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QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXV. 1 JANUARY, 1926. PART 1.

Event and Comment.

The Current Issue.

A striking message to the farmers of the State from the Minister for Agriculture and Stock (Hon. W. Forgan Smith) is a notable feature of the current issue. Cotton breeding in Queensland is described in a valuable report by Mr. Wells. Mr. Ballard discusses the Pink Boll Worm and other matters of importance to cotton-growers. His notes were prepared at the instance of the Federal Department of Home and Territories, through whose courtesy we are able to reproduce them in the Journal. Mr. Hubert Jarvis contributes an interesting progress report on his Fruit Fly Investigations in the Stanthorpe district. The work of the Department in maize improvement is described by Mr. McKeon. This month Mr. Shelton discusses hairlessness, lack of vitality, and goitre in pigs; he has also a topical contribution on pig clubs. Mr. McGrath has a useful note on the campaign for better cows; and sugar crop prospects are reviewed by Mr. Easterby. A brief report of the initial business meeting of the newly constituted Manurial Experimentation Committee and an account of the Speech Day at the Gatton Agricultural High School and College, the occasion of the deliverance of some cogent addresses, add interest to a very readable number.

Opening of the Hamilton Cold Stores.

One of the notable events of the month was the opening of the State Cold Stores at Hamilton by His Excellency the Lieutenant-Governor (Hon. W. Lennon). In the course of introductory remarks as chairman, the Minister for Agriculture and Stock (Hon. W. Forgan Smith) paid a graceful tribute to Mr. Lennon, a predecessor in office, for his great work for the agricultural industry. Mr. Lennon's term as Minister, he said, had been marked by the planning and the laying of much of the foundation of the great advance in rural organisation that had taken place in recent years. As the

originator of the idea of providing adequate ship-side cold storage for dairymen and other primary producers, it was a fitting and happy circumstance that Mr. Lennon should declare the Stores open for business.

The Lieutenant-Governor, having congratulated the Government and all who had participated in the erection of the Stores, said the works were the most up-to-date in the Commonwealth. They would be a boon and a blessing to primary producers. He was pleased to see the consummation of such a great scheme, which had been carried out with satisfaction to every one concerned. He hoped that the stores would be given generous support.

The large company present, representative of the primary industries and commercial interests, assembled later in the grading-room, where several toasts were honoured. Proposing the health of the Lieutenant-Governor, the Minister for State Enterprises (Hon. D. Gledson) said the Government expected the people of Queensland, who owned the Stores, to support them. The Stores would provide for two classes of people—the producers and the consumers here and in other countries. They were proposing to provide for the storage of fruits, particularly dried fruits, as well as other produce.

Responding, Mr. Lennon said he sincerely felt it an honour to have opened the Stores. He had taken a warm interest in the provision of ample cold storage facilities for Brisbane.

Efficiency in Industry.

In the course of a noteworthy speech at the opening of the Cold Stores, the Minister for Agriculture and Stock (Hon. W. Forgan Smith) said that Queensland was a country largely engaged in primary production. The production of butter and cheese was capable of a good deal of expansion. The dairying industry had received encouragement from all Governments. It was due to the primary producers to be given that standard of living to which every man was entitled. In 1914 Queensland had produced 37,230,240 lb. of butter; in 1924 the production had increased to 67,800,000 lb. The Queensland cheese production in 1914 was 7,931,869 lb.; in 1924 it was 13,200,000 lb. Also the quality of the produce had been carefully considered by those in the industry. It was not enough to say that Queensland produced a commodity; they had to say that Queensland could produce products second to those of no other country in the world. There was a tendency in some quarters to discount the value of efficiency in industry. No one taking that view cared anything for the prosperity of the race to which he belonged. No people could be prosperous unless their existence was based on industrious habits of that people, and that people's determination to produce the best possible products.

The Business of Farming.

On the same occasion, the Minister said that the fact that the various co-operative companies were improving the standard of their products showed that they realised the importance of placing their commodities on the world's markets so as to compete on favourable terms with the products of other countries. The Department of Agriculture had given assistance in connection with the improvement of the breed of dairy cattle. The average Queensland cow, unfortunately, was of a lower standard than it should be. Herds had to be improved, and the return to the producers would be improved. The Department had decided to assist dairy farmers by a subsidy to the extent of one-half for the purchase of better bulls. One of the most regrettable features of the primary industry was due to the fact that the dairy farmer had little or no say in determining the prices of his product. Unlike the producers in other industries, he produced for a market of which he had no foreknowledge. When the seasons were good prices were low; when prices were favourable the farmer had little to sell. The application of business methods to the primary industries would relieve the men engaged in them of many of their difficulties. He was pleased that Queensland dairy farmers were taking kindly to co-operative efforts. Much improvement could be looked for in the industry. Still it was not to be expected that everything could be accomplished in a day or two. He advised those connected with co-operative organisations not to be discouraged at any set-backs, but to look on those set-backs as an indication of the need for greater determination to attain their objective.

The Poultry Industry—Cold Storage and Stabilisation.

Speaking of the egg and poultry industry, the Minister said there was much scope for development. Those engaged in the industry would find ample equipment in the Stores to help them carry on their business. During last year the average wholesale price for eggs had been about 1s. 7d. a dozen, although they had fluctuated considerably at the retail selling end; in some cases they had gone as high as 3s. 6d. By means of stabilisation and cold storage, during periods of great production, the markets could be supplied regularly all the year round, thus ensuring a fair deal to the farmer and the general public. The value to the Commonwealth of the poultry industry was £9,250,000, of which Queensland's share was £530,000. At the present time the industry was supporting 1,000 families in Queensland, and lent itself as a valuable adjunct to all farming industries. Cold storage had been responsible for the rapid expansion in the export trade in eggs, which was valued at £2,569 in 1919, but rose in value in 1923 to £102,984. The Stores were for the people of Queensland, and the producers of Queensland, and were a tribute to the rapid expansion of Queensland's primary industries.

A Rural School on Wheels.

For some time past the Department of Public Instruction has had in operation on the railways two domestic science schools, and the success of this system of bringing modern technical training to remote rural centres has inspired its extension to the addition of a travelling manual training school carriage. If this innovation succeeds, as it is sure to do, the system will be further extended. A travelling dental clinic which will provide for the extension of regular dental services to country school children is also under consideration. The Department, through its staff of itinerant teachers who bring the benefits of modern education to remote inland hamlets and homesteads, its successful system of tuition by correspondence with isolated families in the far interior, and its later instructional innovations, is doing a great work towards improving the conditions of country life and rural social amenities generally. In effect the Department says that if the bush child cannot go to school we will take the school to him. Similarly with its domestic science and manual training cars it aims to bring sound training in arts and crafts within reach of those who otherwise would be denied, on account of the distance of their homes from the larger centres, the advantage of up-to-date technical tuition.

The Fuel of the Future.

A writer in a recent issue of "Engineering" expresses the interesting opinion that Australia may be destined to acquire a dominant position in the production of power alcohol. For the time being, he says, enough is not known of how alcohol can be produced economically from waste products to enable any definite projects to be framed. The experiments that have been going on in this country, and that it may be hoped are receiving, or will receive, the co-operation of Australian workers, have to be carried further before an industrial means of so producing alcohol will emerge. It must, however, be admitted that of the many possible sources of power the introduction of an economical basis of power alcohol is among the most fascinating. He points out that coal is ever a diminishing quantity, and that alcohol, on the other hand, is not a fossilised substance, but the product of a living growth. Theoretically, all the straw left from the wheatfields of Australia can be made into alcohol, and so perhaps can be some of the natural growths that without any sort of cultivation thrive so vigorously as to become actual pests to the districts in which they occur. That all the waste remains of wheatfields and the vast vegetable plagues of tropical countries should be turned directly into a source of power is an alternative to living on fossilised power, which is all the more attractive because the growths recur year after year as long as the sun radiates in the sky. The subject is an absorbing one, and to Queenslanders it would be most satisfactory to know that if there is no oil at Orallo there is at least plenty of "juice" in the paddock.

Bureau of Sugar Experiment Stations.

SUGAR CROP PROSPECTS.

The Director of Sugar Experiment Stations (Mr. H. T. Easterby) states that if the estimates of the several sugar-mills are realised this year Queensland shall have produced about 3,753,000 tons of cane—a record crop. It is expected that this amount of cane should yield 484,000 tons of raw sugar. In addition, the New South Wales production is estimated at 32,000 tons of sugar, and Victoria at 3,017 tons, making Australia's sugar output about 519,000 tons.

This immense output is the result of favourable seasons and a much larger acreage under cane. In the course of the past five years the area under cane has increased from 162,619 acres to 253,519 acres—an increase of over 90,000 acres. The number of canegrowers also has grown from 4,000 to upwards of 6,000 in the same period. In order that all of this large crop may be crushed, many of the northern mills will be obliged to continue operations well into 1926. Their capacity to do so depends entirely on the nature of the remainder of the season. Should a heavy wet season set in early, the mills which continue crushing after the New Year will be obliged to cease, and so leave much of the cane uncrushed.

Increase in Sugar Consumption.

The Government Statistician has given the consumption of raw sugar per capita as 138 lb. This on a 6,000,000 population basis would equal 369,000 tons of raw sugar. It is apparent therefore that the consumption has materially increased in recent years.

CANE PEST COMBAT AND CONTROL.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (7th December, 1925) from Mr. G. Bates, Assistant to the Entomologist at Meringa, near Cairns:—

Giant White Ants (*Mastotermes darwiniensis* Frogg).

This insect, one of the major cane pests, is well distributed over the Lower Burdekin, and was found in the following places:—Seaforth, Ana Branch, Jarvisfield, McDesme, Ayrdale, Pioneer, and Home Hill. Damage has also been reported from Inkerman, eight miles south of the latter place.

The termites prefer sandy soil, and at McDesme were found in abundance in a sandy ridge, yet cane close handy on heavier soil was untouched. Over twenty farms were found to harbour this pest, and in some cases the farmers were not doing anything to try and eradicate the ants. On the other hand several growers have been using a mixture of arsenic, caustic soda, and molasses, with splendid results. The correct proportions of this mixture are given in Mr. Cottrell-Dormer's report, "Queensland Agricultural Journal," July, 1925, page 9. It might be as well to repeat this formula, which is: Arsenic, 4 parts (by weight); caustic soda, 1 part (by weight, Q.D.A. formula).

