoomba)	Do.	1	135	639
*C. P. Buchanan	Do.	4	133	636
G. Williams	Do.	1	125	629
*W. Becker	Do.	2	141	628
*H. Fraser	Do.	2	133	628
G. J. Byrnes	Do.	3	118	620
*L. G. Innes	Do.	3	144	609
*Mrs. L. F. Anderson	Do.	1	144	600

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Class.	Sept.	Total.

LIGHT BREEDS—*continued.*

W. A. Wilson	White Leghorns ...	2	129	599
H. A. Jones (Orallo)	Do.	3	132	599
*J. J. Davies	Do.	1	141	595
S. W. Rooney	Do.	1	121	591
*W. Lyell	Do.	3	136	590
*Thos. Taylor	Do.	2	149	566
*Mrs. A. G. Kurth	Do.	2	141	565
*Mrs. R. Hunter	Do.	2	124	552
G. H. Kettle	Do.	2	123	538
Geo. Trapp	Do.	2	129	537
B. Chester	Do.	2	129	519
H. O. Jones (Blackstone)	Do.	1	124	514
Oakleigh Poultry Farm	Do.	3	123	512
Mrs. N. Charteris	Do.	3	129	511
C. A. Goos	Do.	2	124	505
*O. W. J. Whitman	Do.	1	129	494
N. A. Singer	Do.	1	148	492
R. C. J. Turner	Do.	2	114	476
J. W. Newton	Do.	1	133	469
W. Morrissey	Do.	3	116	451
J. H. Dunbar	Anconas	2	106	443

HEAVY BREEDS.

*R. Holmes	Black Orpingtons ...	2	147	858
*E. F. Dennis	Do.	1	160	779
*E. M. Larsen	Do.	1	151	777
*R. Burns	Do.	2	147	774
Geo. Nutt	Do.	1	135	749
*W. Smith	Do.	1	149	735
*A. E. Walters	Do.	2	131	729
*A. Shanks	Do.	2	141	719
*Kelvin Poultry Farm	Plymouth Rocks ...	1	130	706
*E. Morris	Black Orpingtons ...	3	125	684
*Nobby Poultry Farm	Do.	2	143	683
*D. Fulton	Do.	3	110	642
*Jas. Ferguson	Chinese Langshans ...	3	119	622
*T. Hindley	Black Orpingtons ...	2	137	621
*W. H. Reilly	Chinese Langshans ...	3	129	604
*H. Puff	Rhode Island Reds ...	1	112	590
*Mars Poultry Farm	Black Orpingtons ...	2	144	577
Burleigh Pens	Do.	1	124	569
A. Homan	Do.	2	123	544
*F. W. Leuey	Do.	3	144	540
R. B. Sparrow	Do.	2	144	523
*T. B. Barber	Do.	2	119	519
C. H. Singer	Do.	2	128	480
J. A. Cornwell	Do.	1	123	468
A. Gaydon	Do.	2	126	443
H. Ashworth	Do.	1	131	441
Total	...	...	8,986	41,002

* In the foregoing indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
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LIGHT BREEDS.

J. M. Manson	135	127	138	135	130	132	797
W. Hindes	145	133	126	116	127	126	773
T. Fanning	140	111	129	135	124	132	771
Dixie Egg Plant	117	119	135	142	114	122	749
E. A. Smith	116	114	137	119	109	129	724
Dr. E. C. Jennings	121	94	121	115	113	136	700
G. W. Hindes	127	104	129	113	103	115	691
Haden Poultry Farm	127	128	122	112	93	107	689
Range Poultry Farm	90	115	130	130	94	113	672
Quinn's Post Poultry Farm	103	117	127	122	97	93	659
B. Caswell	90	52	109	135	141	112	639
C. P. Buchanan	90	125	98	98	107	118	636
H. Fraser	82	115	126	108	83	114	628
W. Becker	136	113	126	91	59	103	628
L. G. Innes	77	121	83	113	115	100	609
Mrs. L. Anderson	107	119	84	91	88	111	600
J. J. Davies	86	88	107	110	109	95	595
W. Lyell	88	113	115	90	92	92	590
Thos. Taylor	114	75	73	115	114	75	566
Mrs. A. G. Kurth	122	99	105	91	59	89	565
Mrs. R. Hunter	87	92	101	97	90	85	552
O. W. J. Whitman	74	108	76	72	86	78	494

HEAVY BREEDS.

R. Holmes	146	148	159	130	163	112	858
E. F. Dennis	148	110	141	127	105	148	779
E. M. Larsen	135	144	131	119	137	111	777
R. Burns	131	120	130	162	114	117	774
W. Smith	93	141	120	108	148	125	735
A. E. Walters	125	119	133	117	104	131	729
A. Shanks	80	91	146	127	129	146	719
Kelvin Poultry Farm	151	102	107	100	132	114	706
E. Morris	117	116	121	112	140	78	684
Nobby Poultry Farm	103	107	100	117	131	125	683
D. Fulton	108	109	113	99	115	98	642
Jas. Ferguson	117	136	85	85	101	98	622
T. Hindley	131	119	72	112	93	94	621
W. H. Reilly	92	82	118	118	94	100	604
H. Puff	115	76	98	119	91	91	590
Mars Poultry Farm	76	127	180	62	66	116	577
F. W. Leney	75	87	107	132	65	74	540
T. B. Barber	83	88	85	86	102	75	519

CUTHBERT POTTS,
Principal.

GENERAL COMMENTS ON "TRUENESS-TO-TYPE" COMPETITION BIRDS.

DETAILS OF CLASSIFICATION.

Class.	
Mrs. L. Anderson	1 Even throughout; A possesses ideal headpiece.
Haden Poultry Farm	2 D and E could do with a little more size. Taken throughout, a tight-feathered, hardy, business-like pen.
H. Fraser	2 Good size; C and D, high tail carriage; A possesses ideal body.
Dr. Jennings	3 Too high in carriage; can do with more size; an improvement on last pen; excellent doers; tight-feathered.

DETAILS OF CLASSIFICATION—*continued.*

Class.			
Range Poultry Farm	..	1	Very even throughout; good heads.
Thos. Tayler	..	2	Very uniform in size; can do with more comb; splendid eyes.
B. Caswell	..	2	Magnificent face and eyes; tail carriage inclined to be high.
Dixie Egg Plant	..	2	A big improvement in size on previous pen; B has outstanding superiority in type.
J. M. Manson	..	2	Very even in size and shape; F has slight side spike on comb; excellent doers; splendid in eye and face.
L. G. Innes	..	3	Lack uniformity in size and shape.
T. Fauning	..	1	A fine pen throughout; A could do with a little more size; headpieces all that could be desired.
J. J. Davies	..	1	A pen we like very much in every way.
W. Becker	..	2	A big improvement on previous pen; tail carriage can still be lowered a little.
Quinn's Post Poultry Farm	1		Very even in type and size.
O. W. J. Whitmen	..	1	Approaching English standard.
G. W. Hindes	..	1	A, B, C, and D of exceptional merit; E and F just a trifle small.
Mrs. R. Hunter	..	2	Headpieces a little coarse; D a very good specimen.
W. Hindes	..	1	A, B, C, and D stand right out; E and F on the small side.
W. Lyell	..	3	Defective combs; F best body formation.
Mrs. A. G. Kurtl.	..	2	E, tail carriage too high; good size throughout; we like F very much for type.
E. A. Smith	..	2	C spoils pen, being very much on the small side; otherwise first class.
C. P. Buchanan	..	4	A has side spikes; C too small; D deformed.
H. Puff	..	1	Good size and type; E and F of exceptional quality.
R. Holmes	..	2	Fair-sized and uniform; C and D inferior combs.
E. Morris	..	3	B has side spikes; C could do with more size; D closely approaching ideal.
E. M. Larsen	..	1	Lower on leg than majority; good heads; a little more size wanted.
F. W. Leney	..	3	On racy side, with the exception of A, which approaches our requirements.
J. Reilly	..	3	Too variable; side spikes in evidence.
W. Smith	..	1	Good heads; have size and are not so long in back as majority; D is our choice.
T. Hindley	..	2	Fail in colour; B shows white in lobe; good eyes; can do with more moderation in comb.
R. Burns	..	2	Side spikes on E; a big improvement in type on previous pens.
D. Fulton	..	3	Fail in type and side.
Nobby Poultry Farm	..	2	Side spikes on F's comb a bit overdone; splendid eyes; first-class colour and size; an improvement.
Mars Poultry Farm	..	2	Side spikes on D, and F being pale in eye spoil pen from being the most typical in the competition; possess size, shape, and are very low.
A. Shanks	..	2	Type too variable; D, E, and F splendid type; E possesses best body to our liking in the whole competition.
E. E. Dennis	..	1	Good size; excellent heads; could do with a little more width in proportion to their size.
A. E. Walters	..	2	Fail in headpieces; good bodies, low set; colour can be improved.
Kelvin Poultry Farm	..	1	A good uniform pen.
W. Barber	..	2	Type not consistent; combs over-developed; low set; feathering of tight nature.
J. Ferguson	..	3	B and C side spikes; type variable.
W. Morrissey	..	3	Side spikes on two individuals; otherwise first-class.
J. W. Newton	..	1	Very even birds of good type; remarkable doers.
B. Chester	..	2	Too fine and racy; splendid eyes and faces.
C. Goos	..	2	Good body formation; fail in eye.
H. A. Jones	..	3	Another finely built, racy class of bird.

DETAILS OF CLASSIFICATION—*continued.*

			Class.	
G. Trapp	..	..	2	One small specimen spoils pen completely; good eyes and faces.
J. H. Jones	..	..	1	Even, serviceable pen; good doers; size can be increased a little.
Geo. Williams	..	..	1	Very uniform; excellent feeders.
Geo. Kettle	..	..	2	Type variable; some inclined to beefiness in head.
N. A. Simpson	..	..	1	Very even; nice textured combs; good bodies and carriage; shy feeders at commencement, but have improved vastly.
Mrs. N. Charteris	..	..	3	Uneven; not as good doers as one would like.
H. O. Jones	..	..	1	A solid, close-feathered pen; good bone; splendid feeders.
W. A. Wilson	..	..	2	Too fine, especially in bone.
S. McPherson	..	..	1	A little more size required; excellent doers.
Oakleigh Poultry Farm	..	..	3	On fine side and variable in outline.
S. W. Rooney	..	..	1	Size can be improved; excel in stamina and evenness.
Geo. Byrnes	..	..	3	Two small birds spoil the chance of four good ones.
R. J. Turner	..	..	2	Good bodies and nice size in five birds; pen spoiled by one a trifle small and a bad doer.
Geo. Nutt	..	..	1	Very even; typical headpieces; nice shape; good backs; just a little more size wanted.
Burleigh Pen	..	..	1	Even, large, big-boned stock; backs a little on long side.
R. B. Sparrow	..	..	2	A nice all-round pen; size and shortness outstanding features; one bird too much feather on shank.
H. Ashworth	..	..	1	Good size and even combs; a trifle overgrown.
C. H. Singer	..	..	2	Nice type, but indifferent feeders.
J. A. Cornwell	..	..	1	Another big-boned pen; a little long in back; good doers.
A. Homan	..	..	2	Not as uniform as we would like; indifferent feeders at times.
A. Gaydon	..	..	2	Type not consistent; one bird possesses side spikes on comb.
J. H. Dunbar	..	..	2	Good spangling and type, but too dwarfed.

POULTRY CONFERENCE.**GATHERING AT GATTON COLLEGE.**

The Annual Conference of poultry-breeders took place at the Gatton Agricultural College on Wednesday, the 17th September. At 10 a.m. the visitors toured the competition pens and the College poultry farm and brooders. Luncheon was subsequently served in the dining-hall of the College.

THE CONFERENCE.

The Conference took place in the afternoon in the Gymnasium, the Principal (Mr. Cuthbert Potts) presiding. In welcoming the delegates on behalf of the Minister for Agriculture (the Hon. W. N. Gillies), Mr. Potts said: This is the third consecutive year that the poultry-men of the State have been invited to meet in conference at the College. This year finds a greater number accepting than on former occasions; and we take this as indicating that you, as poultry-men, appreciate this annual gathering as of value, and as of interest to you and your industry. This year we meet under happier circumstances. The war is over; and the dead load of anxiety has passed. We have won, and there now remains the aftermath of reconstruction, with all the urgent problems raised by the world's great upheaval. These problems will not be easy of solution, but conferences such as this must go far to assist. Therefore, while granting the benefit that each and everyone of you must derive from the exchange of personal experiences, I would ask you to render your Conference truly effective by converting idea into action. In all industries there are some common interests—some matters which require concerted action both for the betterment of the industry and the protection of the public. These two concepts are inseparable, for no industry can exploit the public without suffering in its turn, nor can any industry survive unless it receive adequate remuneration. This balance between

opposing forces is normally established by the free operation of supply and demand. The past five years, however, have seen this balance greatly deranged; while the very process of repatriation, involving as it does the establishment of many of our returned soldiers on poultry farms, has introduced a further complication. Are you going to allow natural, unguided forces to re-establish a passable stability in your industry; or are you, consciously and conscientiously, going to bend your best endeavours to the direction of conditions, and so make for a truer stability on which the future development of the industry may rest as on a safe and solid foundation? If I may, I would suggest several lines along which you might proceed:—

(1) To stabilise the prices of eggs throughout the year.

As you all know, eggs vary in price from season to season in a manner which at one time renders this valuable food too expensive for a vast number, while at another season the price is too low to properly remunerate the producer. Taken in large, a stable or more stable price throughout the year would be to the advantage of both the producer and the buyer. Cold storage is probably the solution; but cold storage and the arrangements appertaining thereto will require your concerted action. Such storage cannot hope to be successful if attempted by only one or two.

(2) The efficient distribution of your eggs.

Queensland is a big and widely distributed market. Something might be done by placing the handling of all eggs under a central control, so that grading might be efficiently carried out, but chiefly that eggs in the quantities required might be despatched West and North. This is a marketing operation which is undoubtedly beyond the scope of the individual producer, and could only be given effect to by concerted action. However, this matter will be discussed later on.

(3) The educating of the purchasing public so that they may recognise quality.

This applies most intimately to table poultry, which are now sold under conditions that are patently in opposition to the interests of the careful breeder and feeder. Selling by weight seems to me to be the only solution. This is an alteration of market practice which will require your united efforts to secure. These are only a few points, but they are fundamentals if the industry is to progress on sound lines. They are the concern of both the poultry-farmer and the poultry-breeder; and I could wish to see this Conference elect a small committee who would be empowered to collect information and make tentative arrangements for submission to you next year, or, if sufficient progress can be made to bring the matter before you, sooner. Such a committee, acting, as it would, with this Conference's sanction, would be in a strong position to negotiate in the interests of the industry. Just one other matter. I want to congratulate this year's competitors on the marked improvement both in the type of birds entered and the better weight of eggs secured. Both of these have been effected without loss of fecundity, and there is every promise that breeders will maintain high egg-production together with, and not in neglect of, the characteristic points of the various breeds and the stamina of the birds. I have much pleasure in declaring the Conference open.

STANDARDS FOR "TRUE-TO-TYPE" PRIZES.