These are mixed dry, and water gradually added until the whole is dissolved. For every 1 lb. of arsenic used, add two gallons of molasses. Three or four tablespoonsful of this mixture have been found sufficient to treat an average-sized fence post. Arsenic can be obtained free of cost from the Lower Burdekin Cane Pest Destruction Board.

During May, 1925, two experiments were laid out at Jarvisfield to determine the value of dehydrated tar and paradichlorobenzene, as deterrents against termites.

Dehydrated Tar Experiment.

Sets were dipped in dehydrated tar, drained, and planted with the cane planter in the usual manner. Results showed that dipping sets in pure dehydrated tar, regardless of how long they are drained, will seriously interfere with the germination of the plants. Termites did not attack the sets to any extent, although several of the untreated plants were eaten out.

Paradichlor. Experiment.

Two rows of cane, each 1 chain long, were treated with paradichlor, two days after planting. Doses of ¼ oz. were injected on both sides of the sets, 12 inches apart, 4½ inches deep, and 5 inches to the side of the plants. It was found that paradichlor, injected in this manner did not affect the germination of plants, as the treated plants "struck" as well as the rest, and no difference could be noticed in the growing plants. With regard to controlling white ants, this experiment gave negative results, as neither the treated nor control rows showed white ant damage. The previous season this block was badly damaged, but in the meantime the farmer had been poisoning the surrounding timber and fence posts with arsenic and molasses, and obtained heavy mortality.

From information gathered it seems that if poisoning is systematically carried out by every farmer, and timber cleared from the vicinity of canefields, the damage caused by white ants will be negligible. A large number of termites were collected and forwarded to Meringa for experimental purposes.

Grubs.

Grubs have not done such a great deal of damage this year, and as usual the damage is confined mainly to Ivanhoe. Growers in this locality should destroy the Black Palm, which is a feeding tree of the grey-back beetle (*Lepidoderma albohirtum* Waterh.). Beetles cannot be collected from these palms, and their destruction would force the beetles to trees from which they could be more easily collected. At Maidavale grubs were responsible for damage to young plant cane last June. A block of 1900 Seedling was planted towards the end of May, and grubs tunnelled into the sets, and later the roots and base of the young shoots were eaten, thereby killing the plants. Two acres as a result had to be replanted. The nature of the injury and general appearance of the grub points to this pest being a species of Dynastid.

Large Moth Borer (*Phragmatiphila truncata* Walk.).

By request of the Cane Pest Destruction Board, a visit was paid to several farms at Giru, where "borers" were reported to be doing a fair amount of damage.

This proved to be the large moth borer (*Phragmatiphila truncata* Walk.). Damage was most noticeable in H.Q. 426, but was also to be found in all other varieties. Farmers were advised to keep headlands clean, not to leave trash lying about, and to cut out and burn any affected shoots in young ratoons; also, if possible, to grow a harder variety than H.Q. 426.

This insect pest is to be found all over the Burdekin, more abundantly at Giru and Rita Island, and is frequently confused with the "weevil borer" (*Rhabdocnemis obscurus* Boisd.). The moth borer can be recognised as a caterpillar from 1 to 1½ inches in length; colour light purplish, indistinctly blotched with white; under surface white; head, light to dark red. The presence of moth borer in young ratoons can be noticed by the "dead hearts"—*i.e.*, the central leaves dying.

MINOR INSECT PESTS.

Bud Moth (*Opogona glycyphaga* Meyr.).

This insect, like the large moth borer, is to be found all over the Burdekin, but is of minor importance. It is, however, sometimes injurious to seed cane, as the caterpillars destroy the "eyes." Damage is more noticeable in the soft varieties, such as H.Q. 426.

Mealy Bugs (*Pseudococcus* sp.).

This insect is to be found all over the Burdekin district. It is of minor importance.

ACKNOWLEDGMENT.—The writer wishes to thank the members of the Lower Burdekin Pest Destruction Board for the invaluable assistance tendered him while in this district.

HINTS TO CANEGROWERS.

A. N. BURNS and R. W. MUNGOMERY, Acting Entomologists, Bureau of Sugar Experiment Stations, Gordonvale, North Queensland.

Grey-back cane beetles (*Lepidoderma albohirtum* Waterh.) are now emerging in considerable numbers, and may be seen every evening at dusk flying in their mating flight. After this flight, which lasts about an hour or so, they congregate on the foliage of their feeding trees, the principal of which are several species of figs (*Ficus* pilosa being the favourite one) and Moreton Bay ash (*Eucalyptus tesselaris*). Other trees are favoured, but the abovenamed will yield the most beetles. During

the day time large numbers of these insects can easily be collected from these feeding trees, as many as six or even more can sometimes be shaken from a single leaf, and in view of this many thousands of beetles may easily be destroyed by hand collecting. The advocation of collecting these notorious pests cannot be too highly emphasised, particularly where extensive areas are under cane, for when one considers that each fertile female is capable of producing from twenty-five to thirty grubs the next season—enough to eat out a stool of cane—the destruction of many thousands of these productive females must necessarily result in a considerable decrease of grubs in the ensuing season.

Regular cultivation should be carried out this month in order to have the cane free from weeds before the onset of the wet season, and the soil in good tilth so that fumigation against grubs may be carried out if necessary. A further advantage of having the soil in this condition is that it proves a hindrance to gravid female beetles about to enter the soil.

Growers whose farms are infested with the beetle borer (*Rhabdocnemis obscurus* Boisd.) should take every precaution to rid their farms of this pest. On the majority of fields burning of the trash is for the most part carried out, but in some places it is either ploughed in or allowed to remain on the surface to rot, and in this way to conserve the amount of organic matter in the soil. In badly infested fields, however, it is essential that the practice of burning the trash should be universally adopted. Not only is it sufficient to clean up the trash in this manner, but also old sticks of cane and sometimes bundles of cane that have been overlooked in the harvesting operations as well as the stout butts of cane tops, should be raked up into rows at regular distances and thoroughly burnt, thus getting rid of all possible breeding grounds which normally tide the borer over the period between harvesting and the time when the young ratoons begin to make cane.

Where a regular "pick up" is not carried out by the mill authorities, individual growers should from time to time, and especially at the end of the crushing season, gather up all cane that may have fallen from the trucks when passing through their fields, and have it destroyed, for otherwise in this manner pests such as the beetle borer may readily be transferred to clean areas and make the whole district a centre of infestation.

In centres where beetle borer infestation has become particularly heavy, a small block of cane about ¼ acre in area should be left to stand over for the introduction of Tachinid flies, and a communication be sent to the entomologist at Meringa. It is to be regretted that Tachinid flies in our breeding cages have suffered severely from an entomogenous fungus, and many have been killed, thus delaying liberations, but it is hoped that further liberations will shortly be made.

(*Continued on page 45.*)

Photo.: L. Vidler.]

PLATE 1.—THE PICTURESQUE BRISBANE RIVER, A GUM-SHADED BEND AT DUTTON PARK.

MAIZE IMPROVEMENT.

By C. J. McKEON, Assistant Instructor in Agriculture.*

Several maize plots, which had not reached maturity when the previous report was submitted, were harvested, and the following quantities of seed were selected:—

34½ bushels Golden Beauty, ex H. Ind, Beaudesert.
54½ bushels Golden Beauty, ex G. B. Mouatt, Kilcoy.
6½ bushels Golden Beauty, ex H. Schen, Kilcoy.
30 bushels Golden Beauty, ex W. Beverley, Boonah.
31½ bushels Funk's 90-day, ex J. Brent, Boonah.

A 3-acre plot sown with seed selected from Atherton maize was also gone over, but was found to be too uneven in type, and possessing too many other undesirable features to be worth further trial.

General.

Apart from the districts visited in connection with maize improvement work, to which the majority of the time was devoted, the following places were also visited:—Kilcoy and Gayndah to plant up, report on, and harvest dairy and pig fodder variety trials on G. B. Mouatt's and D. E. Greggery's farms respectively. Particulars of growth were secured, and small areas of each variety were harvested for arriving at the yield. Toowoomba was visited to witness a trial of the Eclipse maize harvester; Imbil and Kilcoy, to take particulars of and report on potato variety trials on A. H. Ernst's and J. Tinney's farms respectively; Gympie, to report on the quality of the land in response to an inquiry by W. Lang *re* fertilising pastures; and Atherton, in connection with the proposed maize improvement scheme.

Seed Maize Improvement.

Although the past season was an abnormal one in most maize-growing districts, the results on the whole have not come up to expectations, due to excessive rain, the heat-wave during February, and, in some districts, to early frosts. The mice plague was also responsible for a considerable amount of damage.

Many of the early sown plots suffered considerably from floods, and in some cases these were completely destroyed. Blight made its appearance in a number of plots during the cobbing stage, and reduced the yields greatly.

Owing to the sodden nature of the ground, plantings were rather late in some districts, particularly the Murgon district, through the farmers being unable to get the land prepared. In some cases the land was ploughed as many as four times, but rain fell immediately after each ploughing, and before the land was dry enough to work weeds had made such headway that another ploughing was necessary. The resultant crops were spoiled by the early frosts.

Mice were, more or less, bad in all districts, and one plot of Star Leaming at Boonah was completely eaten out. Arrangements were made for twenty-eight individual plots at Kilcoy, Boonah, Hivesville, Stanthorpe, Murgon, Imbil, Beaudesert, and Manyung. These totalled 161 acres, and comprised the following varieties:—Funk's 90-day, 24 acres; Reid's Yellow Dent, 22 acres; Star Leaming, 22 acres; Leaming, 13 acres; Funk's Yellow Dent, 32 acres; Golden Beauty, 7 acres; Red Hogan, 5 acres; and Improved Yellow Dent, 36 acres.

An "ear to row" test of each variety, with the exception of Red Hogan and Leaming (Ryan), was sown. Of the 161 acres arranged for, 10 acres were not sown, 2 acres were completely destroyed by flood waters when nearly ripe, 13 acres failed owing to tasselling during the heat wave, 3 acres were eaten out by mice, 11 acres were flooded and failed to germinate, 16 acres were cut by early frosts when the grain was in the milk stage, 10 acres were badly affected with blight and failed to develop ears, and 4 acres of an otherwise excellent crop were of no use for seed purposes, owing to the grower planting another variety at the same time, and both crops tasselled much at the same time. This makes a total of 69 acres, or over 40 per cent. of the total acreage arranged for.

The peach moth, which did so much damage last year, did little or no damage this season.

Funk's 90-Day.—Two plots of this variety, one at Hivesville and another at Kilcoy, did exceptionally well, but, unfortunately, only portion of the latter was harvested owing to flood waters covering the field to a depth of about 4 feet, on three different occasions just as the crop was ripening. The former crop gave

*Abridged from the Annual Report of the Under Secretary (Mr. E. Graham) to the Minister for Agriculture and Stock (Hon. W. Forgan Smith) for presentation to Parliament.

splendid results, and over 30 bags of seed were secured. The grower was asked to advise this office *re* the quantity of seed threshed, but this information has not come to hand to date. It is estimated that the crop would yield at the rate of about 70 bushels per acre.

The all-round improvement shown in this variety is highly satisfactory. Ripening is much more even, and the period of maturity is becoming shorter each season. The "ear to row" test plot and the surrounding propagation plot were sufficiently mature to harvest and store in the barn in 107 days from the date of germination.

The highest yield in the "ear to row" test plot was 57·14 bushels, and the lowest was 35·87 bushels, per acre. Considering the way this plot suffered from flood waters these yields can be considered very satisfactory. The type of grain, on the whole, was very good, and the colour fairly even; only a very small percentage of reddish-tinted grain being noticeable. The husk covering, although still weak, shows an improvement.

Funk's Yellow Dent.—Thirty-two acres of this variety were sown, but only one plot of 14 acres reached maturity, and this is only a light crop. Two other plots failed to germinate, and a 10-acre propagation plot and an "ear to row" test became badly affected with blight just after tasselling, and failed to develop ears of any size.

Reid's Yellow Dent.—None of the yields from the bulk plots come up to some of the previous season's yields. Three plots made great growth and promised to give heavy yields, but two of these were checked by blight, one very badly, and the third plot, which gave a very fine yield, had to be abandoned for seed purposes owing to another variety tasselling too close to be certain that cross-fertilisation had not taken place. The best yield was approximately 60 bushels per acre.

The highest yield from the "ear to row" test plot was 109·99 bushels per acre, and the lowest yield 45·18 bushels per acre. As usual the type of grain was very even. Husk covering was fair, and the height and direction of the ears was good.

Star Leaming.—Of the four plots sown two failed, but the remainder did very well, the type of grain and size of ears being particularly good. From one crop in the Mary Valley over 50 bushels per acre were threshed, and were it not for the fact that, at the very least, 30 per cent. of the crop was damaged by stock breaking in on several occasions, the yield would have been about 80 bushels per acre. Another plot at Beaudesert turned out very well, and, although a considerable number of plants were flattened and the ears ruined by a cyclone, yielded approximately 65 bushels per acre. The field characteristics were very good. Only seven rows of the "ear to row" test were harvested, the remainder being too badly damaged to be of any use for comparison purposes. The best yield was at the rate of 90·36 bushels and the lowest 69·09 bushels per acre.

Golden Beauty.—This has proved to be one of the hardiest of any of the varieties and does well in any district that it has been tried in. In the past the most undesirable feature was the height of the ears on the plant, but, as a result of continuous field selection, a gradual improvement has been noticed each year, and the majority of the ears are now borne about the middle of the stem. The type of grain is very even, and appears to be more fixed than any other variety, with the exception, perhaps, of Reid's Yellow Dent.

None of the bulk plots have been harvested to date, but the best of these will yield between 60 and 65 bushels per acre. The "ear to row" test was harvested, the highest yield being 69·09 bushels per acre, and the lowest yield 38·98 bushels.

Improved Yellow Dent.—Arrangements were made for sowing 36 acres of this variety, but one plot of 8 acres was not sown owing to continuous wet weather, and a 10-acre plot, planting of which was delayed by the same cause, was cut by frosts when the grain was in the milk stage. The remainder, including the "ear to row" test plot, has done well, but none have yet been harvested.

Red Hogan.—Only one plot was sown, and although it yielded fairly well the type of grain did not show any improvement. The ears are of good size, and the depth of grain is good, but the type is very uneven. This variety, or possibly the strain, appears to be very subject to mould, as this appears each season, and in any district, even though the season may be a very favourable one for drying maize.

Leaming.—Two plots totalling 13 acres were sown, but both gave very poor results. The weather conditions during tasselling were not the best, but were not sufficiently bad to be wholly responsible for the poor results.

Although the stalks were very light and short, the growth made up to the tasselling stage was very fair. The ears were very small and the grain rather shallow.

Ears were borne very low, many being no more than 2 feet from the ground. Sufficient seed was selected for further trials.

"EAR TO ROW" TEST—REID'S YELLOW DENT.

Row No.	Yield per Acre. Bushels.
402 x 141	67·77
402 x 142	78·40
402 x 143	100·99
402 x 144	59·79
402 x 145	45·18
402 x 146	55·81
Check	57·14
402 x 147	66·44
402 x 148	85·04
402 x 149	74·41
402 x 150	58·46
402 x 151	51·82
402 x 152	47·83

Sown 10-9-24; ripened 10-2-25; period of maturity 147 days.

"EAR TO ROW" TEST—GOLDEN BEAUT

Row No.	Yield per Acre. Bushels.
410 x 121	45·18
410 x 122	61·12
410 x 123	58·46
410 x 124	61·12
410 x 125	46·50
410 x 126	39·86
410 x 127	38·98
410 x 128	53·15
Check	55·81
410 x 129	47·83
410 x 130	63·78
410 x 131	66·44
410 x 132	69·09
410 x 133	51·82
410 x 134	59·79
410 x 135	43·85
410 x 136	49·16

Sown 13-11-24; ripened 15-4-25; period of maturity 149 days (5 days allowed for germination).

"EAR TO ROW" TEST—STAR LEAMING.

Row No.	Yield per Acre. Bushels.
403 x 126	71·75
403 x 127	71·75
403 x 128	82·38
403 x 129	90·36
Check	63·78
403 x 131	73·08
403 x 132	69·09
403 x 133	69·09
403 x 134	Too badly damaged by cyclone to take weights.
403 x 135	
403 x 136	
403 x 137	
403 x 138	
403 x 139	
403 x 140	

Sown 8-10-24; ripened 25-2-25; period of maturity 135 days (5 days allowed for germination).

"EAR TO ROW" TEST—FUNK'S 90-DAY.

Row No.	Yield per Acre. Bushels.
413 x 41	50·5
413 x 42	47·83
413 x 43	54·48
413 x 44	57·14
413 x 45	35·87
Check	40·52
413 x 46	42·52
413 x 47	41·19
413 x 48	Destroyed by flood.
413 x 49	
413 x 50	

Sown 14-10-24; ripened 3-2-25; period of maturity 107 days.

FRUIT FLY AND OTHER ORCHARD PESTS IN THE STANTHORPE DISTRICT.

By HUBERT JARVIS, Entomologist.

Mr. Hubert Jarvis, Entomologist, Stanthorpe District, has supplied the following progress report to the Chief Entomologist (Mr. R. Veitch, B.Sc., F.E.S.), covering the months of August, September, and October, 1925:—

FRUIT FLY.

Field Experiments.

The fruit fly cages erected over fruit trees in the orchard of Mr. J. W. Barlow, and referred to in my previous repots, have, during the months of August, September, and October, been periodically examined.

On 27th August these cages were visited in company with the Chief Entomologist, Mr. R. Veitch, and four fruit fly puparia were taken from under the fruit in one cage. When found they appeared to be healthy. Examination, however, proved three to be dead and one possibly alive.

On 7th October a portion of the soil in each of the above cages was put through a sieve, but not a single fruit fly puparium was discovered, nor were any empty pupa cases found.

No fruit flies have hatched in either of these field cages to date; this failure of any fruit flies to hatch in either of the above cages under almost normal natural conditions would seem to indicate that it is not the habit of the fruit fly (*C. tryoni*) to overwinter as a maggot or as a pupa in the "Granite Belt." Many hundreds of fruit fly maggots must have been present in each of these experimental cages. If the habit of the fruit fly is to overwinter as a pupa in the soil in this district, it is certainly remarkable that not a single fruit fly has so far emerged this season in these cages, notwithstanding the fact that the fruit fly is now again within the district.

On 30th October two fruit flies (*C. tryoni*) were trapped with "Harvey's lure" within the district; this is, to my knowledge, the first appearance of the fruit fly this season, about a fortnight later than last year.

On 15th October Dr. T. Bancroft, of Eidsvold, reported fruit fly hatching from citrus fruit at Eidsvold. He, moreover, forwarded me specimens of the fruit fly, and also fruit containing maggots.

Excursion to Taloom Scrub, New South Wales.

It was suggested at an Interstate Fruit Fly Conference held in Stanthorpe last June, and at which Mr. W. B. Gurney, Government Entomologist, New South Wales, and Mr. W. Allan, Fruit Expert, were present, that an excursion be made to the Taloom Scrub, situated in New South Wales (the entomologists of both Queensland and New South Wales co-operating), in order to search for any native host fruits of the Queensland fruit fly that might be growing in this scrub.

Accordingly, on 26th October, the visitors from New South Wales were met at Stanthorpe and driven by car to the Taloom Scrub.

Two days were spent in the scrub searching for native fruits, fruiting trees, and shrubs, and a fairly large number were collected and handed over to the botanist, Mr. R. Anderson, for identification. Mr. Anderson's report on same is not yet available. Fruit fly maggots were discovered in the berries of the Cheesewood tree (*Acronychia laevis*), and it is possible that these maggots will prove to be those of the Solanum fruit fly (*C. tryoni* var. *solani*).