The POULTRY EXPERT (Mr. A. G. Harwood) submitted the proposed scale of points which, in future, it was intended to adopt as standards for the "true-to-type" prizes at the College. He invited criticism on the proposed standards, and said that, to a large extent, he had adhered to those of the National Utility Poultry Breeders' Association's points. He had varied them, however, to some extent. He said that, in his opinion, the standards adopted by the associations generally were defective in that they did not provide any limitations in any particular feature. For instance, if it was desirable that a bird should have a long leg, the greatest number of points for this feature went to the bird with the longest leg, no matter whether the leg was out of proportion or not. He had provided a limitation in this scale.

Mr. Harwood promised to forward a copy of the standards to the Department.

Mr. PARKER: Will the weight of the egg have anything to do with the judging of the "true-to-type" prizes?

The CHAIRMAN: No bird is eligible for any prize unless it lays an egg weighing not less than 2 oz.

Mr. ELMS said he had followed Mr. Harwood's remarks very closely, as he was a member of a subcommittee of four appointed in New South Wales, two years ago, to draw up a standard for utility birds. He thought the proposed scale might appear a little complicated, but it was desirable to make a start; and he was pleased that this had been done. The commencement of the whole business was an endeavour to get a bird true to type, consistent with the keeping up of good laying qualities.

He thought it would be a good idea, in order to save Mr. Harwood from criticism, to appoint a committee of three or four from the Conference to confer with Mr. Harwood and prepare a definite scale of points.

Mr. HARWOOD said that the utility birds would have to prove themselves in the laying competitions; but it was the work of those who entered them to follow up the breeding in order to ensure that they will be pure. It was not for him to allot points for all the birds. He should welcome the proposed committee if it was considered necessary.

Mr. DOCHERTY said he did not think 10 points for colour was sufficient. In a White Leghorn, for instance, the colour was taken into consideration in four portions—the eye, the beak, the feathers, and the legs. With this exception, he thought the standards set down were very good, as they would improve the breeding of the birds as well as secure good layers. He was pleased that the standards had been drawn up.

The CHAIRMAN said the colour points only referred to the colour of the plumage, and the colour of the other parts would, of course, be taken into consideration in the judging of those parts. They would notice that there were two standards—one for type and one for stamina, with 100 points for each. They had decided that, unless a bird possessed such stamina as rendered her capable of reproducing herself, she would not be worthy of a prize. It was provided that, unless a bird received 75 per cent. of the total points for any of the standards, a prize would not be awarded, and, also, that a bird must get 50 per cent. for each particular portion. For example, if a bird did not get 50 per cent. of the points for plumage, it was little use examining it further for type. They had set these points for the “true-to-type” prize, and the scales quoted were those upon which it was intended to judge the birds in future. It was not, however, the standard by which they would be judged for admission into the competitions. That would still be decided by the National Utility Poultry Breeders’ Association standards. The standards given were for the “true-to-type” prizes. They certainly hoped that they would all send birds that would be eligible for the prize. He thought the position was met by these proposals without the committee proposed by Mr. Elms.

MARKETS FOR EGGS.

Mr. JACOB (representing the N.U.P.B.), in speaking on the need for an improvement in the marketing conditions for eggs, said that eggs, at the present time, were 4s. 6d. per dozen in the North, and they could only get 1s. 3d. per dozen in the South.

Voices: 8d. a dozen.

Mr. JACOB said they wanted to get as uniform a price as possible throughout the State, so that they could have some idea what they were doing. If they could store their eggs, it might be a good scheme. This practice was adopted very successfully in America. In Sydney, last week, eggs took a rise in price owing to the exportation of one big lot. Why was the position in Queensland so unsatisfactory? Because they were lacking in organisation. In reply to a question, he said the high prices of eggs in the North might be due to some extent to the shipping strike, but it was due largely to the high freight on feed.

Mr. WILSON agreed that the chief difficulty was the matter of organisation. They wanted combination amongst the poultry-keepers in order that they might undertake the sending away of their eggs.

A Voice: Co-operation.

Mr. ELMS thought that until the poultry-men were forced by the stress of circumstances to combine, nothing satisfactory would be done. Nothing but co-operation would solve the problem. There were always some keen business men who would take up the work, because it paid them to do so; but until the sections amongst poultry-men were broken up, and a strong organisation formed, they would never be able to reap the benefits that the industry was capable of giving. The poultry-keepers must take it upon themselves to act in such a way that they will receive the full results of the industry they are engaged in. They had the experience of other industries to find out what co-operation had done.

Mr. GOLD (Oakey) said he had been a producer of eggs for over thirty-eight years, and it seemed to him that the poultry business was no better now than it was when he first started in New South Wales. They received almost as good prices then as they did now. This year he had sold eggs at 3s. 6d. per dozen, and now they were worth about 8d. in the markets. Thirty-eight years ago he had also sold eggs as high as 3s. 6d. per dozen, and they had been as low in price as 4d. per dozen in the periods of the year when the farmers produced a great quantity of eggs. Poultry-men needed a Poultry Board to draw up rules and regulations formulated by

poultry-men in their own interests. There were some farmers who did not keep poultry which were as well bred for egg-production as those kept by some poultry-men in the towns and cities, but they laid well in certain seasons of the year, and it was when all these eggs came in that there was a glut in the market. The farmers also sent out fertile eggs which were affected by the warm climate and were not too fresh when the consumer received them. They needed to educate their farmers to produce eggs which were not fertile, and so improve the quality of their eggs. It behoved the fanciers, and poultry-men generally, to stand together and endeavour to formulate some plan for the improvement of the quality of the birds in some places, and for the purpose of stabilising the industry, in order to be able to put eggs on the market when prices begin to soar and to regulate the prices when they go down very low, thus securing to the poultry-man a fair return for his labour.

The CHAIRMAN said he was particularly pleased to hear the remarks in regard to the necessity of the poultry-men combining for the purpose of controlling their own produce. The men who had been making profits out of the eggs would continue to do so if they held their individuality to be sacred; and these men would be willing to continue to make profits out of the poultry-raiser. He was pleased with Messrs. Prescott, Limited, for having done something in the matter of marketing, even if it was for their own benefit. Their action had benefited the industry in the South to some extent; and he knew that it paid them to take the action they had taken. He did not think they could adopt a better plan than to appoint a small committee to draft a scheme for consideration at the next Conference. If they wanted legislation, there would have to be a strong enough public cry for this legislation.

A Voice: We can do it by organisation and co-operation.

The CHAIRMAN: No doubt you can get what you want by organisation. The matter had a patriotic side. There were many former members of the A.I.F. who were taking up poultry-farming, and they, like others, would, under the present conditions, have to put eggs on the markets when they were glutted. They could see, therefore, that they could do something for the returned soldiers as well as for themselves in this matter. (Applause.)

Mr. GOLD thought that the Conference should appoint seven men to draw up rules and regulations for the purpose of securing a better distribution of eggs throughout Queensland. He thought the Conference, representing, as it did, so many poultry-yards, was sufficiently strong to do this work, and should have sufficient backbone to get a scheme on paper at least. They should be prepared to take the lead in the matter, as the producers of butter and cheese had done. As co-operators they sent away more cheese and butter than any other individual or combination in the Commonwealth.

Mr. CAMPBELL seconded the motion, and remarked that in New South Wales the system of combining for the distribution of the product of poultry-runs worked well.

Mr. BYERS (Gatton) said the N.U.P.B.A. had had the matter of co-operation amongst the breeders in view for some time, and he thought the poultry-breeders should support the Association, and give their leaders in Brisbane a chance of doing the work for the poultry-breeder that they were anxious to do. There were several men belonging to the Association who were giving their time and money in the effort to bring about an improvement in the conditions, and many of the breeders stood back, and thus did not give them the opportunity of doing the work they desired to do.

Mr. R. HOLME: (Toowoomba) said he thought they should let the Association do the work.

The CHAIRMAN said they had waited for the N.U.P.B.A. to do something; and now he asked those present, as poultry-breeders of the State, to deal with the question. He did not think it was right for the Association to wait until nearly every poultry-man joined the organisation before they started to do something.

Mr. GRAVES agreed that the time had arrived when the Conference should take some action. He thought it was necessary that a co-operative society should be formed for the purpose of dealing with the distribution of eggs as well as to deal with the purchase of feed for the fowls.

Mr. JACOB said the N.U.P.B.A. worked for the good of the industry generally. If they were going to have a limited organisation, they were going to slip. The Association had been endeavouring to get a co-operative society formed. They were continuing in this work, but they had been greatly hampered by the lack of support from the poultry-men. With the co-operation of the breeders, however, they would come out on top in the end. He moved, as an amendment, that the Conference ask the Association to formulate a scheme and report to this Conference.

Mr. ELMS seconded the amendment, and suggested that the Association be asked to get into touch with other similar bodies in the State, and endeavour to arrange a system of working together. Then they would have something tangible to work on. He did not think it would be fair to take action independent of the N.U.P.B.A.

The amendment was carried.

The CHAIRMAN said that there appeared to be a large number of members of the N.U.P.B.A. present, but, now that they had carried this motion to ask the Association to do something for them, he hoped that they would all not only become active members but also see that others would join the Association and support it in the work it would have in hand. (Applause.)

In reply to a request that the Association should endeavour to give poultry-men assistance in the matter of learning more of the industry, Mr. JACOB referred to the official journal of the Association—namely, "Utility"—which he said contained a good deal of information of interest to poultry-men.

POULTRY FEED.

Mr. HINES spoke on the desirability of utilising Queensland summer-grown crops for the purpose of feeding fowls. He said they were all aware what a difficult time they had had during the last few months in getting decent feed. During the dry times that were experienced in Queensland from time to time, the wheat crop had been almost a failure, and they had not had a very large quantity to draw their supplies from. These supplies had come very largely from the South, and, owing to the shipping difficulties, they had not been able to get the wheat through at a reasonable price. The question they had to consider was: How were they going to get their supplies in case of emergency? Personally, he would get no other feed than wheat while he could get it at a reasonable price; but circumstances altered cases; and he thought they could get from other cereals a ration which would pretty nearly fill the bill. If they had a good maize season, he thought they might be able to utilise this grain. It had very large fattening properties, but this might be neutralised by using more green feed and by adding more protein matter. Then there were grains of the millet families which may make very good rations. Unfortunately, he had no data at hand regarding the analysis of the different grains, but he was sure that they might be able to balance these feeds, and so make, perhaps, as decent a ration as wheat and pollard provided.

Mr. WILKINSON asked what was the matter with maize. They grew more of this crop in Queensland than any other crop. He had tried maize; and if it was equal in price with other feed, he would take it every time. He had found that wheat was not any better.

Mr. HINES did not agree with the speaker. He had found, when he was obliged to use maize, that the egg-production of his run dropped 20 per cent.

Mr. WILKINSON: In that case, the change of ration may have been made too suddenly. He had fed on maize, and did not think the egg-production of his place dropped at all. He had found that it was not a good thing to feed the same kind of ration all the time, but to give his poultry a certain amount of maize and a certain amount of wheat. From his experience, if he could get maize at 3s. per bushel and wheat was 4s. 6d., he would prefer to have the maize. He did not think he could make up the difference.

Mr. HINES: I think I could. Maize is more fattening than wheat, and it creates internal fat to a greater extent than appears. It was not only more fattening but it was more heating.

Mr. BURNS (Warwick) said that birds confined in a small pen would be likely to fatten too much on maize.

Mr. FANNING said this was largely a matter of opinion. He had had no difficulty in getting feed.

A Voice: No; you live in Brisbane. (Laughter.)

Mr. FANNING said that poultry-men generally did not understand the different quantities of ash and other ingredients there were in their feeds, and in regard to a balanced ration he had found that Thorpe's feeds were very good. The firm had the different ingredients analysed, and they knew the percentages of different foods in each. No matter what they were feeding, poultry liked a change like anyone else did. He liked to feed a certain amount of wheat and a certain amount of maize. They needed some fat.

The CHAIRMAN said the discussion had drifted somewhat from the point. The question was, whether or not Queensland summer-grown crops could be utilised for feed as well as wheat.

Mr. GOLD said he had found that a very good catch crop, and one which would grow in practically any Queensland climate, made a very good feed. He referred to well-developed Sudan grass seed. It would grow a tremendous crop of seed. He had fed a lot of this seed to his poultry, and he had not found that they failed in constitution or in egg-production. Unless the seed was well developed and dry, however, it had a detrimental effect on the poultry. It was a good crop for the farmer to grow a little of, with which to feed his poultry. It would grow in large quantities, and was easily threshed and easily fed. Then another good feed was Japanese millet. He found that a due proportion of this, with other feeds, made a splendid ration. He thought these foods were worthy of the attention of the poultry-farmers.

The CHAIRMAN thought Queensland was inclined to follow hard-and-fast methods too much, and to copy the South too much. Queensland was not such a good wheat country as New South Wales and other Southern States. They were more a maize and millet growing country; and if they proved that these crops were good for feed for fowls, then the feed difficulty would be largely solved. He hoped to be able to devise experiments during the next year in which the value of the various foods would be tested; but, owing to the dry weather, he had not been successful in accumulating the various foods. He did not think that Queensland, with all its powerful summer growth, should be dependent upon winter-grown crops for feed for fowls. He would like the assistance of everyone in conducting these experiments, and he hoped that some of the gentlemen present would be able also to conduct some experiments and report to the next Conference.

WEIGHING OF EGGS, ETC.

Mr. WILSON advocated the weighing of eggs more often than once in the year. He said the weight of eggs varied, and, in order to arrive at the real value of the hen, it was necessary to have the eggs weighed at least four times a year. He quoted figures showing the result of regular weighing of eggs, and bearing out his contention in regard to the varying of the weight. He suggested that some steps should be taken to provide better shade over the pens.

Mr. PARKER congratulated the College on having put the 2-oz. standard as a condition of entry into the competition pens. In the past, breeders had sacrificed weight to numbers; but the College, in adopting the 2-oz. standard, had done something to prevent this. He hoped that, in future, competitions would be decided on the weights of the eggs laid during a particular period. He thought that, in the interests of the improvement of the breeds generally, the weights of the eggs should be taken at least as often as suggested. Mr. Wilson had proved by the figures he had quoted that men might be unfairly penalised under the present system. At Birkdale it had been proved that the weather affected the size of the egg. Personally, he thought the hen that laid the 2½-oz. egg was just as big a culprit as the one which laid a 1½-oz. egg. In regard to the shade over the pens, he knew that this was a difficult matter. He thought some litter might be provided for this purpose, and also that some litter should be placed on the floors of the pens. This would not only provide scratching material, but would also provide a certain amount of moisture, and would prevent the ground from getting hot as it does now.

The CHAIRMAN said Mr. Wilson's figures were particularly interesting, but they supported, to a certain extent, the system that was in vogue at the College in connection with the weighing of the eggs. He understood that the product, not only of fowls, but also of animals generally, varied about 14 to 15 per cent. He had borne this in mind, and he had found that the variation worked out at about 14 per cent. They had weights as low as one-sixteenth of an ounce. This was equal to a second decimal place. Under the system, if an egg weighed a little under one-sixteenth of an ounce less than the 2 oz., it was counted a 2-oz. egg, and so on. A medium was struck between the two extremes in the weight of the eggs from the one bird which were taken for the purpose of discovering the weight. Under this system, he thought the weighing was a pretty accurate estimate, even if it was only done once. The figures given by Mr. Wilson supported the variation they allowed in the weights under the present system. He could not guarantee to weigh the eggs three or four times during the year. They did not take one egg. They took six eggs from the individual pens and thirty from the group pens, and struck an average. They would understand that to go through the whole of the pens, as suggested, would mean a pretty heavy task. However, he was willing to take, say, a dozen pens, and weigh them three or four times, in order to demonstrate that the present system was not far out. He thought they would be honestly surprised at the result.