Mr. W. B. Gurney, Government Entomologist, New South Wales, bred, in 1910, large quantities of fruit flies from Cheesewood berries. Some of these flies he has recently sent me, and examination proves them to be a fruit fly other than our Queensland fruit fly (*C. tryoni*). The specimens sent had been fourteen years in alcohol, and it is difficult to state with certainty whether they are the Solanum fly or a new species.

The Taloom Scrub occupies a belt about 3½ miles wide by 60 miles long, and it is, of course, impossible in two days to secure anything like a complete list of the fruiting trees and shrubs which may be growing in this area.

Again, at the time of the year that the investigation was made, there were comparatively few ripe fruits present in this scrub. This applies to most of our southern scrubs.

I am, however, of the opinion (after my brief acquaintance with the Taloom Scrub) that its potentialities in regard to fruit fly breeding and dissemination are very great. Traps were set in and on the border of the scrub and baited with "Harvey's lure," but no fruit flies were caught.

The Woolly Aphis Parasite (*Aphelinus mali* Hald.).

The first hatchings of this useful parasite recorded in the field this season were as follows:—Mr. B. Teale (The Summit) saw several Aphelinus active on his trees as early as 24th August. One of these he caught and submitted to me for identification. On 31st August Mr. A. H. Paget reported Aphelinus in numbers on his trees at work on the Woolly Aphis.

The first insectary hatchings recorded by Mr. S. M. Watson (assistant) were on 21st September, on which date eight insects emerged from the material placed in the breeding cage last autumn. From 21st September daily hatchings were recorded until the end of October.

The following is a list of the orchardists who have received the Woolly Aphis parasite this season, to end of October:—

Orchardist.	Locality.	Number Received.
F. Naylor	Applethorpe	30
J. Sewell	Applethorpe	30
E. O. Elwood	Applethorpe	15
H. J. Stanton	Eukey	30
R. Jolly	The Summit	25
J. M. Hannigan	Kyoomba	32
F. Beerling	Amiens	20
J. Board	Applethorpe	30
M. Jones	Kyoomba	60
A. S. Pringle	The Summit	30
J. Henderson	The Summit	30
—. Scott	Pozieres	25
J. Linneker	The Summit	40
J. Passmore	Stanthorpe	20
R. Ward	Broadwater	15
W. J. Long	Glen Niven	30
G. Sims	Applethorpe	30
J. Treymayne	Stanthorpe	30
R. Taggart	The Summit	30
A. Hall	Cannon Creek	30
T. Grant	Mount Tully	20
P. M. Kelly	Dalcouth	30
J. Murray-Prior	Reeves Gully	25
C. C. Sparrow	Pozieres	30
O. Phillips	Thulimbah	20
L. P. A.	Dalveen	100
G. Ramsay	Wyberba	20
Hall Brothers	The Summit	30
J. R. Taggart	The Summit	30
J. P. Halloran	The Summit	25
—. Lee	Broadwater	25
T. J. Thompson	Sugarloaf	20
C. Lister	Applethorpe	20
E. H. Little	Applethorpe	40
H. F. Stockton	Applethorpe	50
	Total	965

Woolly Aphis Parasite.

Two fairly large apple trees have been placed in the insectary and infested with Woolly Aphis. The Aphelinus is now at work on these trees, and it is hoped thus to have a continuous supply.

In regard to the usefulness or otherwise of this parasite in the orchards this season, it is, of course, too early to state an opinion. Reports from various sources are a little contradictory. In some orchards the parasite appears to have over-wintered and made a good start. In other orchards again, in which the Aphelinus was undoubtedly firmly established last season, it has failed to appear this season.

The Woolly Aphis is, of course, bound to get ahead of the parasite at first; this was noticeable last year. Later in the season, however, the parasite will usually catch up with and destroy the Aphis, cleaning the trees before the fruit is ripe.

Should the Woolly Aphis remain two or three months on the tree before being destroyed by the parasite, the usefulness of the latter is questionable, as the Woolly Aphis can, if unchecked, do a great deal of harm to an apple tree in three months; in fact, it is claimed that Woolly Aphis can entirely kill an apple tree if left unchecked for twelve months.

The female Aphelinus has been kept alive under laboratory conditions for twenty-one days; the artificial food used was honey and water.

I am indebted to the members of our local inspectorial staff for aiding also in the work of distributing the parasite.

Last July application was made by Mr. F. Wort, of Raby Bay, Cleveland, for a consignment of the Woolly Aphis parasite.

Mr. Wort was desirous of giving the parasite an opportunity to attack the Black Citrus Aphis, so injurious to the young foliage of his orange trees. A supply of the parasite was accordingly sent to him in July last, and an additional supply later. Mr. Wort, who was successful in rearing a good number of Aphelinus from the material sent him, writes as follows:—"The first insects emerged on 4th August, and to date, 7th September, I have released upwards of fifty."

This is the only attempt, to my knowledge, yet made in Queensland to introduce *Aphelinus mali* to the dark-coloured Citrus Aphis, which, according to New Zealand reports, it will attack, and I am much indebted to Mr. Wort for the trouble he has taken in the matter, and trust that he may obtain satisfactory results.

Several efforts were made this season to induce the Woolly Aphis parasite to attack the Black Peach Aphis (*Myzus* sp.), which is such a destructive pest in the Stanthorpe district. I have as yet, however, no record of *A. mali* attacking Peach Aphis.

Paradichlorobenzene Experiments.

Further experiments with this soil fumigant have been made at Ballandean and The Summit, with the object of controlling the Woolly Aphis of the apple (*Eriosoma lanigera* Hausm.) on the roots of the apple trees, and also the Black Aphis of the peach.

In regard to the latter aphis, our experiments have proved a little disappointing, but although we cannot claim a control of the Peach Aphis, yet results seem to indicate that treatment of the roots of the trees subject to aphis attack with paradichlorobenzene is partially effective, and I consider that further experiments should be made next year at earlier dates.

OTHER INJURIOUS INSECTS.

Codling Moth *(Cydia pommonella).*

The first insectary hatchings of the Codling Moth were on 7th October. In the departmental field cages, however, hatchings were earlier, viz., 18th September.

Apple Weevil *(Orthorhinus cylindrirostris).*

Inspector St. J. Pratt submitted specimens of this insect from the Broadwater district causing damage to apple shoots and small branches.

I have already recorded this beetle from Dalveen similarly associated with the apple (vide Report, September-October, 1924), and I have also found the larva of this beetle (commonly known as Elephant Beetle) boring in grape vine wood, and the adult insect was bred out in the insectary.

Since the above record I have found this beetle breeding abundantly in native "Stringy Bark" timber.

I do not think that it is likely to become a pest in relation either to the apple or the vine, and the ordinary arsenate of lead spray should prove effective in controlling it.

Apple Case Moth.

A case moth larva (*in situ*) was on 27th August brought to this office by Inspector St. J. Pratt; this case moth, which was associated with the apple, is of a species unknown to me, and it is hoped to breed out the adult moth for identification.

Greedy Scale *Aspidiotus* (Hemiberlesia) *Camelliae* Sig.

I am indebted to Mr. H. M. Jones, of Broadwater, for submitting specimens of pear wood infested with a scale insect very similar in appearance to the San Jose Scale. Specimens were forwarded to Mr. H. Tryon, Government Entomologist and Pathologist, who identified the scale insect, and who reports as follows:—

> The scale insects, infesting the wood of the pear, are of much interest, not as being an uncommon kind of Coccid, but as being associated with the tree on which it has been met with, for, notwithstanding it has a very large and varied number of host-plants, I cannot recall having myself seen it upon the pear, nor of anyone else having reported its occurrence in this association.
>
> It is named *Aspidiotus* (Hemiberlesia) *Camelliae*, Signoret, but is also known as *Aspidiotus rapax*, Comstock, the term *rapax* having reference to its rapacious appetite, so to speak, or rather the extensive range amongst plants figuring in its dietary, a feature commemorated in the popular designation "Greedy Scale," that was often formerly bestowed upon it.
>
> It is one of those scale insects that might be readily mistaken for the Pernicious or San Jose Scale (Aperniciosus), but the adult insect is rather larger and has a much more swollen "cover," the general colour of which is more in harmony with that of the bark than happens in the case of this more notorious pest.
>
> The Greedy Scale yields to the same treatment as does the Pernicious or San Jose one, but may be more readily destroyed. However, it is a less harmful pest since it does not instil a poison into its victim whilst feeding.

Fungus Diseases.

During the months covered by this report many fungus diseases of the apple, pear, and peach have been submitted to this office by various members of the inspectorial staff, and forwarded to the Government Entomologist and Pathologist, Mr. H. Tryon, whose reports on the same have been duly received.

Concluding Remarks.

From 31st August to 23rd September I was away on leave of absence. During this period Mr. S. Watson was in full charge of laboratory and field experiments, and ably met every demand on his services.

THE KILLING OF GREEN TREES WITH ARSENICAL POISON.

In response to several inquiries on the subject, this note is reprinted from a previous issue. Trees, of course, should not be killed indiscriminately.

The trees to be killed with arsenical poison are first rung or "frilled" by making downward cuts with the axe completely round the tree, 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 to 12 inches 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 feet diameter may require about one 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 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 3 lb. of washing soda or 2 lb. 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 2 lb. caustic soda thoroughly in the dry state, and add gradually and carefully water.

Sufficient heat is generated to dissolve the whole of the arsenic. Make up to 4 gallons, and finally stir in ½ lb. whiting, which latter indicates readily which trees have been treated. If washing soda is to be used mix 1 lb. of arsenic and 3 lb. of washing soda into a paste with some water, add about 2 gallons of water, and boil for half 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 poisoned 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.

MILK AND PUBLIC HEALTH.

By L. VERNEY, Dairy Inspector.