In regard to the matter of shade, Mr. Harwood said he would like to see how they were going to keep litter over the pens during the weather that they had had

lately. They must remember that there were 260 competition pens, and 160 on the other side; so that the suggestion involved a rather big task. He thought, however, that they achieved something since last year; and he would see if it was not possible, during their spare time, to plant some more beans around the pens similar to those which grew over the old pens. But they had to do quite a lot of things during their spare time.

It was suggested that pieces of hessian might be put up to protect the birds from the sun.

The CHAIRMAN said the roofs of the pens were specially constructed for ventilation, and 6 inches beneath the roof there was absolute air temperature. There was no striking down of heat.

Mr. WILSON said that what was wanted was a shed almost immediately in front of the pens. He thought a growing shade of some kind was the best for the purpose. He recognised that Mr. Harwood was a very hard-worked man, and it seemed to him unfortunate that some assistance could not be obtained for him, so that he could devote his attention to the technical part of the work.

The lucerne tree was suggested as a good means of providing shade.

Mr. HARWOOD said it would involve a lot of work to provide shade for each pen.

A BREEDER: It is cruelty to dumb animals to keep them in the pens as they are at the present time, especially when the summer comes.

Mr. HARWOOD said the low number of cases of heat apoplexy proved that the heat was not so trying as was suggested.

Mr. HINES said he noticed that the College was becoming short of green feed for poultry. The College had its own water system, and he thought something might be done to irrigate a piece of land for the purpose. Green feed was an important feature.

The CHAIRMAN said they had not the water supply, as Mr. Hines would see if he inspected it.

Mr. HARWOOD said that at present he was feeding on milk thistles. He must have green feed for the fowls. They had been taught a big lesson in this matter last year, and he knew how important it really was.

Mr. ELMS asked whether the water which flowed through the troughs in front of the pens could not be utilised for the purpose of irrigating some of the land near by on which to grow greenstuff?

Mr. HARWOOD said this was being done to some extent, and they might have noticed some rape growing near some of the pens. This was being irrigated by the water from the pens. All this meant additional work.

Mr. WILSON thought someone should be appointed to do this class of work.

The CHAIRMAN said he did not deny that Mr. Harwood was a hard-working man, but they could not kill a man's enthusiasm; and he did not think he could kill Mr. Harwood's enthusiasm, even if he desired to do so. (Applause.) Probably if he had fifty assistants Mr. Harwood would be the hardest-working man on the place. Then there was the question of expense. This was not only a poultry college, but he was frequently being asked whether it was. He desired to make it the best poultry farm in the State, and he believed that it was that, even now; but other departments must receive their share of attention and expenditure.

AN APPEAL FOR ASSISTANCE.

The CHAIRMAN read an apology from Mr. Manson, the leader in the competition at present, who asked that the matter of making further contributions of laying hens to the Grange Red Cross Convalescent Hospital, Brisbane, be placed before the Conference. A number of those present readily responded, and it was announced that over thirty birds had been promised.

Subsequently Mr. PARKER made an appeal for contributions to the College Honour Board, and a collection was taken up for that purpose.

The visitors were subsequently entertained at tea, where, on behalf of those present, Mr. Parker accorded hearty thanks to Mr. Potts and his officers for the manner in which they had been treated. Mr. POTTS acknowledged the vote of thanks, and said he hoped they would have a succession of successful conferences of the kind.

HATCHING MUSCOVY DUCKS.

By R. T. G. CAREY, Beerwah.

Many mistakes occur when hatching Muscovy ducks, which result only in failure. When these birds desire to lay, they seek a most sheltered position if range fed, but if penned, of course, their nests are somewhat artificially prepared by their owners. Always out and away from draughts, the nests are hollowed on the bare ground, and raised six inches above the ground level, where the Muscovy duck will deposit her eggs, as she loves to guard her nest while laying, so that their keeper can accurately identify the particular duck which is the rightful owner of the nest from any of the others in a flock, by her walking round one's back when approaching it, and uttering a faint, shrill cry. Each morning an egg is added until twenty or thirty eggs are laid, when she immediately broods, sits, and hatches almost every egg.

Repeatedly have clients written to me telling about their non-success in hatching these beautiful ducks! Why? The chief cause stated appears to be the result of fussiness, over-anxiety and interfering with the nest, or forgetting that it takes *five weeks* for these duck eggs to hatch, and sprinkling and moistening them with tepid water.

Do not touch, handle, or interfere with their belongings once their bed is made and a few eggs are therein laid. Instinctively they have a recollective idea of the number of eggs that were laid and ought to be therein from day to day. For that reason, it is wisest not to meddle with, or remove, any eggs during their laying season. If you do so, you invariably cause them to forsake that nest, or perhaps they will choose a new locality, and are even apt to go off the lay. When eggs are required to be taken away, do so after five are laid, or seven, always leaving the odd count, and remove the eggs during the feeding time; in the early morning for preference. You can daily visit their nest-kiosk at any time during their absence on "sentry go"; ascertaining the number of eggs laid, or if sufficiently sheltered from the sun's rays; or should there be any need to erect a break-wind, likewise making it rain-proof, or any other such alteration as can quietly be performed during her absence. Make sure that the sun's rays do not reach the eggs, as the effects are fatal, nor does any water need to be sprinkled on them during hatching. Once the Muscovy duck has settled down to brooding and sits close, make her snug. She can then be handled like a hen and will not then forsake her nest-kiosk. Remember that five weeks is the duration required to hatch those duck eggs.

Every morning or in the evening the broody duck leaves her nest, to feed and obtain water. She is distinguished by the ruffled feathers, the red colour on the face changing to a yellowish tinge; also a particular waddle—i.e., between a run and a walk—suspiciously, anxiously, and hurriedly moving about, first to water, then to food and toilet. When satisfied, she returns to her nest-kiosk. Do not worry or get fussy or anxious should she remain off her nest for a lengthy time. Her nest is so well protected, and the eggs covered securely over with beautiful soft downy feathers, which keep them warm and free from chill, that the mother hatcher can assuredly stay off for several hours at a time. If, owing to a thunderstorm, the rain should happen to flood the eggs in the nest, do not worry. Provided that rapid drainage carries away the water immediately, no ill effects or any retardation arising therefrom prevent them from hatching, because those eggs are coated over with a strong solution of oily or greasy material, which acts as a waterproof coat keeping the inner membrane from being affected through a deluge. I will illustrate the above fact from my own experience. Last season, nine ducks were sitting, having made their nest in low places, between a couple of tufts of grass. Three hatches were in the advanced stage of one month's incubation, when a severe storm came late in the afternoon, and swamped all the nine nests, causing the eggs to float, and the mother-hatchers were standing full length up off their eggs. An hour thereafter they had nestled down as if nothing had occurred. Two of the nine were flooded twice, and I am glad to record that all the nine hatches came off most successfully. Only two eggs failed, and those were unfertile, therefore the above incident demonstrates that nature did provide for such a case by imparting to the eggs that greasy or oily solution to ward off a deluge. It strikes me that these ducks, in a natural state, must have been accustomed to construct their nests in dangerous places, which were liable to be flooded through rivers rising, or swamped through heavy rains, and yet hatched and reared their young through such misfortunes as the above. Therefore, never worry or get fussy about the ways of those beautiful Muscovy ducks when they are nest-forming, laying, or brooding; because they are quite capable of managing their own nest-kiosk and brood.

When the eggs are about to hatch, and the young ones pip the shell, they remain for some hours before beginning to effect their severance from the incasement of the shell. Thus the raising of broods is a fascination and one of the greatest delights

of the duck breeder. At the moment of the duckling's birth it is covered with what is apparently a layer of hairs—not with a covering of downy fluff. Those hairs rapidly dry and by some process begin to uncurl or unfurl themselves into what is termed down. That is their first garment. The brood when complete, and all well dried up, can be removed to its brooding quarters along with the mother, when they will within a week have gained agility and sprightliness so amazingly rapid that freedom may be allowed, when by judicious care and management they will thrive again.

Generally, every duck this month, or by the middle of November, should have got off her first season's brood. If, after a couple of weeks mothering her young, she be removed to a mating pen, she will have a good hatch reared again for you in the month of February, which is termed second season's hatch; the management being correct, a third season's hatch gives equally good results for market purposes. Finally, do not trouble too much about the laying, sitting, or brooding duck, as she does her work perfectly when left alone. The writer has now on the market a book absolutely on the Muscovy duck and its management, for the small cost of 1s. 3d., post free.

WHEN HENS EAT EGGS.

Egg-eating sometimes becomes a serious vice, fowls becoming very fond of eggs when they have learned to eat them; and it often spreads from fowl to fowl. It usually begins through accident by eggs being broken or frozen. Be careful to see that this does not happen. See that the nests are properly supplied with straw or other nesting material and have them darkened, so that if an egg is accidentally broken the fowls will not be likely to discover it. Supply plenty of lime in the form of oyster shells, bone, or similar substances to ensure a firm shell. As soon as it is discovered that a fowl has formed the habit, the fowl should be removed, in order to prevent the spread of the vice. Once formed, it is difficult to eradicate, and the safest remedy is the death penalty.

Fowls sometimes pluck feathers from themselves and from each other, which is often caused by too close confinement, by the presence of insect pests, or by improper feeding. When some of the fowls of a flock have formed the habit slightly, a wide range with a change of diet, including a plentiful supply of animal feed and freedom from insect pests, will usually correct the evil. Above all, see that the fowls have plenty of inducement to exercise. If the habit becomes well formed, it is very troublesome and may necessitate the killing of some of the fowls in order to stop it.—“Weekly News Letter.”

RECORD FLIGHT OF A CARRIER PIGEON.

A New York telegram to the London “Daily Chronicle,” dated 16th July, says:—

The steamer “Westkysa” has brought into port a carrier pigeon which alighted on the steamer on 11th July in an exhausted condition.

It is presumed that this pigeon is the one which escaped from the R34. It has been handed over to Colonel Thwaites, the British provost marshal in New York.

It was 1,000 miles east of Sandy Hook—about a third of the distance across the Atlantic—says another telegram, that the pigeon boarded the steamer. If all facts are as stated, the bird has probably accomplished a record non-stop flight.

R34 had two pigeons on board for emergency purposes as messengers, and one of these escaped through a window of one of the gondolas before the airship left Long Island on her return journey on 9th July.

There is an instance of a homing pigeon accomplishing a flight of 1,100 miles in America, but that was across country, and the bird could rest at night, as is the habit of carrier pigeons when on long distance journeys.

The pigeon must have been ahead of the R34 during the journey home.

SEED COTTON PRODUCTION IN 1918.

In the September issue of the Journal the quantity of seed cotton ginned by the Department of Agriculture in 1918 was, owing to a typographical error, given as 106,458 lb. This should have been 166,458 lb.

Viticulture.

GRAPES FOR EXPORT.

REMARKABLE QUALITIES OF THE OHANEZ VARIETY.

In continuation of our article from "The Fruit World," which appeared in the October issue of the Journal, we take the following notes from the same source:—

"The production of grapes on a commercial scale has much to commend it. The vines come into bearing early; there is a big local demand for the fresh fruit; on the other hand, grapes may be grown for the dried fruits trade, and for wine making.

"The growing of grapes for export to oversea markets is of itself capable of developing into a big and important industry, apart from the features enumerated above.

"While grapes grow and bear well under many conditions, there are certain conditions under which the vines do particularly well.

"The purpose of this article is to enumerate those conditions and to emphasise the value of the grape, variety Ohanez, for planting, for these reasons:—

1. Ohanez grows well in Northern Victoria, where the soil and climate are exceptionally favourable.
2. It is a choice grape, a heavy bearer, possesses a strong skin, and is appreciated on local and interstate markets.
3. It is a grape of excellent quality and size, and is the finest grape for export, carries well, and opens up fresh in oversea markets.
4. The export of Ohanez grapes is profitable, and shipments from Australia, packed in cases containing from 25 to 30 lb. net, realised up to 33s. per case.
5. The variety is well and favourably known in the London and other markets. Large shipments are annually sent abroad from Spain. These arrive in winter, and under unfavourable conditions as regards the season. A market exists which consumed upwards of 2,500,000 barrels of approximately 53 lb. net per annum. *Australian-grown Ohanez grapes arrive in the European summer, and realise treble the prices of the Spanish grapes,* and if the quantity was available, the market could take equal to the quantities shipped from Spain without affecting the price. The illustration on this page is of one of the barrels of Ohanez grapes shipped from Spain to London. This particular barrel was reshipped under instructions from the Fruit World Pty. Ltd. from London to Melbourne as ordinary cargo, and the grapes arrived in excellent condition after a voyage of 12,000 miles.

"When the information published in our September issue relative to the prospects of growers of the Ohanez grape has been carefully considered in conjunction with these facts, there is every reason to predict a very big and profitable future for this field of viticulture. This industry, in Victoria, although quite in its infancy, was entered into from the point of view that the Ohanez grape was suitable for shipping, and no idea of developing a local market was then considered. War conditions, with the curtailment of freight, have proved that we have in Australia a market for the Ohanez that might never have been touched had normal conditions existed. At Merbein, in Victoria, there are upwards of one hundred acres planted to Ohanez grapes. The average tonnage of fruit of suitable shipping quality has been about 9 tons to the acre, and the gross returns, as reported by growers, have been up to £210 per acre. The yield speaks well for the productivity of this vine under Victorian conditions, and the price has been obtained by exploiting the magnificent storage quality of this remarkable grape. Quoting from a leaflet issued by Mr. F. de Castilla, Government Viticulturist of the Department of Agriculture, Victoria, he states, in regard to Ohanez grapes for export, 'This branch of viticulture presents very great possibilities.'

"Prior to the outbreak of war, several successful shipments were made. Curtailment of shipping space during war time proved a severe check; but with the return to normal conditions, there should be a great future before this branch. Owing to the six months' difference in the incidence of our seasons as compared with those of

Europe, America, and Asia, we are enabled to ship our grapes to all countries north of the Equator without fear of local competition. Our grape shipping season lasts from the end of February to June. The duration of the voyage is less than six weeks.'

"Grapes of the Ohanez variety, which have been in cool storage for six months, are exhibited at the Victorian Royal Agricultural Society's Show, and are in excellent condition, there being less than 1 per cent. of waste. No other variety has stood up so well in this test as the Ohanez, and thus another confirmation of the superiority of this grape over all varieties as a storage and shipping grape has been demonstrated. There are a number of important factors regarding this industry that are bound to carry weight with those looking to the land as a means of livelihood; among the more important of which are the following:—

"*Bearing Age.*—Vines planted with proper care should reach a productive stage in three years from planting. Thus, a distinct advantage over many other branches of horticulture is evident; the waiting period is a short one, but sufficiently long for the unskilled settler to become thoroughly acquainted with the methods of pruning, cultivation, and packing necessary to the successful conduct of the business.