The value of milk as a food has never been fully appreciated, and the tendency appears to be towards its curtailed consumption in its natural form. This is explained when we consider the convenience of the many preparations offered consumers as substitutes for liquid milk, but it is hardly conceivable that in the case of the requirements of invalids and infants preference would be given to the prepared forms. The superiority of cream fresh milk is incontestable, and dairy farmers and those engaged in the milk business should be able to count upon the support of all municipal authorities and other organisations actively interested in the welfare of invalids and children. The several herd book societies concerned in the breeding of high-class dairy animals could with advantage co-operate in any scheme for increasing the demand for new milk. We live in an age of propaganda, and not even milk, the irreplaceable produce of the cow, can escape the risk of neglect if nothing is done to proclaim its virtues to an indiscriminating public.

Much has been said of late on the matter of milk distribution, and present methods could certainly be improved upon. Hygienic practice is to supply milk in sealed bottles or glass jars. This method also has its drawbacks unless distributed from a central depôt under the control of the authorities where strict supervision is exercised. Milk that conforms to a high standard only should be allowed to go into consumption. Even bottled milk sold by dairymen may not always be pure or wholesome. The mere fact that milk is delivered in bottles where no supervision is exercised means little or nothing in respect to freedom from harmful contamination; it only implies that contact with external impurities cease with the sealing of the bottle. This, of course, is an appreciable consideration, but it does not discount or correct imperfections already present before the milk is bottled, and in this way the mere fact of milk being purveyed in bottles may only tend to allay suspicion and not prove an absolute safeguard against impurity and inferior quality. These imperfections would be eliminated when the milk is treated and bottled by a central authority and the consumer assured of a pure commodity free from dust, germs, or any other deleterious matter. In order to avoid the risk of disease, it is necessary that milk should be pasteurised before going into consumption. It is common knowledge that disease and contagion may be transmitted through milk, consequently great care should be taken in every department from the time of milking until it is consumed. Milk will one day be sold according to its grade and quality, a system that should appeal to all classes of people, especially to those with little children.

It is most important that those responsible for the production of milk should remember that two things are most necessary in order that a pure supply may be forthcoming, viz.—

1. To prevent the absorption of foul odours.
2. To prevent the development in the milk of living organisms that are liable to cause taint.

The first can be accomplished by not feeding the cow with taint-inducing feeds, and by keeping the milk in a pure atmosphere. The second result can be obtained by "cleanliness." Dirt and filth are so intimately connected with bacteria in nature that germ life can be largely excluded by keeping out dirt. This cannot be emphasised too strongly.

THE CAMPAIGN FOR BETTER COWS.

HERD TESTING—GOVERNMENT ENCOURAGEMENT.

C. McGRATH, Supervisor of Dairying.

The Department of Agriculture appreciates the interest taken by Local Producers' Associations in dairying centres in the matter of herd testing, as evidenced by the receipt of upwards of 100 applications through Local Producers' Associations for the services of departmental herd testers for 1925-1926 herd testing season.

The scheme inaugurated by the Department of Agriculture and Stock for a production test of all dairy cows is free of cost to the owners. Every encouragement is given, and facilities are placed in the way of all dairy farmers to enable them to avail themselves of the services of official herd testers, and all dairy farmers are advised to co-operate with the department by embracing the opportunity offered.

It is realised that the unfavourable weather conditions that prevailed during September and October last have delayed other centres from joining the campaign for better cows.

A Sure Foundation for Success in Dairying.

Systematic testing of dairy herds is the chief factor in securing efficient service from each cow—fed, milked, and cared for. A herd of profitable dairy cows properly cared for is the sure foundation on which a successful dairy business can be built.

All primary producers interested in the dairy industry should become interested in ascertaining what their cows are doing. They will become more interested when they co-operate with the official herd testers, and keep records of the production of each cow.

Before the testing season is over some cows will be found to disappoint, while other animals will surprise by the way they hold out in production and by test.

Progressive dairy farmers believe it pays to test their cows and submit their herds to a production test.

Every dairy farmer should know the cows that are making a profit and those that are being kept at a loss. Such information can be obtained by taking advantage of the herd testing scheme inaugurated by this department.

The day has arrived when mere guess work by dairy farmers must be superseded by the adoption of the business method of herd testing, the objective being to keep fewer but better cows, to reduce expense, and increase income. Cow testing associations should, therefore, receive every encouragement, and much good can be accomplished by such activities.

The Negative Side.

There are things that herd testing organisations cannot do. They cannot compel a dairyman to destroy or sell to the butcher the inferior cows in his herd if he desires to keep them. They cannot compel him to buy a better bull and to select and rear heifer calves from high producers only. They cannot make him provide and store feed and feed according to production.

The work and results of herd testing associations will, however, point the way, and urge the dairy farmer to direct his attention to the economical importance of his dairy herd, and of his dairy farm, and of the value of his own time, and assist in ensuring prosperity in his business.

The better bull campaign, the method of disposal of the unprofitable dairy cows, and the conservation of fodder on the dairy farms should receive the attention of local producers' associations in dairy centres with a view to the formulation of an organised and comprehensive and practical scheme for making more effective the work of the herd testing officers.

Things Already Done—Dairymen Working in the Dark.

The following extracts from the annual report of the herd testers, covering the 1924-1925 period, will be of interest to dairy farmers.

It is a summary of the work done, and provides evidence of the fact that a great number of dairymen are working in the dark.

A perusal of the figures quoted should stimulate a desire in every dairy farmer to seek the enlightenment afforded by a system of recording individual yields of animals comprising their dairy herds. Such knowledge makes for progress and ultimate success:—

The number of herds submitted under the department's herd testing scheme was 994, comprising 21,918 cows, an increase of 76·5 per cent. over previous records.

The average daily yield of milk per head of all cows tested was 16·79 lb.

The average daily yield of milk per head of the highest producing herd tested was 46.1 lb.

The average daily yield of milk per head of the lowest producing herd tested was 6.5 lb.

One individual cow produced 65·25 lb. of milk in twenty-four hours. This is the highest individual yield recorded under ordinary herd testing conditions.

The average daily production of butter fat per head of all cows tested was ·68 lb.

The highest individual daily yield of butter fat was 2·28 lb., and the lowest ·13 lb.

The number of herds submitted to tests in the Darling Downs area was 334, comprising 7,340 cows. This was the largest number tested in this district to date. The results bear a favourable comparison with those of other dairying districts visited by the herd testers. The average yield of milk and butter fat per cow is well above the average of all herds tested, while the highest producing individual herd, also the highest producing individual cow, were within the Darling Downs area.

In the North Coast area 264 herds, comprising 5,680 cows, were submitted to test. Some individual herds well above the average production are located in this area.

In the Kingaroy district 149 herds, comprising 3,226 cows, were tested. Some excellent dairy herds, the property of progressive dairymen, were submitted for testing, which accounts for an average production next to that of the Darling Downs.

In West Moreton the operations of the herd testers were confined to a limited area within this important dairying district, in which 133 herds, comprising 3,426 cows, were tested. Some good dairy herds are located in this area.

On the Gayndah line weather conditions checked testing activities, which diminished after a heat wave. The work ceased early in April. Eighty-three herds, comprising 1,651 cows, were partly tested.

Testing in the Mount Perry district was confined chiefly to Gin Gin and Tirroan, where thirty-one herds, comprising 595 cows, were tested.

Production below the Payable Line.

A comparison of the average production of the highest yielding herd with that of the lowest producing herd tested, and by comparing the highest individual yield with the lowest individual yield, provides convincing evidence that there are many herds of dairy cows with an average production well below the payable line, and that there are individual cows in many dairy herds that do not pay for the labour of milking.

SUMMARY OF YEAR'S OPERATIONS.*

Number of herds tested	994
Number of cows tested	21,918
Daily yield of milk in tested herds—	lb.
Mean	16·79
Highest	46·1
Lowest	6·5
Butter fat content of herd milk—	Per cent.
Mean	4·08
Highest	6·25
Lowest (once-a-day milking)	2·3
Daily amount of butter fat produced in herd—	
Mean	·68
Highest	1·60
Lowest	·29
Amount of milk yielded by individual cow daily—	lb.
Highest	65·25
Lowest	2·0
Amount of butter fat yielded by individual cow daily—	
Highest	2·28
Lowest	·13
Butter fat content recorded—	Per cent.
Highest	10·6
Lowest (once-a-day milking)	1·2

*From Annual Report, 1924-25, Department Agriculture and Stock, Queensland.

HAIRLESSNESS, LACK OF VITALITY, AND GOITRE IN PIGS.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

A number of instances have come under notice in which farmers have suffered severe losses from absolute lack of vitality in certain litters of pigs, and in some of these cases the suckers were the progeny of sows kept under exactly the same conditions. In other instances it appeared to be only the progeny of certain sows that have exhibited these indications of bodily weakness. In some cases the pigs thrive admirably for the first three, four, or even the first six or seven weeks; they then begin to fade away, dropping off one by one until the bulk, if not all, have died. There does not appear to be any specific disease present in these cases, though in one or two instances it was evident that the sow had suffered from an inflammation of the udders and had possibly developed the trouble commonly referred to as milk fever, and had not regained her normal milk supply, but in most instances both the sow and her progeny appeared normal up to the stage referred to.

The writer is convinced that these are cases in which the lack of vitality indicated a serious lack of nutriment in the food, possibly a lack of vitamines, those strength-giving units in our food about which we have heard so much in recent years. Prior to coming to Queensland several cases of hairlessness in newly-born pigs were investigated, this latter trouble apparently being associated with the development of goitre, a peculiar disease about which we know all too little. Professor John M. Evvard, one of the most prominent of American authorities on hog raising, has recently been devoting a good deal of time to a study of that trouble. Answering a correspondent recently he referred to the trouble in this way:—

Iodine such as is contained in the potassium iodide and sodium iodide, recommended as additions to mineral mixtures for pigs, is of immense importance in promoting the right kind of uter or prenatal development. If there is not enough iodine in the ration, then the absence of this material will show itself in the resulting pig crop. In this connection we are wondering if you have ever noticed any hairless pigs in your herd? Hairlessness in the new-born pigs is, in a great many cases, due to an insufficient amount of iodine in the ration. Potassium iodide carries approximately 76·45 per cent. of iodine, and sodium iodide carries in round numbers 84·66 per cent. of iodine.