"*Export.*—The market for this grape, when exported, is assured, provided proper care and attention is given to packing. The great populations of the world are all north of the Equator, so that growers in Australia are in a unique position to develop this industry to their advantage.

"*Storage.*—The storage qualities of the Ohanez variety are such that an added safeguard to this industry is available by means of cool storage, thus making it possible to spread the marketing for local consumption for a period of six months after harvesting.

"*Soil and Climate.*—The soil and climate conditions of Northern Victoria are exceptionally suitable to the Ohanez variety, where it thrives admirably, yielding heavy crops of grapes of excellent quality."—"The Fruit World."

KILLING GREEN TREES WITH ARSENICAL POISON.

Trees to be killed with arsenical poison are first rung or "frilled," by making downward cuts with the axe, completely round the trees, each cut well overlapping the adjoining one, so as to leave absolutely no unsevered section of bark in which the sap could flow. The cuts must be made right through the bark into the wood proper, and as close to the ground as possible, say from 6 in. to 12 in. up. The poison, prepared as given below, is poured into this frilling right round the tree, using an old teapot or kettle, as the spout makes pouring easier, and prevents wastage of solution. A large tree of 4 ft. in diameter may require about 1 quart of the solution, smaller trees proportionately less. Small saplings and suckers may be cut off level with the ground and thoroughly swabbed with the poison.

Trees may be killed by ringbarking or by frilling combined with poisoning at any time, but unless a suitable season is chosen suckering is likely to take place. From May to July is probably the best period of the year to carry out the work successfully. In the winter months the sap is assumed to be down, and therefore, at the end of autumn and during the winter, the trees and undergrowth are more easily killed.

Preparing the Poison.—The arsenic may be dissolved with the aid of caustic soda or washing soda. When using the latter boiling from half an hour to one hour is necessary before all the arsenic is dissolved. Under ordinary circumstances 1 lb. of arsenic and 2 lb. of washing soda, or $\frac{1}{2}$ lb. of caustic soda, to 4 gallons of water is of sufficient strength to kill timber, but when it is a question of making doubly sure, and kill more quickly in the case of vigorous saplings, the solution can be used double strength. The preparation and mixing is best done in an empty kerosene tin, which holds 4 gallons. When using caustic soda mix 1 lb. of arsenic and $\frac{1}{2}$ lb. caustic soda (soda ash) thoroughly in the dry state, and gradually and carefully add water. Sufficient heat is generated to dissolve the whole of the arsenic. Make up to 4 gallons and finally stir in $\frac{1}{2}$ lb. whiting, which latter indicates readily which trees have been treated. If washing soda is to be used mix 1 lb. of arsenic and 2 lb. of washing soda into a paste with some water; add about 2 gallons of water, and boil from half an hour to one hour until all arsenic is dissolved. Make up to 4 gallons, and add the whiting.

There is not much danger to stock grazing on areas treated by poison, and the leaves fallen from the poisonous trees would not contain any poison, but it is safer to keep the stock off such areas for some weeks, as they might lick some of the poison from the frills on account of the salty taste.

Horticulture.

ON ROSES.

Complaints are generally made by amateur gardeners of their non-success in growing the rose in this State; one being that some kinds flower so poorly, and the other that the flowers produced are so inferior to the same kinds grown in different climes. Hence the conclusion generally come to is that Queensland cannot produce really good roses. However true this is generally, yet an improvement can be made in this the queen of flowers in our gardens. Care is necessary as to nature of soil and to the kinds grown.

At present the system invariably is to procure cuttings, and stick them in in various parts of the garden without any special preparation of the soil, leaving them until they bloom or not in their misery; the natural result is disappointment, and would be the same in the best rose-growing country.

The rose is a gross feeder, requiring rich deep-drained soil, either natural or artificial, with a plentiful use of rotten cow manure, which on account of its cool nature is the best manure for this plant.

Broadly speaking, roses are classified into three kinds by their habits—hybrid-perpetuals, tea-scented, and climbing. Hybrid-perpetuals are recognised by bearing long and straggling shoots springing from a common base, which in wet seasons never flower, and even in the most favourable seasons flower so poorly as to be disappointing. They require special pruning—these strong shoots are shortened to twelve or twenty buds from the bottom, so as to direct the energy into a variety of channels, and so weaken them into flowering. Complaints of the flowerless nature of this kind of rose are so general, and their treatment so peculiar, that their growth will be largely discontinued, with the exception of a few which have proved suitable to our climate; La France being a grand exception.

In pruning tea-roses which naturally form a bush, the object is to keep them so by first cutting out all weak central and overcrowding branches, and by reducing the plant to 2 feet or 3 feet from the ground, cutting each shoot and branch to two buds.

The principal pruning may be made in July, and will cause the plants to flower in the spring when the temperature is not too severe; although the peculiar nature of each season must determine the best time; and by pruning successionaly the flowering season is prolonged over a longer period.

Immediately after the roses have faded each shoot should be at once cut back to three or four buds, as then the next formed shoot will be stronger than if allowed to grow at the extremity of the shoot, and thereby at least two crops of flowers can be got in one year. No unnecessary or unprofitable shoots are allowed to rob the plant, which is also kept low and does not require so severe an annual pruning; the balance is maintained between growth and use, and neatness is preserved.

Every two or three years large rose bushes should be lifted—their roots and branches shortened to 1 foot or 18 inches from the stock according to the strength of the plant, and replanted, not too deep, with plenty of manure. The plant is thus induced to form fibrous roots near the surface of the ground and a check is given to the natural tendency of the roots to wander often into sour and unhealthy soil. In every case heavy mulching should be done; the benefits are invaluable, protecting the surface roots from the sun, preventing too rapid evaporation, and supplying nourishment with every shower. At the time of the greatest drain on the plant—namely, when in bud—it can be very much helped by giving liquid manure as well as reducing the number of buds. Soapsuds are a simple and effective fertiliser and in all cases should be used for such purposes.

The pruning of climbing roses differs considerably from that of the other kinds. As a rule, only old and exhausted shoots should be cut out. The young shoots, though long and without branches, if put down will form flowering twigs all along the shoot. In many climbing roses the best flowers are produced on the thin twigs, whereas in Climbing *Devoniensis* they are produced on clusters at the extremity of a long shoot.

Tea and climbing roses are by far the most successful in this climate, as one good crop of flowers can be depended on, and by careful attention and pruning and other necessary helps a succession can be got; those pruned now and flowering from July onwards will be the best of the season.

Another important question in rose growing in this State is, whether budded or on their own roots. Budding roses on the wild briar and manetti stocks had long been practised in England, but even in that climate experience has shown its fallacy—budded roses have proved so liable to canker and other diseases, besides the nuisance of suckers springing up and often taking the place of the scion and flourishing for years without the owners finding out the mistake. As in the orange in this climate, the unsuitability of constitutions seriously affects the prolonged health of any two differing budded or grafted kinds, and most roses make a better struggle through life with one constitution than with two. Roses procured from the Southern States are often budded and it is important to increase as soon as possible by layers or cuttings. Layering can be best done from February to July, and is the safest way to increase any choice kinds. Shoots of wood not too old or too young if slit up the middle for an inch or so from below a joint and buried in fine soil about 3 inches deep, keeping the shoot firm with a peg and keeping the slit open, will root in a short time and when rooted will at once form a plant.

In increasing by cuttings let the wood be firm, the cuttings about 6 inches long and cut clean at bottom of a joint and buried to one eye in sandy soil.

The rose is liable to diseases which much be watched, mildew being the chief. It can be held in check by sprinkling with flowers of sulphur, but is a sure sign of the roots being in an unfavourable condition and is often cured by lifting and pruning root and branch as recommended above.

In working among roses it is very important to have pruning scissors, especially as the most enthusiastic rose-growers are ladies, on whom all duties relating to the garden very often fall. This useful instrument is preferable to a knife, as all cutting can be done without danger to the hands.

List of good roses suitable to Brisbane.—La France, h.p., Souvenir de La Malmaison, b.; Marie Van Houtte, t.; Safrano, t.; Alba rosea, t.; Duc de Magenta, t.; Souvenir d'un ami, t.; Perle de Lyon, t.; Niphetos, t.; Anna Oliver, t.; Celine Noiret, t.; Mademoiselle Th. Genevay, t.; Marie Sisley, t.; Marie Nova, t.; Queen Victoria, t.; Bougère, t.; Devoniensis, t.; Madame Carnille.

Climbing.—Maréchal Niel, t.; Gloire de Dijon, t.; Cloth of Gold, N.; Madame Berard, t.; Climbing Devoniensis, t.; Lamarque, N.; Celine Forrestier, N.; Reine Marie Henriette, t.; Chestnut hybrid; Rêve d'or, N.; Solfaterre, N.

PAPER PULP.

Mr. J. Campbell, of Cairns, who has for several years been identified with the cotton-growing industry in the North, and who has furthermore experimented with plants producing fibres, dyes, tannin, &c.—in which work he has been very successful—has now shown the way to an apparently lucrative business in the utilisation of "blady grass" in the manufacture of paper pulp. The "Cairns Post" has the following note on the subject:—

"It takes 3 tons of green blady grass to manufacture 1 ton of crude pulp, while it takes, at least, 7 to 8 tons of sugar-cane to make 1 ton of brown sugar. Delivered in the Southern Paper Mill, the pulp is worth, at least, £21 per ton—a value equal to that on 1 ton of sugar. Under present conditions the cost of manufacturing the pulp is greater than that of making sugar, owing chiefly to the fact that chemicals are dear and the machinery and appliances have not been perfected; but Mr. Campbell can show not only how to make good use of local crude alkalis, but, also, how to bring the application of his method up to sugar-mill standard, thus greatly decreasing the cost of manufacture. This would mean that a higher price could be paid for the grass—in fact, a price equal to that of sugar-cane, say £2 per ton green—making 1 ton of hitherto useless blady grass (considered a pest and a curse by the cane-farmer), growing without cultivation, equal in value to 1 ton of the best cultivated sugar-cane."

We ("Queensland Agricultural Journal") shall be very pleased to hear that Mr. Campbell's experiments achieve such a result, as it would be of exceedingly great value to Australia generally; and would doubtless give rise to an extensive business in Papua, where there are large tracts of land on navigable rivers, notably the Kemp Welsh River, covered with a luxuriant growth of this hitherto pest of the planters. And it must not be forgotten that native labour in New Guinea is cheap, plentiful, and reliable.

Dairying.

HOME-MADE CHEESE.

Take, say, 10 gallons of milk, which should not be sour, but should have developed sufficient sourness or lactic acid necessarily to be present in milk intended for conversion into cheese. Milk drawn from the cow at the evening and kept overnight, when mixed with equal quantities of the morning's milk (freshly milked), and providing the evening's milk has not gone sour generally, meets the requirements.

This milk should be put into a clean, tinned vessel, about 2 ft. long by 1 ft. wide by 1 ft. deep, which should stand in another vessel 2 ft. 6 in. by 1 ft. 6 in. by 1 ft. 3 in. deep, and should rest on three pieces of wood laid on the bottom of the larger vessel, which will bring the top edge of the inside vessel a little higher than the outside one.

Hot water is then poured into the outside vessel, and the milk in the inside vessel should be stirred with a wooden pat till it reaches a temperature of 86 degrees Fahr. Should the water used at this period be of sufficient warmth to further heat the milk, it should be drawn off by a water cock inserted in the bottom of the outside vessel, and this water can be put back into the heating boiler if desired. When the milk is 86 degrees Fahr., add about 15 drops of cheese colour and stir thoroughly. Then add about $\frac{1}{2}$ oz. of rennet, and stir for two minutes. Cover with a cloth (a piece of calico answers), and let the milk rest until coagulated and it is of such firmness that, when you insert the finger into it and raise the finger to the surface bent forward, the junket will make a clean break in front of the finger. This stage usually takes from 25 to 60 minutes from the time of adding the rennet, according to the sourness of the milk and the strength of the rennet. This stage of the process requires careful attention. When the junket reaches the condition above described, it should be cut into cubes about $\frac{1}{2}$ in. square. For this purpose a vertical and a horizontal curd knife are used. The curd is first cut lengthwise with the horizontal knife; then crosswise and lengthwise with the vertical knife. The curd is then stirred for a minute with the hands or a pat. Then more boiling water is run into the outside jacket, and the curds and whey brought up to a temperature of 100 degrees Fahr. This should take about 20 minutes. By this time the curd should be firm to the touch. A small piece (about the size of a walnut) of the curd should then be taken and squeezed dry in the hand, and placed on an iron which has been heated to an almost red heat. The curd should be firmly placed on the iron, on a part that is just hot enough to hold the curd but not burn it; then draw the curd gently away from the iron. If sufficient acid has developed, it will be noticed that small threads about $\frac{1}{2}$ in. long adhere to the iron. If the curd has not developed an adequate amount of acidity, these threads will break away, or, if very sweet, the curd will not show any threads at all. In the latter cases, the curd must be kept at the above temperature or not allowed to fall below 98 degrees Fahr. until the curd shows thickly-populated threads, $\frac{1}{2}$ in. long, on the hot iron. When this is accomplished, the whey should be drawn from the curd. This can be done by shifting the curd to one end of the vessel, and dipping the whey out at the other. The end of the vessel should then be raised to allow the whey to drain away from the curd. After the whey is drawn off, the curd will readily become matted, and it should then be cut into blocks about the size of bricks, and turned over. The turning should be repeated about every 10 to 15 minutes to allow the whey to drain off. In the course of about 40 minutes, the hot-iron test is again brought into requisition, and a piece of curd applied as before; and when the curd shows fine threads about 1 in. long, the correct acidity for cheese purposes has been attained. This usually takes from about an hour to an hour and a-half, after drawing off the whey. The curd is next cut into pieces about the size of broad beans. There is a mill for this purpose, but a small quantity of curd can be cut with an ordinary butcher's knife. This completed, the curd is stirred with the hands just sufficiently to separate any pieces that may have united. Then add 4 oz. of fine salt (or at that rate), and mix thoroughly. In 7 to 10 minutes the curd is ready for hooping and pressing into cheese. For this amount of curd you would require two 5-lb. 7-in. cheese hoops and half-dozen yards of 7-in. binder. The half-dozen yards of binder are sufficient for 100 cheeses of the weight above mentioned. After the curd is put into the hoops, it should be pressed for 20 to 24 hours under a ton pressure. If the milk is too sweet at the outset, it takes a long time to get the required acid (hot-iron test), or, if too sour, the acid is developed too rapidly, and the cheese will be sour and probably leak on the shelves. Try and strike the medium. A nice time for completion of the process is about 4 hours from the time the rennet is added to the milk until the curd is in the hoops preparatory to the application of pressure.

Tropical Industries.

THE NORTHERN SUGAR DISTRICTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has returned to Brisbane after an extended visit to many of the Northern sugar districts. The Innisfail district received most attention, due to the initiation of a new Sugar Experiment Station at South Johnstone. This establishment is situated on the opposite bank of the river from the South Johnstone Mill; and, the buildings being now completed, a commencement has been made with cultivation. The cultivable area comprises about 30 acres of land of medium quality. Varieties of cane which were sent up to the Kairi State Farm, on the Atherton Tableland, in 1913, for the purpose of, if possible, restoring the vigour and vitality of some of the better of the older varieties, were brought down to the new station for planting out. These comprised Rose Bamboo or Rappoe, Meera, and Mauritius Gingham. At the time these canes were sent to Kairi it was thought advisable to include the canes known as New Guinea 15 and 24 A (Badila and Gorn), and these were also brought down to Innisfail. It is hoped that the long spell they have had on the Tableland will reinvigorate these varieties to such an extent that they will be of the greatest value to cane-farmers, and it is expected that distributions will be able to be made next year. In addition to these canes, many varieties from Java, Hawaii, Mauritius, and other places have been sent up from Mackay and Bundaberg Sugar Experiment Stations. The plantings also included cane for experimental trials and for revenue purposes. The new station is completely fitted up, and a laboratory has been installed for the analyses of soils, manures, limestones, and sugar-cane. This station should prove of the utmost benefit to Northern cane-farmers; and it completes the system of Sugar Experiment Stations, there being now Southern, Central, and Northern Institutions.

The weather during the General Superintendent's visit was dry; but the whole country looked beautifully green, and the soil moisture was particularly good. The sugar contents in the cane were high, and farmers were obtaining a very satisfactory price. The South Johnstone Mill was working smoothly and satisfactorily, and the growers were generally feeling more satisfied and confident of the ultimate success of the mill. At Babinda the mill is dealing with an enormous crop of some 150,000 tons of cane, and will need to work at high pressure in order to get through. The density of the cane here was somewhat low at first, but it has recently considerably improved. After leaving Babinda—where, like Innisfail, everything was green—the regions of Mulgrave and Hambleton were reached. Here the rainfall has been much below the average, and the whole of this country was urgently in need of rain. The sugar content in this year's crop, however, was exceptionally good, and high prices are being paid for cane. Unfortunately, owing to the shipping strike, the Mulgrave and Hambleton Mills were forced to close for many days, on account of the shortage of sugar-sacks. This was at the time when the cane was at its best, and must lead to a reduction in the total amount of sugar to be manufactured. A great deal of planting was going on for next year, in spite of the dry weather; and, fortunately, since the time of the visit referred to some rains have fallen which will be of great assistance. It is considered, however, that the crop now being harvested has been reduced by 12 per cent. since the original estimate was formed.

On the Herbert River conditions were even drier than at Cairns, and rain was at that time badly required for the young plant cane, of which considerable areas had been planted. The sugar contents in this district were also particularly fine, and the high sugar content in cane should tend to considerably increase the ultimate yield and atone to some extent for the mills having to stop for bags. Just before leaving the district, good showers fell which will materially aid next year's crop.

At Mackay very dry weather was being experienced, and no rain had fallen for a long time. The young plant cane for next season now requires rain urgently. The sugar contents in the cane in this district are also very high—a matter of great satisfaction with farmers. Clark's Seedling (H.Q. 426), a cane of high density, is now being extensively grown; but a good deal of anxiety is being felt as to its permanence. In many of the sub-districts of Mackay it is developing disease. The sticks are inclined to die and wither in the middle, while the foliage also dies away. This disease strongly resembles one that attacked the old Rappoe or Rose Bamboo in 1902-4 in the Mackay district.

The Mackay mills were all crushing, and most of them were doing good work.

The Sugar Experiment Station work was found to be going on satisfactorily, and distribution of new varieties had been made to a large number of farmers; plantings of new experiments had taken place, and the harvesting of this year's crop was almost complete.

Throughout the North a good deal of planting had been carried out, so with fair climatic conditions a good crushing for next year in the Northern districts should be ensured.

Dry as some of the Northern districts appeared (continued Mr. Easterby), they were relatively moist when compared with Bundaberg. Here the cane has made no growth for months, and of what there was a great deal had been frosted. Bingera Mill ran for a very short season; Millaquin and Fairymead will soon close up; and it is anticipated that the amount of sugar to be manufactured in the district will be under 7,000 tons. The Childers district is even worse than Bundaberg; planting in both districts has been considerably interfered with, and, unless rain falls shortly, next year's crop will also suffer materially. It may be summed up, therefore, that, while the sugar areas north of Townsville and also Mackay will yield fair to good crops this season, the Lower Burdekin and Bundaberg and Childers districts will be very short and reduce considerably the amount of sugar usually made. It is estimated that we shall be quite 100,000 tons of sugar short this year.

Meetings of farmers were held on the Johnstone and Herbert Rivers, which were well attended, and many questions important to cane-growers were discussed.

SUGAR PRODUCTION ESTIMATE FOR 1919.

The General Superintendent of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) states that the probable estimate for the 1919 sugar crop is in the region of 155,000 tons. This is considerably lower than that formed about May, and is due largely to the long continued drought and the damage caused by frosts in the southern sugar districts. The sugar content in the cane this year fortunately is very high, otherwise the output would have been still lower. Compared with last year, there will be a reduction of 35,000 tons of sugar made, and 152,714 tons less than were manufactured in 1917. The variation is due largely to climatic reasons, but the high prices of implements and fertilisers, and the scarcity of the latter during the past two or three years, has had a deterrent effect upon production.

RICE-GROWING IN THE NORTH.

For several years little has been heard concerning rice cultivation in Queensland. But, from a report received by the Director of Agriculture (Mr. H. C. Quodling) from the Northern Instructor in Agriculture, giving progress results of the efforts of the Department of Agriculture to encourage the growing of Upland rice on the Atherton Tableland, it would seem probable that the cereal may again take a prominent place in Northern agriculture, as it did some years ago, when a rice mill was erected at Cairns. The Department distributed a quantity of rice seed amongst the Atherton farmers; but owing to the scant rainfall during the growing season, the results were unsatisfactory as far as grain was concerned, the bulk of the crops having to be cut for hay. There was, however, as a set-off a good demand for rice hay chaff, which readily sold locally at £16 per ton. Where grain was harvested, many offers were received for the "paddy," or undressed rice, at £24 per ton f.o.b. Cairns. At this price the grower would receive a gross return of about £15 per acre, a very satisfactory return, equal to a 60-bushel maize crop at £10 per ton.

At the State Farm at Kairi, near Atherton, a plant for hulling and polishing the rice has been installed. Although the quality of the rice grain of this season is not as good as that of previous years, it is said to be quite equal to the imported rice.

In and previous to 1916, Mr. J. F. Keane, of Carbean, Mareeba, always had a crop of rice, and was enthusiastic in his advocacy of its cultivation on a commercial

scale. In the year mentioned he obtained a yield of over 40 bushels of grain (paddy). The straw averaged from 4 to 6 ft. in height, and each stool averaged about 20 ears. He stated that 24 oz. of paddy would be sufficient to sow an acre. An experimental sowing of 3 oz. resulted in a crop of 5 bushels.

In 1899 mention was made in the annual report of the Under Secretary for Agriculture of the then position of rice-growing in Queensland as follows:—

“This (rice) is becoming a staple grain crop in North Queensland, the area for 1898 showing an increase of 418 acres over 1897; that for the former year being 863 acres, with a yield of 38,133 bushels, or an average of 44.19 bushels to the acre, as against 29.19 for 1897. Hitherto, rice had been in the experimental stage, having been grown in many parts of the State, and had fluctuated in area as success or non-success had been met with. It was, however, in 1897 settling down to be the property of the Northern District, and it is to that part that the future supply may be looked for, and it behoves the farmers to be careful to grow the variety to suit the market, for, of all grains, rice is most subject to prejudice and favouritism. It is the grain that, in the largest quantities, comes into the hands of the consumer in the form that is mostly allied to the original state, and so is dependent upon the fancies of the consumers for the variety which shall command the highest price.”

From the figures of the Registrar-General, Queensland, in 1899, produced 14 per cent. of its annual consumption, the statistics being: Production (estimated at the rate of 162 lb. of paddy to the 100 lb. of clean rice), 1,318,176 lb. of clean rice; and the imports 8,235,564 lb., of a value of £49,456. The principal district for rice is that of Cairns, which produced 82 per cent. of the total yield, 708 acres being cropped for 33,540 bushels, or an average of 47.30 bushels per acre.

Only one year later the cultivation of rice had fallen to 319 acres, producing 9,275 bushels, averaging 29.08 bushels per acre.

How are we to account for this great decrease? Is it owing to the cost of production, to the poor variety grown, to the yield per acre, or to the price obtained? Take, first, the average produce per acre. This varies from 30 to 60 bushels of paddy, and even much higher returns have been obtained in the Pimpama district, near Brisbane, where Mr. A. J. Boyd introduced the growing of rice on his sugar plantation, “Oreman,” about the year 1872, and where there is ideal land for rice-growing.

The bulk of the Queensland-grown paddy had usually been sold at 6s. per bushel—that is to say, that an average 40-bushel crop brought the farmer a gross return of £12 per acre. At this rate $1\frac{1}{2}$ acres of paddy gave $1\frac{1}{2}$ tons, equal to 1 ton of clean, marketable rice, worth from £19 to £24 per ton, and the pollard is worth £2 per ton (the pollard in 1919 would bring £10 per ton). The yield of straw amounts to from 3 to 4 tons per acre, worth in 1899 £2 to £3 per ton. In 1919 (October) this rice straw chaffed sold at £16 per ton.

The cost of production and harvesting are about the same as the cost of wheat production. The cost of milling, polishing, &c., amounts to about £2 per ton. Thus, it will be patent to any agriculturist, that there is more money in rice cultivation than in wheat, barley, oats, or maize, the cost of production being about equal.

It cannot, then, be that this item is the cause of the slump in rice-growing.

Now, as to the poor variety grown. No doubt, in former times, when few had any knowledge of the industry, all kinds of rice were sown, mostly of unsuitable varieties; but, thanks to the Department of Agriculture, the very best kinds were introduced, the kinds which yielded the heaviest crops of the most marketable kind of grain. This disposes of the argument about quality and quantity. We have already shown that the yield per acre far exceeds that of wheat, and that the price paid for paddy was much above what is paid for wheat, and over double, what was paid for maize. How, then, is the abandonment of rice culture to be accounted for? In the first place, rice was mainly grown in the North by Chinese. Although the Chinaman is a perfect slave as an agriculturist, yet, if he finds a crop which demands little or no cultivation, but which will return him a rich harvest, and another which will also return a rich harvest, but which demands a considerable amount of labour, he naturally chooses the former. The former was presented in the shape of bananas, and the consequence was that he abandoned rice-growing and took to banana production. This accounts for the failing of the industry in the North.

But, why did the white men in the South give it up? Simply because they were disheartened by their losses in the great drought. Rice had failed them, and they took to sugar and arrowroot, corn, and potatoes. Why they should have done so is

one of those things no fellow can understand. The land most suitable for rice was theirs. So good was the land considered that its value rose from £2 to £8 per acre. Many persons still hold the belief that rice can only be grown in swamp land which can easily be flooded, and that the crop must be labouriously transplanted by hand, and kept continuously flooded until the grain is almost ready for harvesting.

This is quite true where swamp rice is concerned. But there is another kind—the Upland or Mountain rice—which requires little more moisture than wheat or oats. This last is the variety which has been planted in Queensland, and from which such excellent yields were obtained. There is no need to describe the method of sowing and harvesting. Those who know anything of wheat culture may with rice adopt the same methods as in the case of wheat. Rice, however, is cut while the straw is still green, with the result that a second crop is obtained, almost equal to the first. It is well to stack rice for a fortnight after it has been cut. It then undergoes a sweating which hardens and whitens the grain.

There used to be two or three rice mills in this State capable of dealing with a large crop, so that farmers growing rice had no difficulty in disposing of their produce.

We hope that the rice-growing industry is on the eve of revival in Queensland, as there is, unquestionably, more money in it than in many other rural industries.

The facilities in this State for profitably growing such products as sugar, coffee, cotton (particularly cotton), tobacco, flax, and rice are so good that we have little doubt that, eventually, when our rural and other population shall have doubled itself, their production will figure largely in our lists of exports.

Sugar, butter, and meat have long ago reached the export stage, the former interstate, and wheat has also been exported to some extent.

RICE-GROWING AT BULIMBA.

In proof of what can be done in rice-growing, we received, in 1914, from Mr. C. F. Dennis, Hawthorne road, Bulimba, a magnificent sheaf of rice. It was grown on alluvial soil at the foot of a hill. The depth of the surface soil was about 2 feet, with a subsoil of pipeclay. The area planted yielded at the rate of 60 bushels per acre. The heads were well developed and the straw was from 4 to 5 feet high. The seed for this crop was obtained from a well-known local seedsman, Mr. Thos. H. Wood, and germinated freely. The straw was finer than that of oats, with which it compared more than favourably with oats for chaff. The crop was sown on 10th January, 1914, and harvested on 8th May of the same year.

PADDY FOR THE DISTILLERY.

Mr. J. F. Keans, above quoted, stated that he once made a voyage from Europe to Japan in a French mail steamer, which cruised entirely round the two islands, and through the inland sea, picking up paddy at every port touched at. About 5,000 tons were collected, to be used in Holland in the making of square gin. He was informed that the insoluble constituents of the grain would be converted into pulp for the manufacture of cigarette paper, and the chaff (pollard) into wrapper paper. Owing to the long voyage 100 tons of the rice were damaged, but he was told that there would be a profit even in that, for from it is produced a size used in rope and textile fabrics. He remarks that Port Darwin is 5,000 or 6,000 miles nearer to Amsterdam than Nagasaki, and wild rice grows right across Northern Australia from the Pacific to the Indian Ocean. Nothing is more certain than, that if it can be shown that any foodstuff or merchantable commodity can be more economically and abundantly produced in one place than it can in another, money will find its way to it. Coloured labour cannot compete with the combined harvester. There were some thousands of Chinamen in South Australia thirty-five years ago, and they fled to a man before the wheat-stripper.

Science.

POISONING PRICKLY PEAR.

REPORT BY J. B. HENDERSON, F.I.C., AND PROFESSOR B. D. STEELE.

At the invitation of the management of the Cactus Estates Limited, Mr. J. B. Henderson. (Chairman of the Queensland State Committee), and Professor B. D. Steele, a member of the same body, were asked by the Executive Committee to visit some of the stations where the company was operating, and forward a report. This was done, and the report is here appended:—

Mr. Henderson interviewed the manager, Mr. J. G. Gregory, at the office of the Cactus Estates Limited, Creek street, Brisbane. Mr. Gregory stated that the company had abandoned the attempt to clear the 100,000 acres at Dulacca, and no clearing was now being done there, as the cost would be about £7 per acre, and the land was not worth it.

He stated that a contract had just been completed for clearing 12,660 acres of lightly infested country at Noondoo Station, about 120 miles beyond Goondiwindi. The pear had been poisoned and burned off. A copy of a letter from the manager of the Noondoo Station with reference to the work was submitted by Mr. Gregory, and is enclosed herewith.*

Mr. Gregory also stated that a contract was just about to be completed for clearing 100 acres of thickly infested pear country for £700 at Umbercollie Station, near Goondiwindi. It had all been poisoned, and would probably be burned off in about a fortnight. He submitted a copy of the contract, which is enclosed herewith.†

VISIT TO UMBERCOLLIE.

On Wednesday, 25th June, 1919, we left for Goondiwindi, and on Thursday, 26th June, went over the work being done at Umbercollie Station. When we reached the station, the manager, Mr. Heathcote, accompanied us to the paddock, where the Cactus Estates foreman, Mr. Archibald, showed us what had been done.