In three different experiments carried on at Ames, Iowa, U.S.A., wherein the only difference between the rations compared was a small amount of potassium iodide fed, we secured an average of 10 per cent. greater gains with a 10 per cent. lesser feed requirement where the iodine was added to the ration of young growing and fattening pigs. There is less chance for iodine deficiency in the sows kept out on pasture in the summer time. Lack of iodine in the ration caused the pigs to be carried overtime, hence the sows were late in farrowing. The question of exercise is one of importance also with sows having difficulty at farrowing time and in cases where the birth of the pigs is unduly delayed, inasmuch as pampered sows, those which are not permitted to exercise properly, are more likely to be slow in giving birth to their young than those pregnant sows which are allowed to have wider range. Professor Evvard has also recently contributed to the "Chester White Journal" a further report of the experiments conducted at Ames, and as this is of immense importance to pig-raisers here we take the liberty of reproducing these articles in full. The first of this series of articles was reprinted in the November Journal and will be found on page 448 of that issue. On the following pages is a reprint of the second of the series.

PROFITABLY FEEDING IODINE TO SWINE—II.

BY JOHN M. EVVARD.*

It is the purpose of this article to present some evidence that in one locality of this widespread goitrous area of the United States—namely, Ames, Iowa—the addition of iodine to the ration of young growing swine is good practice—this in spite of the fact that in the fifteen years of the senior author's experimental experience at the Iowa Station no recognisable goitre symptoms developed in any of the swine of the station, nor did any hairless "full-time" new-born pigs appear. When there is an iodine deficiency the young are usually carried over time by the pregnant sows.

* A prominent American authority on pig breeding and feeding and a well-known contributor to the "Chester White Journal." The first article of this series was reprinted in the November (1925) "Queensland Agricultural Journal."

In these fifteen years, 1910-1925, the station never had less than 300 new-born pigs in the spring, and oftentimes the number ran up to approximately 800; in the fall the number of pigs farrowed ran from 150 to over 300. With such large numbers of pigs under observation it would appear that if there were a shortage of iodine sufficient to produce a goitrous condition in our swine we would have had the hairlessness and other correlated conditions exhibited.

Ewes, on the other hand, drinking of the same water as the swine and partaking of feeds from the same fields, in four years of sixteen presented some lambs with goitre. In the other twelve years we saw no evidence whatsoever of gross goitrous pathology. The ewes themselves did not exhibit goitres sufficiently large to be noticeable on palpation, but the lambs which had goitre surely had noticeable ones.

Inasmuch as goitre represents fairly advanced stages of the iodine deficiency disease, it is easy to see that there may be a shortage of iodine in the ration sufficient to prevent adequate nutrition and yet not be so great a deficiency as to develop goitrous pathology. Inasmuch as the presence of goitre was noted in our sheep flock and not in our swine herd, it would appear that perhaps sheep had a greater quantitative need for iodine than swine in order to prevent the appearance of goitre. If it is true that feeds of low fat content tend to conserve the iodine supply, and that leafy vegetables or roughages as well as the coarser milled products of seeds carry more iodine than concentrated feeds, then one might logically assume that the breeding flock, under Ames conditions, actually secured a larger supply of iodine suitable for their nutrition, proportionately, in their feeds than did swine. The actual quantitative requirements of sheep and swine for iodine remain for future determination.

In the summer of 1920 we fed in Experiment 208 two lots which are of much interest. These lots had five pigs each and the feeding lasted from 29th July until the pigs reached an average weight of 225 lb. When the experiment started these pigs ranged from two and a-half to three months in age, and weighed on the average practically 50 lb. per head

The allotment and rations fed were as follows:—

Lot A.—Grazed on rape pasture. No iodide, a check lot. Shelled corn grain, mixed colour, yellow and white, self-fed; plus supplemental protein, vitamin, and mineral feed mixture (meat meal tankage, 20; corn gluten meal, 15; corn oil cake meal, 20; linseed oil meal, 10; prime cottonseed meal, 20; bone meal, 3; and flake salt, 2 lb.; total, 100 lb.) self-fed; plus pressed block salt of unusually good grade, self-fed.

Lot B.—Grazed on rape pasture (iodide fed). Fed exactly like Lot A with the exception that one-tenth (0.1) pound of potassium iodide was thoroughly mixed with one thousand (1,000) pounds of the supplemental protein, vitamin, and mineral feed mixture.

Lot A took 145 days to reach 225 lb. average weight, whereas Lot B getting iodide took only 133 days. Lot A took 440 lb. of feed and Lot B only 385, or 55 lb. less, for the 100 lb. of gain made.

It is plainly evident that the iodide fed Lot B outgained Lot A, which received no added iodide. It is also evident that the feed requirement was considerably lessened by iodide feeding.

The potassium iodide intake per pig for the 133 days of feeding averaged two thirds of a grain daily, this being equivalent to only half of a grain of iodine added.

Lot A, which took 440 lb. of feed for the 100 lb. of gain, as contrasted with 385 lb. in Lot B, iodide fed, showed a loss of feed, or an added feed requirement, of 55 lb., due to the lack of iodide feeding. On a percentage basis this amounts to better than 14 per cent. more feed being required for the unit of gain where the iodide was omitted from the ration.

Summarising, it appears that the young growing swine fed in this Experiment 208 on rape pasture showed beneficial results from iodide feeding. The average daily gain was greater by 8.4 per cent. because of the iodide addition, and the feed requirement was lessened by 12.5 per cent. Commercially, such results as these, when capitalised in practice, are of much significance. But let us proceed to another experiment.

In the summer of 1921 we fed in Experiment 220 three lots of seven pigs each from 4th August until the pigs reached an approximate average weight of 225 lb. When the experiment started these pigs were approximately three months old and weighed on the average practically 50 lb. per head.

The allotment and rations fed were as follows:—

Lot A.—Dry lot (no iodide check). Shelled corn grain, mixed colour, yellow and white, self-fed; plus supplemental protein feed mixture (prime cottonseed meal, 80, and Armour's dried blood meal, 20 lb.; total, 100 lb.), self-fed. Then pounds of mineral mixture A were mixed with each 100 lb. of the supplemental protein feed mixture. Mineral Mixture A consisted of high calcium limestone, finely ground, 33.33; flake salt, 33.33; and bone meal, 33.33 lb.; total, 100 lb.

Lot B.—Dry lot (iodide fed). Same as Lot A with the exception that potassium iodide was introduced into the mineral mixture, giving this new Mineral Mixture B the following composition:—High calcium limestone, finely ground, 33.3; flake salt, 33.3; bone meal, 33.3; and potassium iodide, 1 lb.; total, 100 lb.

The addition of potassium iodide to the ration as fed to these young swine resulted in a greater average daily gain and a lessened feed requirement.

The lots reach 225 lb. weight as follows:—A 112, and B 102.5 days, a saving of 8.5 days due to iodide feeding.

The appetite for feed did not seem to be altered much in this experiment by iodide feeding, although, as in the first experiment the iodide-fed pigs consumed a little less.

The potassium iodide intake per pig averaged for the 110 days of feeding .85 grain daily, this being equivalent to 0.51 grain of iodine added. It will be remembered that in the first experiment the iodide-fed lot consumed two-thirds grain daily, equivalent of a half grain of iodine; under the circumstances of the experiment it appears that this is rather a close agreement from the quantitative ingestion viewpoint.

Lot A was clearly excelled by Lot B, receiving iodine, the feed required for 100 lb. of gain being, respectively, 425 and 385 lb. Here is an added feed requirement of 40 lb. due to the lack of iodide feeding. On a percentage basis this amounts to better than 10 per cent. more feed being required for the unit of gain where the extra iodide was omitted from the ration.

Summarising, it appears that the young growing swine fed in this, the second iodide feeding Experiment 220, in dry lot, showed beneficial results from iodide feeding. The average daily gain was 8.3 per cent. greater when potassium iodide was fed, and the feed required for a unit gain was lessened by 9.4 per cent. The iodide-fed pigs likewise showed greater dimensional growth. The results of this second experiment are in practical accord with the results of the first.

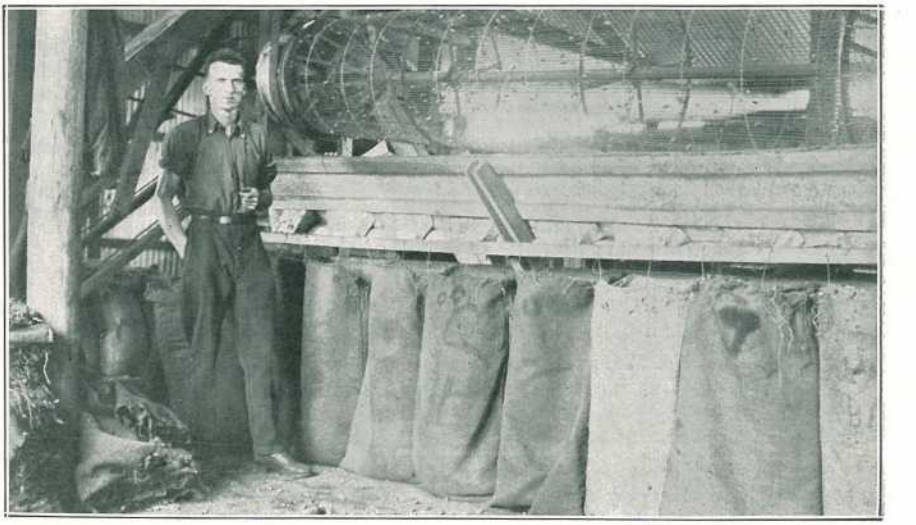


Photo.: C. E. F. Allen.]

PLATE 2.—A PEANUT GRADER, USED BY KINGAROY PEANUT POOL BOARD.

The Grader is an ingenious and efficient machine, invented by the Foreman of the Grading Shed at Kingaroy, Mr. Cavanagh, who is in the picture standing alongside his useful invention.

ABSTRACTS AND REVIEWS.

All foreign agricultural intelligence in this Section, unless otherwise stated, is taken from the International Review of the Science and Practice of Agriculture, published at Rome by the International Institute of Agriculture.

Manurial Value of Sugar-cane By-products.