Pear at Umbercollie.—Mr. Heathcote stated that Umbercollie Station has an area of 50,000 acres, surrounded on three sides by dense pear. Of the station area, 37,600 acres has been kept free from pear, and we were informed that it costs 4d. per acre to keep it clear. There are three paddocks—one of 1,700 acres, one of 10,000 acres, and one of 700 acres—covered with more or less dense pear. It is a 100-acre portion of the 700 acres paddock which is now being cleared for £700.

Reason for Clearing.—Mr. Heathcote also stated that the 100 acres are being cleared to give good access to some permanent waterholes. It is not proposed to clear the other infested areas on the station, as the cost would be much greater than the value of the land.

State of 100-acre Paddock.—We found the 100 acres block in a much less forward state than we expected. Mr. Archibald stated that there were still about 30 acres to spray, and that it was not expected that the burning-off would be attempted until October next.

Relatively few of the pear plants had been killed outright by the poison so as to show no signs of growth in any part of the plant.

The great bulk of the plants had completely collapsed, but were showing green shoots plentifully from many segments; green shoots were common from the "bulb," and seedlings were springing up among the dried or semi-dried segments.

A considerable number of pear plants were only slightly affected by the poison, the plant still standing with merely the outside skin covered with a yellowish, corky layer. These plants had either not been sprayed or only very lightly sprayed, or the poison had been washed off by rain before it had time to penetrate. In any case, they are very much alive, and the corky layer will largely protect them from further spraying. The presence of those plants will render the task of burning-off a difficult one.

* The report shows that the cost of clearing, allowing for wear and tear, is slightly over 7½d. per acre.

† The contract is for 100 acres, and the cost of clearing is £700, or £7 per acre.

Cost of Clearing.—According to the contract, to “kill by poison and clear off by fire the pear” on the 100 acres is to cost £700.

The labourers are being paid £3 10s. per week. There have been from six to ten men employed for over two months in poisoning work. There are still 30 acres to be poisoned, and the work of felling the scrub and burning-off and clearing up odd pear has still to be done. It is obvious that the Cactus Estates Limited is not going to make much profit on this contract.

Conclusion.—As the so-called dense pear in this paddock is not nearly so dense as in many other districts, we are convinced that poisoning, as carried out by the Cactus Estates Limited, is much too costly to be considered as an economically possible means of clearing off pear of even medium density.

STATEMENT OF THE GENERAL PROBLEM.

The results of the visit which we have paid to Umberecolle Station confirm in a striking manner the conclusions that we had formerly arrived at as members of the Board of Advice on Prickly Pear Destruction, and we consider that it will not be out of place to recapitulate briefly these conclusions.

In considering the possibility of eradicating prickly-pear it is necessary to classify the infested areas into at least three classes, each of which presents its own definite problems.

The first class consists of heavily and moderately infested areas, mostly of poor agricultural land but good grazing value. This group consisted a few years ago of areas each centering around a more or less definite area of infestation. These areas are now tending towards coalescence so as to threaten the great bulk of the pastoral lands of the State. They now cover enormous areas.

We are definitely of the opinion that it is impossible to treat this class of country economically by means of poison. This conclusion is based on the information at our disposal, and by the results of about 10,000 plot experiments carried out under the auspices of the Board of Advice on Prickly Pear Destruction in Queensland. We consider that settlement under present conditions is powerless to cope with this class of country, which will be cleared or controlled, if at all, only by the discovery and utilisation of natural enemies of the pest.

This method has already been used with conspicuous success by the introduction of the Wild Cochineal Insect, which has practically exterminated a large area of *Monocantha* Pear. Unfortunately, this insect will not attack any other variety of pest pear in Queensland.

Pending the discovery of some enemy or enemies which shall destroy or control the pear, every effort should be made to prevent the further spread of the pest. This should be attempted by the combined use of settlement and poison.

Belts of pear country, surrounding each large area of infestation, should be carefully selected. Each of these belts should comprise land in such a condition of infestation that it can be economically cleared by the use of poison. Settlers should be established on these cleared belts, which will completely enclose the very heavily infested areas. These settlers should be granted a tenure of the most favourable nature with the condition, which should be strictly enforced, that they must not permit the pear to spread on to their selections. Portions of the belts at present occupied by pastoralists should be brought under the same condition.

2. The second class of pear country consists of infested areas of very large extent, containing more or less scattered clumps of pear. These areas are scattered about the country in patches, and they surround the heavily infested areas on all sides, joining up the centres of infestation already referred to, and tending by the increasing density of the pear which they carry to spread the first class over the whole of the infested area.

This class of country, which will be outside the protective belts suggested in the foregoing, can be cleared at a moderate cost by the use of suitable poison applied at the proper season, the dead or seriously injured pear being subsequently destroyed by burning.

It is probable that cost of doing this will in some cases be higher than the value of the cleared land, but notwithstanding this it should be undertaken as a national problem.

3. The third class consists of very light infested areas situated on the extreme edge of the other two classes of infestation, and also scattered areas in process of development, where seeds have been carried by birds and cattle.

There is no difficulty at all in clearing such country and in keeping it cleared at a comparatively trivial cost by the use of suitable poison. The task of doing so does, however, call for constant attention on the part of the settler, and the duty of devoting this attention is one that should be emphatically and repeatedly brought to his notice.

It is to be noted in connection with this problem that roads, reserves of land, and Crown property are in some districts left uncleared where the pear has otherwise been cleared. This infested land remains a source of reinfestation for the whole district. It is essential in connection with any plan for clearing any district that such roads, reserves, &c., should be cleared and kept clear at the same time as all other infested land in the district. Unless this is done, a quite unnecessary expense is entailed on the surrounding landholders, and the cost of keeping clear remains a permanently occurring expense instead of being a quickly diminishing quantity.

The problem of attempting to cope with the prickly-pear in Australia is one which will severely tax the administrative and material resources of the community, and this fact should be clearly stated and borne in mind by the Governments concerned.

THE TASK AHEAD.

HOW SCIENCE CAN ASSIST. A WIDE FIELD OF ENDEAVOUR.

By F. M. GELLATLY, LL.D., in "Science and Industry."

There are some most important problems facing Australia to-day which can only be solved by patient scientific research. Take some trite instances, for the bigger things have been much discussed, though little that is practical has been done. There stands in the forefront the prickly-pear menace, one that threatens to drive the inhabitants of Queensland, and the northern portions of New South Wales, into the sea. It has already enveloped 20,000,000 acres, and is estimated to be extending at the rate of 1,000,000 acres a year, or, say, 5 per cent. Consider what this means! Those mathematically inclined may exert their ingenuity and tell us precisely how long the prickly-pear, at its present rate of progress, will take to infest the whole continent at 5 per cent. increase per annum compounded. Remember the story of the grain of wheat on the chessboard doubled at each square. The Persian potentate had no mind for figures. He did not realise that his consent to rewarding his victorious general by doubling a grain at each square represented more than the whole of the wealth of his Oriental domain. So with prickly-pear. If nothing be done to stem its fateful advance, the 20,000,000 acres to-day given over to this pest will, in fourteen years, be 40,000,000; in twenty-eight years, 80,000,000; in forty-two years, 160,000,000; in fifty-six years, 320,000,000; in seventy years, 640,000,000; in eighty-four years, 1,280,000,000; and in less than a century, 2,560,000,000 acres, or more than the whole area of the Commonwealth. By that time the annual increase would have reached over 125,000,000 acres. These figures are not so fanciful as they seem. They convey, even to the unimaginative mind, what prickly-pear, spreading at a present rate of 1,000,000 acres a year, may mean. What a task for a brainy entomologist, or biologist, or chemist! The other day, the Minister for Lands in Queensland remarked to the writer that the Government of that State would willingly give any one a free grant of 1,000,000 acres of pear land if only the grantee would guarantee to clear it. What a prize!

Now, take cattle tick. That pest has caused millions sterling of loss to the cattle raisers of this country. It is costing the State Governments of New South Wales and Queensland scores of thousands each year, not to exterminate it, but merely to keep it from making further encroachments. This problem is not peculiar to Australia. The Americans are facing it too. They are driving the tick back slowly but surely, at great expense, with the aid of an army of officials. They dip and quarantine, dip and quarantine, and so on slowly and painfully cleaning it up. There may be an easier and a cheaper way, if only we can find it. Here is a task for a biologist with a brain.

Then again, there is the sheep-fly and the nasal-fly, braxy in sheep, black disease, contagious abortion in cattle, as well as tuberculosis and all the other ills that stock are heir to. These afford ample scope for the entomologist, the microbiologist, and the rest. The denizens of the north and the west build their homes on piles, not, as is the case with the tree-dwellers of Papua, to keep out of reach of human foes, but to keep their houses free from the depredations of the white ant, the scourge of

sub-tropical and tropical lands. The scientist who discovers a way of combating this insect really effectively, and without entailing over much expense, will save hundreds of thousands sterling per annum. Here is a chance for the chemist possibly, or possibly the entomologist, or possibly for a combined effort from both. The borers that eat into the piles upon which our wharfs rest have still to be dealt with at the hands of science.

Quite another series of problems have peculiar application to the larger centres of population. The smoke nuisance, the dust trouble, if properly tackled and overcome, will materially reduce the daily labour of countless housewives, and add much to the general health and comfort of the community. Neither of these evils should be insolvable. The disposal of city garbage should be dealt with on more scientific lines, and greater use made of the by-products of its distillation. The waste products of countless factories should be put to fuller and more systematic use. In the past, we have been prodigal of our resources. We can no longer afford that luxury. We burn coal by the million tons each year, and allow 40 per cent. of its value to go up the flue. The dumps from our mines, and the slag from our furnaces, have still unknown riches to yield up. The sands of the sea, the water of the ocean, can, at a price, be made to yield unseen gold; so can the modern alchemist transmute many seemingly worthless things into substantial banking accounts for the enterprising and the skilful.

The scour from the wool-wash is rich in potash; the common seaweed on the beaches contains iodine; the water hyacinth, potash; sawdust from the timber mills, acetic acid, alcohol, and tar; straw can be converted into a valuable illuminant; the essential oils of our bush plants into additions to the pharmacopœia, and so on *ad infinitum*. The resources of the Commonwealth are well nigh inexhaustible, and will yield untold wealth to the scientifically-trained mind.

Or let us consider that important work, the scientific breeding of plants and animals. It has been universally accepted that he who makes two blades of grass grow where one grew before deserves well of mankind. Apply this principle to agriculture, and consider it in reference to the cultivation of wheat. Farrer has proved what may be accomplished by selection of wheat and scientific hybridisation. He has added millions sterling to the value of the annual production of Australia. But he confined his efforts to wheat only. What about maize, barley, oats, sugar-cane, cotton? What about our native grasses? What about our orchard trees? Let any one who has visited the average orchard recall the poor trees he has seen. A poor variety of, say, orange takes just as much out of the soil as the best does, and requires just as much cultivation. Yet its product may not be worth one-half or even one-fourth as much. So with stock-breeding. Our flocks and herds are susceptible of immense improvement as soon as the benefits are fully recognised. Consider what the sheepbreeders of Australia have already done; how they have added pounds per sheep to their average yield of wool. Wonders still remain to be accomplished right throughout the whole world of live stock.

There is an entirely different set of problems, the solution of which cannot but bring credit to the Institute and benefit to the country. Australia, on account of its isolation, gains and loses something compared with other countries. In war she cannot easily be attacked, her boundaries knowing no other frontier than the sea. On the other hand, if she is attacked and her sea-borne commerce is temporarily cut off, she must be self-sufficient in order to be able to continue to fight. Her ships, her motor service, her aircraft, must have an ample supply of liquid fuel. To-day they are dependent upon petrol produced in America or Borneo. It rests with our scientists to discover a substitute—some raw material that will yield up industrial alcohol in an economical way. There are plenty of known raw materials, but most of them are too costly. The low temperature distillation of coal may be the solution of the problem, or it may be that the huge shale deposits of the Wolgan Valley may yet be the salvation of Australia.

Industrial efficiency in a nation is largely dependent upon three or four cardinal factors—(1) well-trained workmen; (2) cheap fuel; (3) cheap and effective transport; and (4) organisation. Take these factors in order and consider what part the scientist can play in each. First there is the efficiency of the workman. This is contingent upon effective technical training; upon his health, which rests upon comfortable housing and scientific sanitation; upon his contentment, which depends upon his general surroundings, and upon his feeling that it is not a hopeless task for him to provide for a comfortable old age for himself, and opportunities for his offspring equal to those of the most influential in the land. Secondly, cheap fuel goes to the root of all secondary, and some primary, industries. This must be had at any cost. Thirdly, cheap and effective transport includes not only railroad and steamship carriage, but that no less important factor, transport by road. Scientific roadmaking

and maintenance is one of the most important *desiderata* in Australia to-day. Most of our roads are execrable, which throws a heavy and perpetual burden upon all industry. If the Institute could introduce up-to-date methods of roadmaking into the Commonwealth, and do no more, it would more than justify its existence. Then there is the remaining factor of organisation. This is many sided. It connotes such matters as the proper selection of factory areas so as to secure efficiency in handling and convenience to the workers. Take the position to-day in Melbourne, Australia's first manufacturing capital. Here the factories are mixed up in residential areas, often far removed from the railway and wharfage accommodation; often, also far from the homes of the workers. This kind of Topsy-like growth spells costly production, and inability to compete on equal terms with more efficient rivals. Then there is quite another phase of organisation, that inextricably connected with the word standardisation. Are manufacturers to be asked to consider every fad, every prejudice, of a hundred and one consumers, or is there to be some limit, and consequently some possibility of economy, in production? Then, again, are dozens of manufacturers going to continue to produce according to scores of patterns, or are some to have a virtual monopoly of some lines and others of other lines, thus still further aiding economy of production and ability to compete? Standardisation is a weapon of great fineness. It can win where the cruder weapon of the protective tariff fails. Without standardisation as a condition precedent no tariff wall could have been built high enough to have made it possible for Australian manufacturers to roll tramway rails in Australia with our present population, and consequently limited demand. There is another side to standardisation. How long is the Commonwealth going to be content to be the dumping-ground of the rejected goods of the world? Watches that will not keep time; thermometers that cannot once, except by accident, accurately measure the temperature; matches that will not strike; boots that will not wear; and a thousand and one things that are mere frauds may come into the Commonwealth to-day with impunity. One day science will fix standards of quality as well as standards of size and weight. It is a shame that our producers and our manufacturers are compelled to compete against such obvious deceptions, and that our consumers are not protected against such transparent fraud. Science must and can help. This will come within the province of the Bureau of Standards.

It would be impossible, even were it desirable, to cover the whole field that lies before the scientific workers of the Commonwealth. Their labours affect every home, every occupation, every aspiration. They go to the very root of our material progress, of our national well-being, and of our racial security. Who ever had a greater task!

AUSTRALIA'S HIDDEN OIL WELLS.

WHAT PETROLEUM MEANS TO A NATION!