DYMOND, G. C., "Sugar," Vol. xxviii., No. 3, pp. 134-135. New York, 1925.

Sugar-cane requires about nine primary chemical substances as plant food material, and the deficiency of any one of these, and not the superabundance of the others, determines the crop yield, hence the importance of returning to the soil residues containing chemical bodies removed by the crop.

Samples of cane trash and tops were taken from a 15 months old plant cane; the stalks showed an average sucrose content of 12.4 per cent.

Analyses of the dry substances were made, the ash giving the following results:—

Tricalcic phosphate—In trash, a trace; in tops, 6 per cent., or 17 lb. per acre.

Potash—In trash, 3.2 per cent., or 15 lb. per acre; in tops, 23 per cent., or 77 lb.

Magnesium oxide—In trash, 1.8 per cent. and 6.17 per cent. in tops.

Chlorine—0.5 per cent. in trash and 9.4 per cent. in tops.

The value of the dry trash is about 4s. 3d. per ton, or 12s. per acre, and that of the dry tops 19s. 9d. per ton, or 38s. per acre.

On a crop of 100,000 tons of cane the value of the dry tops would be £6,170 and that of the trash £1,550.

Analyses of the bagasse ash showed—Silica, 66.5 per cent.; tricalcic phosphate, 3.2 per cent.; potash, 4.4 per cent.; sulphates, 12.63 per cent.; the total value of the potash and phosphate being 19s. 7d. per ton.

Dry filter press cake contained—Nitrogen, 1.06 per cent.; phosphate, 3.13 per cent.; potash, nil; the value works out at 18s. 7d. per ton. This cake is very suitable for light soils when applied at the rate of 6 to 8 tons per acre.

The manurial value of molasses works out at 9s. 10d. per ton, or £1,536 per 100,000 tons of cane, of which £1,276 is due to the potash content. The most scientific method of dealing with this product is first to obtain the sugar value in alcohol, and then to utilise the residue as manure.

Sugar-cane should not be an exhaustive crop if, as is possible in practice, a large proportion of the chemical substances removed by the crop is returned to the soil.

Orchard Practices in the Citrus Industry of Southern California.

VAILE, R. S. University of California, Agricultural Experiment Station Bulletin, No. 374, pp. 50, tables 27. Berkeley, Cal., 1924.

The purpose of the Bulletin is to show from actual field records the influence of fertilisation, ploughing, climate, soil, age of trees, and costs, on the profitableness of citrus orchards.

The following conclusions are drawn from data collected from about 600 citrus groves, only records being used for analysis that covered a working period of five years.

Citrus groves (in California) produce more fruit per acre near the coast than in the interior, but they do not return higher net profits.

Soils of a medium texture are mainly used, as very sandy soils or clays are less productive.

Citrus trees usually increase in average yield until at least thirty-five years of age.

Nitrogen and bulky organic manures give the best results. Exclusive applications of nitrogen seem to cause mottling.

Orchards with winter cover-crops gave higher yields than clean-cultivated orchards.

Less irrigation water should be used near the coast than in the interior.

Forestry and Agriculture.

MARSHALL, R. C. (Conservator of Forests, Trinidad and Tobago). "Tropical Agriculture," Vol. II., No. 4, pp. 70-72. Trinidad, 1925.

Forestry and agriculture are both based on the yield-capacity of the soil; trees are often far less exacting in their soil requirements than are agricultural crops, and can be successfully grown on areas which are quite unsuitable for agriculture.

The indirect utility of forests.—The opinion is widely held that forests increase rainfall to a marked extent. Ebermayer started observations in Bavaria in 1867, but came to the conclusion that in the plains the effect of forests is very small, but increases with elevation. Extensive observations made in Sweden at 400 stations over a period of fifteen years showed that land with 56 per cent. under forest certainly did not receive more than 3 per cent. rainfall in excess of land with 17 per cent. under forest. The Government of India has studied the subject and concludes that, if forests influence rainfall at all the effect is insignificant.

Forests, however, have a profound effect on the conservation of water. The trees lessen the force of heavy, tropical rainfall; the surface soil in a forest consists of decaying organic matter capable of absorbing large quantities of water, which is held and eventually passes out as springs which yield a steady supply to streams and rivers. A tropical rainfall on a bare hill-side is not absorbed, and causes erosion of the soil and floods in the valleys.

The direct utility of forests.—Forests, in addition to timber, produce many important secondary products. In countries where forests have reached the protection stage, yield tables are available from which the average annual return per acre can be calculated. From the standard formula, under a given set of conditions, the return per acre works out at 18s., and unless this return can be obtained by agriculture it is preferable to grow timber on that area.

Every acre of land round head-waters and along the banks of rivers on which forest cover would protect against erosion and soil wastage, should be forested. All forested lands should be so managed as to yield a maximum of the products most needed by the local communities and industries.

Without agricultural development the present state of civilisation cannot be maintained. We had better be without gold than without timber.

The Growing of Poles for Electric Transmission.

GOUDIE, H. A. (Conservator of Forests, Roturva, N.Z.). "New Zealand Journal of Agriculture," Vol. xxix., No. 4, pp. 243-253, figs. 3. Wellington, 1924.

In writing the article the author had in mind the great development which is taking place in the production and use of electricity, and the very large demand likely to exist in the future for poles for extension of power lines and renewals. It is estimated that for renewals alone, in addition to telegraph and telephone pole requirements, 40,000 poles per annum will be necessary.

The main qualifications required of a pole are strength and durability, hence only poles of the highest quality are employed. For this purpose Australian ironbark poles are used of the following species: Grey or white ironbark (*Eucalyptus paniculata*), broad-leaved ironbark (*E. siderophloia*), narrow-leaved ironbark (*E. crebra*), and red ironbark (*E. sideroxylon*). Although the main object of the article is to deal with the growing of trees for pole-production, the author describes species and varieties recommended for farm forestry. Attention is drawn to the advantages of planting the waste places on a farm with trees, which in most cases may just as well be valuable, timber-yielding species, as trees which have a shelter value only.

PLATE 3.—A FREAK SEEDLING PINEAPPLE (SMOOTH LEAF), THE FIRST FRUIT OF A NEW PLANT FROM MR. J. DENNIS'S GARDEN AT LOGANLEA, AND FORWARDED BY MASTER DENNIS.
The specimen weighed 11 lb. and was grown in loam on a clay bottom.

THE PINK BOLL WORM.

(Platyedra gossypiella Saunders*).*

BY E. BALLARD, B.A., F.E.S., Commonwealth Cotton Entomologist. *

Historical.

The insect which is now known as the Pink Boll Worm was first recorded as a pest of cotton in India in 1842. For sixty years or more nothing was heard of it until a German paper, published in 1904, described its depredations in German East Africa. In 1909 an account was given of loss caused by it to cotton in the Hawaiian Islands, into which it had been introduced from India. Cotton-growing in Hawaii was subsequently abandoned on account of it. In 1906-7 it was introduced into Egypt, and since that date has done some £50,000,000 worth of damage.

It was frequently reported as damaging cotton in India, Burmah, and Siam, affecting exotic cottons more than indigenous varieties. This selection of plants by the insect is still made in India. Numerous papers have been published dealing with the life-history and control of the Pink Boll Worm, Egypt, United States of America, and India all contributing their quota, the most exhaustive research having been done in Egypt.

Distribution.

Complete data of the original distribution of *Platyedra gossypiella* are not yet forthcoming. It is undoubtedly of Oriental origin, and may belong to part of the Australo-Oriental region as well. Its Eastern range will probably be found to be more extensive than was at first supposed. It is now established in all, or nearly all, cotton-growing areas, exceptions being West Africa, Turkestan, and South Russia. No records exist which would enable one to ascertain whether or not it is indigenous to the Western Districts of Papua or, if not indigenous, when it was introduced. It is present in the "dry belt" of Papua (50 miles east and west of Port Moresby) and in and around Rabaul. Previous to 1912 it had not been recorded from Rabaul, and it has probably been introduced since that date.

Nature of the Damage done.

The Pink Boll Worm is the only pest of cotton which is carried in the seed. For this reason special precautions have to be taken when cotton cultivation is carried on in areas infected by it.

A short description of its habits will better enable the cotton planter to understand why these precautions are necessary.

The moth of the Pink Boll Worm is a small grey-brown insect, measuring about three-quarters of an inch across the outstretched wings. It is about the size of a clothes moth, and the tips of the fore wing are

*In a pamphlet published by the Home and Territories Department for circulation in Papua and Mandated Territories under Commonwealth control.

pointed. The hind wings are more rounded and are lighter than the fore wings and heavily fringed. It is crepuscular in its habits, and hides by day in sheltered dark spots, such as under fallen leaves and other débris always present in a cotton field. The female moth lays its eggs usually on the inner side of the bracts of the cotton boll or on the tip of the boll, or in the flowers. The eggs are small, whitish, scale-like objects, longitudinally ribbed, and when seen under a low-powered microscope appear iridescent. They may be laid singly or in small groups. They hatch in from four to twelve days.

From them emerges small, colourless, hairless caterpillars with dark heads, which immediately bore into the boll. The whole of the caterpillar stage is passed inside the boll, the seeds being eaten and hollowed out. The caterpillar casts its skin a certain number of times, and as it grows older the characteristic pink colouration appears. This colour is sometimes more or less evenly distributed over the whole dorsal surface of the body, but is often concentrated into spots. When full grown the caterpillar is about half an inch long. One characteristic of Pink Boll Worm attack, which distinguishes it from other boll worms, is the neat way in which the caterpillar works. It does not fill the boll with a mass of excreta like other boll worms. When full grown it cuts a hole to the exterior through the boll wall. This escape hole is very characteristic. It is small and oval in shape and quite different from the larger round holes cut by other boll worms (*Earias* sp and *Heliothis*).

After this is done, the caterpillar becomes a pupa. The pupa is about two-fifths of an inch in length, a bright chestnut brown, and is generally to be found inside a seed. At times it is to be found in the lint in the open boll. The caterpillar may leave the boll and pupate in a crack in the soil or under fallen leaves, &c. In due course the pupa gives rise to the moth, and the cycle starts again. As each female moth can lay up to 600 eggs, it will be obvious that a light infection soon gives rise to a very large number of boll worms.