Mr. George D. Meudell, whose efforts to that end have earned for him the title of "Pioneer of the Modern Petroleum Industry in Australia," is distinctly of the opinion that this Commonwealth of ours is rich in fuel oil deposits. Mr. Meudell, who has spent many months in the United States, is thoroughly conversant with the ways and means of locating and marketing natural oil deposits, and for that reason he has directly appealed to members of Parliament throughout Australia and to the Press, urging their co-ordination in the founding of a petroleum industry in Australia.

Mr. Meudell further states that the Federal Committee on Public Accounts inquired last year into the causes of failure of the Government's efforts to produce oil from the oilfields proved to exist in Papua and that the committee's recommendations were as follows:—

"Urgency of production.—The committee is of opinion that the urgent requirements of Australia demand that prospecting work in Papua should be prosecuted with great vigor; that investigations as to supplies of 'well-oil' throughout the Commonwealth should be undertaken, and that the shale-oil deposits of the Commonwealth should be developed without delay."

Mr. Meudell's optimism is founded on these salient facts:—

"Australia, as a great mineral country, possesses all the metals, also all the earths and minerals known to science, and it would be extraordinary if petroleum had not been included in the category.

"The chief reason oil has not yet been found in Australia is that, with one exception, no proper modern drilling plant had ever been used by men understanding how to bore for oil.

"Water-boring appliances and water-seeking engineers have proved fatal to the creation of a petroleum mining industry.

"Rotary drilling machines used in California can bore 200 feet a day, as deep as 6,000 feet.

"Petroleum is found in most of the earth's rocks, and especially under the tertiary rocks—sandstone, limestone, and shale—and three-fourths of Australia is covered by these rocks.

"The essentials for its collection below are:—(1) An anticlinal or 'saddle-reef' formation; (2) a hard, impervious rock, preferably a shale, just above and just below the oil-sands.

"The indications are seepages of oil, bitumen, brine, rock salt, salt lakes, lignite, gypsum and natural gas.

"The most powerful argument in favour of the existence of oil in the Commonwealth is that this country possesses deposits of coal, brown coal, and kerosene shale unequalled in extent on earth! Coalfields indicate petroleum near-by, and oil-wells usually exist alongside coal.

"The supplies of petroleum are falling off in North America, our chief source of supply, and an oil and kerosene famine here would not be remarkable."

Mr. Meudell's contentions are logical, and his advocacy of a national search for oil throughout Australia must meet with warm seconding from the universal body of leaders of industry and commerce in Australia.

Turning from Mr. Meudell's reasoning based on hard practical experience of the American oil-fields, we are confronted by the disturbing evidence furnished by geology and experience of another kind that there is a gradually falling-off in output of the crude oil-fields at present being actually operated in many parts of the world. The drain on the world's oil-fields for war and home service alike is to-day enormous, and even oil-fields are not inexhaustible.

Strictly speaking, each field passes through only a transitory phase of existence as an oil producer, and from current literature on the subject one gathers that the world's annual consumption of petroleum has reached a total of nearly 50,000 tons and that the economic life of an oil-field is probably not more than 50 years!

In the United States, preliminary estimates indicate that the quantity of petroleum produced and marketed in its oil fields in 1917 reached the record-breaking total of 341,800,000 barrels—a quantity nearly 14 per cent. greater than the former output of 300,765,158 barrels established in 1916.

The salient features of the industry in 1917 were record levels reached and firmly maintained by prices of crude oil at the wells, and the enormous demand which absorbed not only the current output of the wells but necessitated a net draft of about 21,000,000 barrels of oil in storage, principally in California and Illinois. The surface reserve of crude oil in the United States at the end of 1917 was estimated at 153,000,000 barrels.

War-time service in the oil fields is expressed by the vast increase in the use of hydro-electric energy in the drilling of new wells and in the pumping of the oil itself. It is by the use of electrically-operated pumps that the oil is taken from its natural bed below the earth's surface. From the temporary lakes created from the output of the pumps the oil product is then taken and loaded, still by electric power, into cars or storage tanks. The largest portion of the oil is, however, pumped directly to the seaboard through pipe lines which are being operated at the present time to their fullest capacity to facilitate railroads in coping with car shortage.

But before we in Australia need to consider how we shall work our own oil fields and transport their produce, we must first find our oil-bearing areas. To quote George D. Meudell once more:—"The Federal Government should spend £500,000 a year and each of the State Governments £100,000 a year in drilling for oil. The drill and not the geologist will sooner or later find oil in vast quantities."

During the period of the shale oil industry in New South Wales, the export of shale at a high price for gas-making and the 6d. gallon duty on kerosene contributed largely to its success, but the duty being discontinued and the demand for export shale practically ceasing, the price of shale gradually diminished to such a small amount as to destroy all possibility of profit from that source. There are large areas containing an abundant supply of raw material of good quality shale, and the industry, if properly established, would be an avenue of employment for a considerable number of hands and the local production of lighting, spirit, lubricating, and fuel oils. But the difficulties which the local industry would have to face would be exceptional, inasmuch as its competition with the products of natural oil wells would be conducted under unequal conditions.

The petroleum industry in the United States originated in the drilling of wells for brine and the observation that gas and oil were usually found with it and throughout the globe. This association of gas and petroleum with salt, either in solution or in the solid state, is almost universal.

The most important hint in the existence of oil in depth is a seepage of the fluid or exudations of asphaltum at points on the surface. In many instances, however, no indications of petroleum have been seen until it was met with in the bore, and this has sometimes been appealed to as a warrant for blind stabbing with the drill on the off-chance of striking oil in country which has taken the prospector's or promoter's fancy!

It is on record that "in nearly every case where oils have been discovered in the United States or other countries, the discovering has been directed by a seepage of oil or gas. The most usual places for exudations of oil are in stream beds, in ravines and low ground generally, or at out-cropping joints on the slopes of rockfolds." Frequently the surface soil will have to be removed before any actual signs of seepage can be seen. Outcrops may have a bituminous appearance, but, if exhausted and much unearthed, they may not be recognisable at the first glance as oil rock. In such cases a faint odour and with limestones, sometimes sulphur stains, are all the indications available.

In Tasmania, so far, no undoubted surface seepages of petroleum are known to the Mines Department, although unquestionable petroleum residues are present as loose fragments of asphaltum on various beaches of the Tasmanian coasts. These fragments are usually found near high-water mark between normal and storm-tide levels, but no pieces have been found up the streams. They vary in weight from an ounce or two to nearly a hundredweight, and are of no particular shape, being mere fragments. The substance is sometimes plastic, and fresh-looking pieces frequently have an odour similar to that of naphtha. Fresh surfaces show the lustre of pitch. The specific gravity of this asphaltum has been determined in the geological survey laboratory as ranging from 1.0313 to 1.0459. Consequently, though it might not float in stationary sea-water, it would do so in moving water. The finding of this fragmentary asphaltum has a direct bearing on the presence of petroleum, for it will be remembered that alberite, a kindred or practically identical mineral—that is to say an inspissated petroleum—occurs in New Brunswick in vein form.

Investigations for evidence that petroleum is to be found in the region have been made at Kongarong, South Australia, but without results, although coorongite has been picked up on the crests of the oil consolidated sand-dunes in the vicinity, and this substance has been assumed by some people to be a petroleum product, although, strictly speaking, its relationship to petroleum cannot be said to be established.

Fuel oil is perhaps the wealthiest industrial asset in any nation, and although no field yielding native oil as an economic proposition has yet been discovered within the territory of Australia, strong efforts must continue to be put forward to discover the oil fields which no doubt exist somewhere in the great heart of our Commonwealth.—"Land and Transport," Melbourne.

ALCOHOL FROM SUGAR CANE TOPS.

Inquiries having been made as to the practicability of profitably manufacturing alcohol for power purposes from cane tops, "Science and Industry," the official Journal of the Commonwealth Institute of Science and Industry, gives the following notes on the subject:—"As a matter of fact, the sugar content of cane varies very much, equally in the stems as in the tops. The amount will also depend on where the tops are cut off, whether they are to be left on the field to be ploughed in, or taken to feed stock. If the trashing has been done some time before cutting, the green cane under the leaves ripens, and the cut is made just *above* the base of the last leaf. The percentage of hydrolizable sugars might be taken as 2.6 per cent. If a little more of the stalk is taken when cutting off the top—*i.e.*, *below* the last leaf, the percentage might rise to 4.6 per cent., or 5.9 per cent., as a maximum. The moisture would be about 70 per cent.

One ton of cane tops should produce from 3.63 to 8.24 gallons absolute. Thus, from a ton of cane tops we might reckon on an average, say if 4 gallons absolute alcohol, but varying up to, say, 7 gallons, depending on place of cutting off tops, ripeness of top, and variety of cane, &c. It is not very safe to generalise too much for calculation and it is better to be on the conservative side and calculate on a rate of 4 to 5 gallons.

General Notes.

LICE AND MANGE INFECTION OF PIGS.

By T. H. WILLIAMS, Chief Inspector of Stock, South Australia.

MANGE.

Authorities say the pig is liable to one variety of mange only—viz., that arising as the result of the presence of the *Sarcoptes scabiei suis*, the mange mite which burrows under the skin of its victim. Severe irritation is set up, and is followed by the formation of thick masses of scabs and scales. Accumulations of filthy, rough, and splintered surfaces of decaying timber, rough bark on pepper and pine trees, and boxthorn, together with dirty sties favour the harbouring of the mange mite. The disease is usually more common in young pigs. Immediately after weaning the attacks occur in the most severe form, when they are shut in dirty, infected sties. The first lesions are noticeable about the head, back, behind the ears, &c. As the itching caused by the burrowing mites increases, bran-like dry scales pile up forming crust-like masses. The skin hardens into thickened folds along the back. Severe itching and the presence of scales and scabs makes the diagnosis clear. The mites can only be seen by the aid of a microscope.

Treatment.—Thoroughly scrub infected animals with softsoap and water, then rub in lard and sulphur. Badly infected pigs will need treating several times. Many young pigs have died of weakness and secondary infection due to mange.

The hog louse (*Haematopinus suis*) is the largest of animal lice, and is erroneously referred to by the majority of pig-keepers as a tick. The female louse deposits large numbers of eggs, or nits, which may be seen by the unaided eye, attached to the hair. They are yellowish-white in colour, and are deposited behind the ears, on the back, shoulders, &c. Adult lice and eggs are easily seen, and are common where pigs are kept in dirty, neglected surroundings. Young pigs infected with lice become unthrifty. Recent investigations have proved that the hog louse conveys into the system of young pigs a virus which kills off whole litters. Like the human louse, which caused trench fever, so the animal louse sets up a fever. In America this louse has been held responsible for spreading swine fever, and in the light of recent history it has probably caused the disease among pigs in this State.

Treatment.—The destruction of the pig louse is an easy matter, but the nits, being covered by a tough gelatine cover, are not readily destroyed. The application advised for the mange mite, with the addition of kerosene to the lard or mutton fat and sulphur, will be effective, or if the owner can afford to construct a dip, pigs may be dipped in any of the carbolic dipping preparations.

THE LEGAL SIDE OF THE QUESTION.

As mange and lice are now proclaimed diseases under the "Stock Diseases Act of 1888," owners, managers, or agents are liable to a penalty of from £5 to £100 if they travel infected pigs on public roads or in railway trucks, or expose them for sale in any markets, whether public or private. When pigs are found infected with mange or lice, the owner may be required by notice served on him or his agent or servant to treat the diseased pigs and disinfect sties, yard, shelters, &c. It now becomes the duty of every one about to buy pigs to see that mange and lice parasites are not included in the deal, whether private or at the sale yards. Pig owners must now be seized of the fact that lice and mange of pigs is a notifiable disease. In South Australia, any persons failing to notify the Chief Inspector of Stock render themselves liable to a penalty of £20.—"Journal of Agriculture," South Australia.

MORTALITY AMONG HORSES.

At the present time on the Downs, and more particularly around Toowoomba (says the "Chronicle"), there is flourishing what is known as the "Bee Nettle," or otherwise the "Stagger Weed." It resembles somewhat the ordinary stinging nettle, but is minus any prickles, while it is of a golden hue. Owing to the dry weather and scarcity of grass, the pest, which is apparently a drought resister, is flourishing, and the stock eat it. The consequences have been most serious, and the position has become so acute that the Stock Department will probably move in the matter. The high mortality among horses, and the mysterious cause of their death, has led to a number of complaints, so much so, that in one instance a post-mortem examination was held, and it was then found that the cause of death was due to the animal eating this noxious weed.

ST. JOHN'S WORT PARASITE.

DISCREDITED IN ENGLAND.

Some time ago the Bureau of Science and Industry decided, at the instigation of Professor Lefroy, to introduce from England the *Chrysomela* beetle, which was reported to be a destructive parasite of the St. John's Wort weed.

The objections raised to the introduction of what might in turn prove to be another pest were met by the undertaking of the bureau to conduct experiments with safeguards against the escape of the parasites.

Another light is thrown upon this *Chrysomela* by Professor Newstead, of Liverpool University, who, in a private letter, says: "I have never seen the St. John's Wort beetle in life, although it has been one of my special desiderata for the last three decades. It is said to occur in the Liverpool district, but I can never find it. The food plant grows freely in some places, but it is by no means a common weed. Very little is known of the binomies of the *Chrysomela* in question. In my long experience I have never seen St. John's Wort suffering from the attacks of any insect.

"The Imperial Bureau of Entomology had the subject of *Chrysomela* before it at the last meeting, when a sub-committee was formed to deal with the matter. We (the sub-committee) met on 4th June, and from what we have said in our report I doubt if Australia will ever trouble to introduce the *Chrysomela*."

TO TAN A HIDE.

The first operation to which hides are subjected is depilation—that is, removing the hair and the scarf skin. This is done in various ways. The most common plan is to throw the hide or skin into a strong watery "ley" of slaked lime with lime in excess. By this, in a few days, the hair is easily detached. In America this sweating is performed cold, and the hides are hung up wet in a damp cellar, and are kept moist for ten days or a fortnight. By this a sort of mild putrefaction takes place, when hair and scarf skin are easily removed. One hundred pounds of hides will take 300 lb. of wattle bark, yielding 40 lb. to 50 lb. of leather.

A single hide may be taken from the lime water and folded up wet. The ground bark is placed in water, and may be at first a weak solution, and finishing up with a strong one. From the weak to the strong solution takes about six weeks. The final process is to fold up the hide, putting in thin layers of tanning bark, leaving it in this state for six weeks more, when the hide will be found converted into leather. In tanneries the whole process takes about a year.

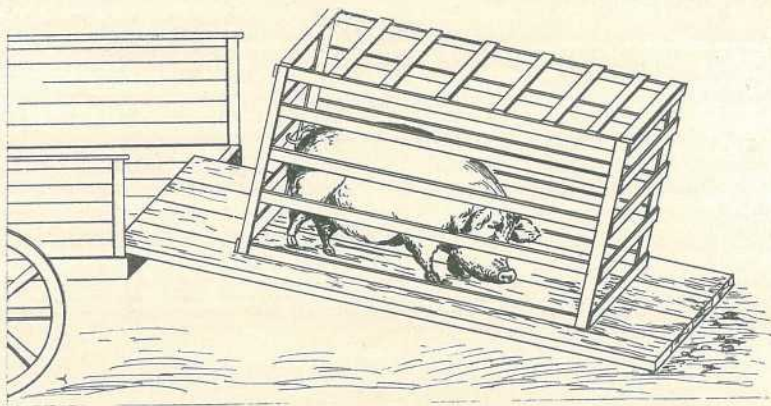
A quick method of tanning skins is the following:—Pour 5 or 6 quarts of boiling water over 2 quarts of bran, and strain the infusion. Make an equal quantity of salt water, using as much salt as will dissolve. Mix the bran and salt water, and to each gallon of the mixture (when only lukewarm) add 1 oz. of sulphuric acid. Immerse the skin in the liquor, stirring occasionally till tanned in about twenty minutes. Then rinse in clean water and hang up to dry. The leather will be white. This applies more to wallaby, rabbit, and other such skins than to heavy hides.

RED POLLS AS DUAL PURPOSE CATTLE.

The dual purpose characteristics of the Red Poll breed were demonstrated recently in England in some figures as to milk yields and weights of stock sold for beef. The twenty-three cows in the Norfolk herd of the late Mr. John Hill, of Gressenhall, have averaged for the twelve months from 1st July, 1918, to 1st July, 1919, an average yield of 8,731 lb., the figures for the leading ten being:—Gressenhall Pearl, 13,459½ lb.; Peggoty, 11,627½ lb.; Roseanna, 11,130 lb.; Red Star II., 11,179½ lb.; Molly, 10,211 lb.; Red Berry, 10,159½ lb.; Strawberry V., 9,981½ lb.; Tottie, 9,400 lb.; Southgate VI., 9,368 lb.; Rosanna, 9,299 lb. The value of Red Polls on the fat stock market was illustrated in connection with the sale of the five-year-old bull, Sudbourne King Crow, belonging to the Earl of Derby. This bull, bred from milking strains, was sold at the auction mart at Newmarket on 13th May of this year for £86 5s. 8d., and he scaled within a few pounds of a ton. No attempt had been made to fatten him, and up to the day of the sale he had been running with the cows. Another Red Poll bull, recently sold on the fat stock market at Framlingham, scaled 18 cwt., and being super-graded, realised £87 16s.

LOADING PIGS.

An American farmer, says the "South African Farmers' Advocate," loads his pigs into a wagon or truck by means of a floorless crate. Two planks, 10 ft. to 12 ft. long, make a gangway; the crate is placed over the pig, and he is made to walk backwards as shown in the illustration, up the planks. As the crate touches his nose,



he will back up the planks and into the wagon. The crate can then be fastened down with a rope. The planks can be laid from the wagon to the railway truck, and the pig loaded in the same way. The slats of the crate must be close together.

Answers to Correspondents.

TO BANISH BUGS.

In reply to a correspondent who wishes to know of an effective means of destroying bugs in a home, the Agricultural Chemist (Mr. J. C. Brünnich) advises as follows:—

"The only absolute cure is the use of hydro-cyanic acid gas, with which the rooms have to be fumigated. One treatment is generally sufficient, as both bugs and all eggs are killed, providing the rooms can be made to hold the gas for some time.

"As the gas is highly poisonous, it is best to get a person used to such work to do the fumigation; but, if care be taken, the operation can be done by anyone.

"For every 1,000 ft. of cubic space, use 9 oz. of cyanide, 12 fluid ounces of strong sulphuric acid, and $1\frac{1}{2}$ pints of water.

"The gas should be generated in earthenware vessels or in water-tight wooden boxes. Fumigate on a calm day. Make all the rooms as gas-tight as possible, closing all cracks and openings, which is easily done by pasting paper on the outside over the openings. A door or window should be so arranged as to be opened from the outside, to allow the gas to escape after fumigation is finished.

"Pour the water first into the earthenware vessel. Then add the sulphuric acid slowly and very cautiously, and, finally, the cyanide (previously broken into lumps of about half an ounce in weight) is thrown into the vessel. The weighed-out quantity of cyanide may be wrapped in a piece of paper, and the whole thrown in at once. As the gas is immediately given off, the operator must take care not to breathe when adding the cyanide, and leave the room at once. Let the gas act as long as possible—at least twelve hours. Then open all the rooms, and allow not less than an hour's interval before anyone is permitted to enter the rooms. No room should be entered as long as the peach-like odour of the poisonous gas is very pronounced."

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Sept.	No. of Years' Records.	Sept., 1919.	Sept., 1918.		Sept.	No. of Years' Records.	Sept., 1919.	Sept., 1918.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton ...	0.59	18	0.83	Nil	Nambour ...	2.58	23	0.15	3.46
Cairns ...	1.69	37	1.56	0.89	Nanango ...	1.99	37	0.29	1.30
Cardwell ...	1.44	47	1.03	0.81	Rockhampton ...	1.37	32	0.03	0.38
Cooktown ...	0.57	43	0.47	0.62	Woodford ...	2.20	32	0.18	0.98
Herberton ...	0.47	32	0.92	0.08					
Ingham ...	1.06	27	0.95	0.45	<i>Darling Downs.</i>				
Innisfail ...	3.61	38	2.86	2.65	Dalby ...	1.82	49	0.15	0.60
Mossman ...	1.01	11	2.01	0.31	Emu Vale ...	1.98	23	0.12	Nil
Townsville ...	0.77	48	0.11	0.19	Jimbour ...	1.71	31	Nil	0.38
					Miles ...	1.50	34	0.03	0.38
<i>Central Coast.</i>					Stanthorpe ...	2.51	46	0.18	0.33
Ayr ...	1.64	32	0.05	0.19	Toowoomba ...	2.28	47	0.41	0.50
Bowen ...	0.84	48	0.03	0.69	Warwick ...	1.97	32	0.16	0.05
Charters Towers ...	0.82	37	0.04	0.50					
Mackay ...	1.52	48	0.18	0.53	<i>Maranoa.</i>				
Proserpine ...	2.07	16	0.12	0.37	Roma ...	1.62	45	Nil	0.24
St. Lawrence ...	1.36	48	0.07	0.61					
<i>South Coast.</i>					<i>State Farms, &c.</i>				
Biggenden ...	1.76	20	0.02	0.29	Bungewongorai ...	1.87	5	Nil	Nil
Bundaberg ...	1.89	36	Nil	0.47	Gatton College ...	1.80	20	0.12	0.52
Brisbane ...	2.06	68	0.19	1.98	Gindie ...	0.95	19	Nil	0.51
Childers ...	2.07	24	Nil	0.82	Hermitage ...	1.73	13	0.12	Nil
Crohamhurst ...	2.53	25	0.33	3.45	Kairi ...	0.87	5	0.91	0.08
Esk ...	2.38	32	0.23	0.73	Sugar Experiment Station, Mackay	1.39	22	0.08	0.46
Gayndah ...	1.61	48	0.06	0.26	Warren ...	0.97	5	Nil	0.55
Gympie ...	2.19	49	0.05	2.95					
Glasshouse M'tains	2.19	11	0.15	1.55					
Kilkivan ...	1.78	40	Nil	0.07					
Maryborough ...	2.01	48	Nil	1.75					

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

GEORGE G. BOND, State Meteorologist.

SOCIETIES, SHOW DATES, ETC.

HERBERT RIVER.—Ripple Creek Farmers' Association. Secretary: Geo. Geeson.

HERBERT RIVER.—Macknade Farmers' Association. Secretary: Geo. Geeson.

SOUTHERN FRUIT MARKETS.

Article.	OCTOBER.	
	Prices.	
Bananas (Queensland), per case ...	...	25s. to 30s.
Bananas (Tweed River), per case ...	...	25s. to 30s.
Bananas (Fiji), per case ...	...	20s. to 30s.
Lemons, per bushel-case ...	...	10s. to 12s. 6d.
Mandarins, per case ...	...	16s. to 20s.
Oranges, per bushel-case ...	...	12s. to 15s.
Oranges (Navel) per bushel-case ...	...	14s. to 18s.
Passion Fruit, per double-case ...	...	15s. to 25s.
Pineapples (Queens), per double-case ...	...	12s. to 20s.
Pineapples (Ripleys), per double-case ...	...	15s. to 17s.
Pineapples (Common), per double-case ...	...	15s. to 17s.
Strawberries (Queensland), per tray ...	...	10s. to 24s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel-case ...	...	14s. to 24s.
Apples, Cooking, per bushel-case ...	...	10s. to 15s.
Bananas (Cavendish), per dozen ...	...	4½d. to 10d.
Bananas (Sugar), per dozen ...	...	3d. to 8d.
Cape Gooseberries, per quart ...	...	10d. to 1s. 2d.
Citrons, per cwt. ...	...	10s. to 11s.
Cocoanuts, per sack ...	...	15s. to 25s.
Custard Apples, per quarter-case ...	...	8s. to 15s.
Lemons (Lisbon), per half-case ...	...	8s. to 14s.
Lemons (Rough), per cwt....	...	13s.
Mandarins, per case ...	...	10s. to 19s.
Mangoes, per case ...	...	15s. to 18s.
Oranges (Seville), per cwt. ...	...	18s.
Oranges (Navel), per cwt. ...	...	14s. to 18s.
Oranges (Other), per cwt....	...	12s. to 22s.
Papaw Apples, per quarter-case ...	...	4s. to 12s. 6d.
Passion Fruit, per half-bushel case ...	...	9s. to 17s. 6d.
Pears, per case ...	...	14s. to 17s. 6d.
Pineapples (Rough), per dozen ...	...	4s. to 11s. 6d.
Pineapples (Smooth), per case ...	...	10s. to 15s.
Pineapples (Ripley), per dozen ...	...	9s. to 14s. 3d.
Rosellas, per sugar-bag ...	...	...
Strawberries, per dozen boxes ...	...	6s. to 25s. 6d.
Tomatoes (prime), per quarter-case ...	...	12s. to 15s. 6d.
Tomatoes (inferior), per quarter-case ...	...	3s. to 6s.

TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1919.

Animal.	SEPTEMBER.	
	Prices.	
Bullocks ...	...	£22 10s. to £30 10s.
Cows ...	...	£16 12s. 6d. to £19.
Merino Wethers ...	...	53s.
Crossbred Wethers ...	...	47s. 6d.
Merino Ewes ...	...	43s. 3d.
Crossbred Ewes ...	...	38s.
Lambs ...	...	43s. 3d.
Pigs (Porkers) ...	...	81s.

ASTRONOMICAL DATA FOR QUEENSLAND.

Times Computed by D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET. **AT BRISBANE.**

1919.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON.
Date.	Rise.	Sets.	Rise.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.3	5.33	5.30	5.47	4.59	6.4	4.46	6.27	The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania, unless "summer time" is adopted. H. M. 3 Sept. (First Quarter 12 22 a.m.
2	6.2	5.34	5.29	5.48	4.59	6.5	4.46	6.28	
3	6.1	5.34	5.28	5.48	4.58	6.6	4.46	6.29	10 " O Full Moon 1 54 p.m.
4	6.0	5.35	5.27	5.49	4.57	6.7	4.46	6.30	17 ") Last Quarter 7 32 a.m.
5	5.59	5.35	5.26	5.49	4.56	6.8	4.46	6.31	24 " ● New Moon 2 34 p.m.
6	5.58	5.36	5.25	5.50	4.55	6.8	4.46	6.32	The Moon will be in Perigee on 13th at 6.6 p.m., and in Apogee on the 29th at 3.30 p.m.
7	5.57	5.36	5.24	5.50	4.55	6.9	4.46	6.32	
8	5.56	5.37	5.23	5.51	4.54	6.9	4.46	6.33	2 Oct. (First Quarter 6 37 p.m.
9	5.55	5.37	5.22	5.51	4.53	6.10	4.47	6.33	9 " O Full Moon 11 39 p.m.
10	5.54	5.38	5.21	5.52	4.53	6.11	4.47	6.34	16 ") Last Quarter 3 5 p.m.
11	5.53	5.38	5.19	5.52	4.52	6.11	4.47	6.35	24 " ● New Moon 6 40 a.m.
12	5.51	5.38	5.18	5.53	4.52	6.12	4.47	6.36	The Moon will be in Perigee on 11th at 2.54 p.m., and in Apogee on the 27th at 6.42 a.m.
13	5.50	5.38	5.17	5.53	4.52	6.13	4.47	6.36	
14	5.49	5.39	5.16	5.54	4.51	6.14	4.48	6.37	1 Nov. (First Quarter 11 43 a.m.
15	5.48	5.39	5.15	5.54	4.51	6.14	4.48	6.37	8 " O Full Moon 8 35 a.m.
16	5.47	5.40	5.14	5.55	4.51	6.15	4.48	6.38	15 ") Last Quarter 1 41 a.m.
17	5.46	5.40	5.13	5.55	4.50	6.15	4.49	6.38	23 " ● New Moon 1 20 a.m.
18	5.45	5.41	5.12	5.56	4.50	6.16	4.49	6.39	The Moon will be in Perigee on 8th at 11.54 p.m., and in Apogee on the 23rd at 12.24 p.m.
19	5.44	5.41	5.11	5.56	4.49	6.17	4.49	6.39	
20	5.43	5.42	5.10	5.57	4.49	6.18	4.50	6.40	1 Dec. (First Quarter 2 47 a.m.
21	5.41	5.42	5.9	5.57	4.48	6.19	4.50	6.40	7 " O Full Moon 8 4 p.m.
22	5.40	5.43	5.8	5.58	4.48	6.20	4.51	6.41	14 ") Last Quarter 4 2 p.m.
23	5.39	5.43	5.7	5.58	4.47	6.21	4.51	6.41	22 " ● New Moon 8 55 p.m.
24	5.38	5.44	5.6	5.59	4.47	6.22	4.52	6.42	30 " (First Quarter 3 25 p.m.
25	5.37	5.44	5.5	5.59	4.47	6.23	4.52	6.42	The Moon will be in Perigee on 7th at 12.48 p.m., and in Apogee on the 20th at 1.36 p.m.
26	5.35	5.45	5.4	6.0	4.47	6.24	4.53	6.43	
27	5.34	5.45	5.3	6.1	4.46	6.25	4.53	6.43	The Moon will cause an annular eclipse of the Sun on Nov. 23rd, but it will not be visible in Australia. There will also be a partial eclipse of the Moon on Nov. 8th which will be visible in England but not in Australia.
28	5.33	5.46	5.2	6.2	4.46	6.26	4.54	6.44	
29	5.32	5.46	5.1	6.3	4.46	6.26	4.54	6.44	
30	5.31	5.47	5.0	6.3	4.46	6.27	4.55	6.45	
31	...	...	5.0	6.4	...	...	4.56	6.45	

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

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

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

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

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

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Orchard Notes for December.

THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry, see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carroty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish dumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit-fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry keep the orchard and vineyard well cultivated, and where the citrus and other fruit trees require it give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and consequently to carry badly.

Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

FIELD.—The wheat harvest will be now nearing completion. The estimates of the probable yield have varied so considerably that it will be well to wait until the entire harvest is over before speculating on the result. This State is a long way from becoming a wheat-exporting country. The principal factor operating against a still greater extension of the wheatgrowing industry is that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

Given favourable weather, maize, panicum, imphee, kafir corn, and the various millets may be sown.

Cotton sown in October and November will be making headway but slowly, owing to the lack of September and October rains. Keep down all weed growth by scarifying as long as the growth will admit of horse work. Tree cottons, such as Sea Island and Caravonica, should be topped and pruned.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.