As the season advances, the population increases very rapidly. The whole life-history only occupies about twenty-one to twenty-eight days, although this is dependent on certain climatic factors.

Long Cycle Larvæ.

In some countries where there is a prolonged dry season or cold winter the caterpillars or larvæ of *Platyedra gossypiella* have the power of remaining in a dormant condition for long periods, extending even up to two years. This resting stage larva is generally known as the long cycle larva. When in this condition the larva does not feed, but remains inside a seed with the entrance hole spun over with silk. Very often another seed is spun to the one containing the larva, thus forming what is known as a double seed. It is by means of these double seeds that the Pink Boll Worm has been carried all over the world.

Under certain conditions the caterpillar stage is prolonged, and, although the larva continues to feed, it takes a considerable time to become mature and pupate.

Some of the symptoms of Pink Boll Worm attack have already been noted. Others are: Flowers failing to open but remaining in a stage when they look like a rose bud, sometimes squares will be attacked and

shed, and another diagnostic character is the presence of a neat round hole in the septum between the locks in a cotton boll. Premature opening often results from Pink Boll Worm attack.

The whole of the damage is done by the caterpillar, but while the crop is growing nothing can be done to check the loss which is being caused.

Control.

Something can be done at the end of the season. The great sources of danger are the long cycle larvæ and careless cultivation. The long cycle larvæ can be destroyed by means of heat. All seed intended for sowing should be treated by heat by exposing it to the sun for about one hour so that it is raised to a temperature of at least 60 degrees C. (140 degrees F.). This can be done by spreading the seed thinly on mats or corrugated iron sheets. The temperature should not exceed 150 degrees F. (65 degrees C). Another method is to heat the seed in machines specially designed for the purpose, as is done in Egypt and Queensland.

In addition to ensuring seed free from boll worms, all refuse from the cotton bushes must be cleaned up and burnt, as otherwise a shelter is provided for long cycle larvæ. If plants are left to stand over at the end of the season, when in all probability the boll worm population is high, any new crop planted will be infested early, as the boll worms will get a flying start, and bolls forming on the last season's bushes will also be destroyed. In climates like those of Papua and New Guinea cotton will go on flowering all the year round. For this reason there may be some reluctance to plough out a crop which is apparently still bearing. Cotton-growers must make up their minds to make this apparent sacrifice in the interest of the succeeding crop. The sacrifice will be more apparent than real, for a close examination will show that most bolls at the end of the season are damaged and stained and would only produce low-grade cotton. This close season should be of at least two months' duration.

Cotton after it is picked often lies in store for some time awaiting transport. This cotton when infested with boll worms is producing moths the whole time (they can always be seen flying about in a place where seed cotton is stored). These moths are flying out every evening and reinfecting the crop. (Cotton and Malvaceous weeds related to cotton, when growing near a cotton ginnery, are always heavily infested with Pink Boll Worms from moths coming from the stored cotton awaiting ginning.) Stores where cotton is likely to be kept for any time should be made moth-proof. Ordinary mosquito netting would be sufficient for this purpose, and the door need only be closed just before sunset.

The Pink Boll Worm is rightly regarded as one of the most important insect pests of cotton, ranking with the boll weevil of America and "stainers." Its power of being transported in seed and its resistance to drought and flood, its short life-history, and its rapid multiplication, all combine to make it an insect to be dreaded, and against which all possible precautions should be taken. If these precautions are taken, it will be quite possible to raise good cotton crops; without them it is waste of time and money, as many have found to their cost.

List of Illustrations.

1. The Pink Boll Worm Moth.
2. The Pink Boll Worm Caterpillar.
3. The Pink Boll Worm Pupa.
4. Pink Boll Worms, double seeds and characteristic hole in boll partition.
5. Left: Boll, showing characteristic hole in carpel made by Maize grub (*Heliothis obsoleta*). Right: Two characteristic openings made by Pink Boll Worm. This photograph also shows the type of damage.
6. Contents of three locks, showing characteristic clean character of the injury.

From photographs by H. Kirkpatrick, Tallulah, Louisiana Laboratory.

From Bulletin No. 723, United States Department of Agriculture, by W. O. Hunter.

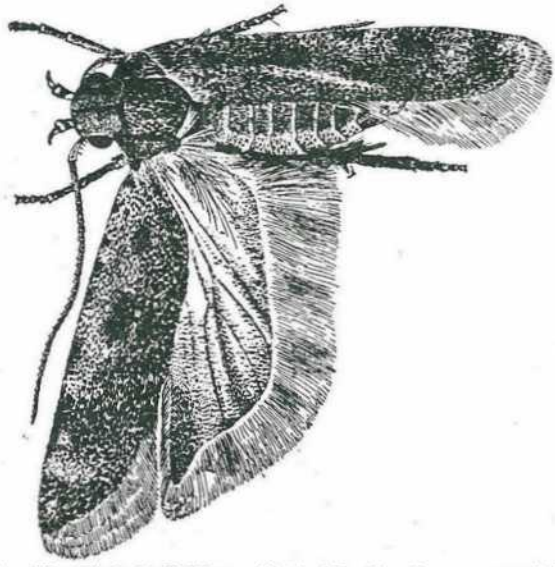


FIG. 1.—The Pink Boll Worm Moth (*Pectinophora gossypiella*): Adult. Much enlarged. (Busck.)

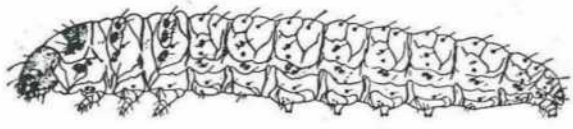


FIG. 2.—The Pink Boll Worm: Outline drawing of larva, showing structure. Much enlarged. (Busck.)

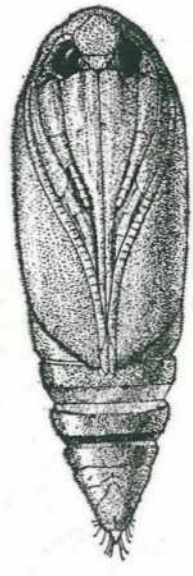


FIG. 3.—The Pink Boll Worm: Pupa. Much enlarged. (Busck.)

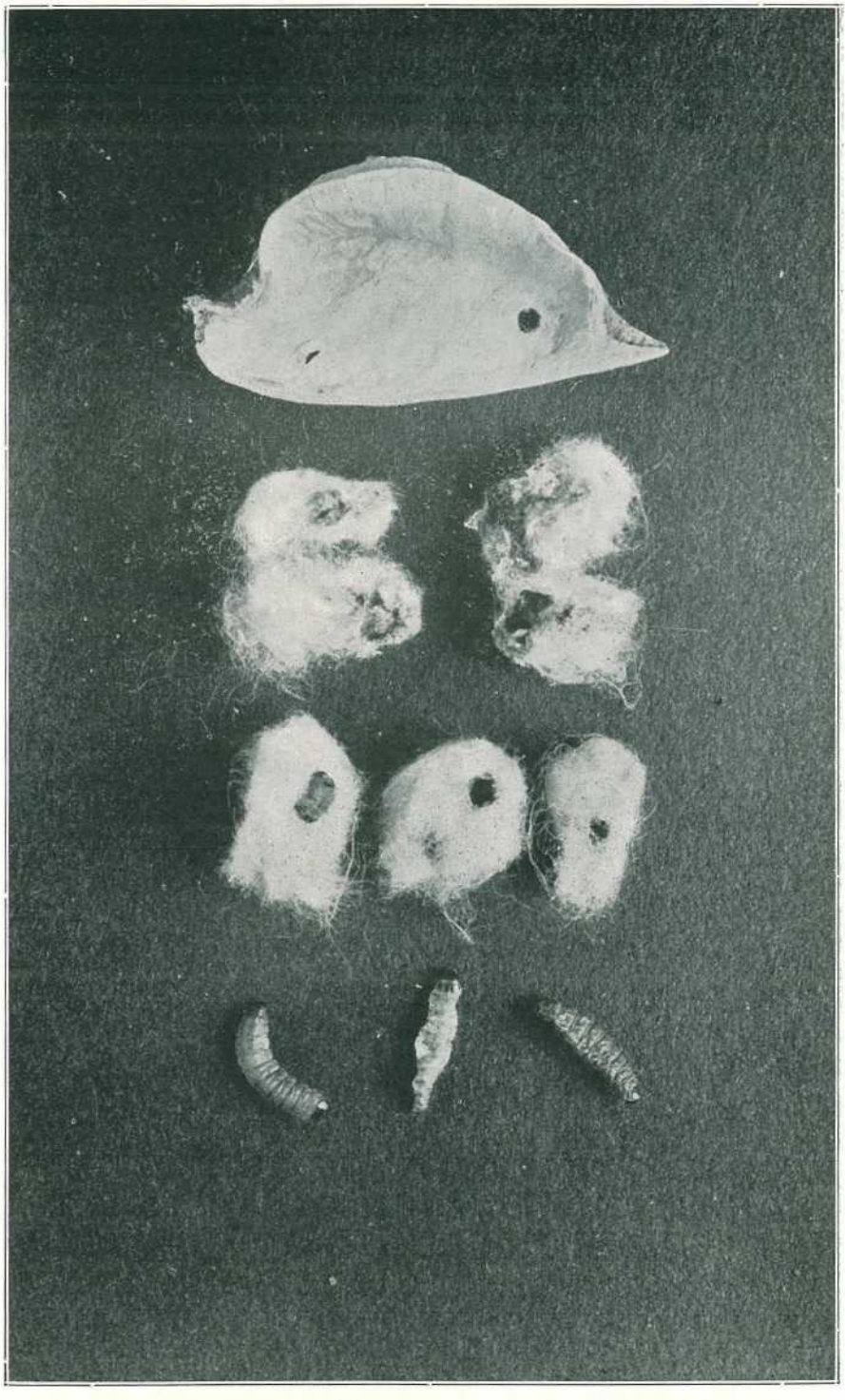


FIG. 4.—Pink Boll Worms, double seeds, and characteristic hole in boll partition.

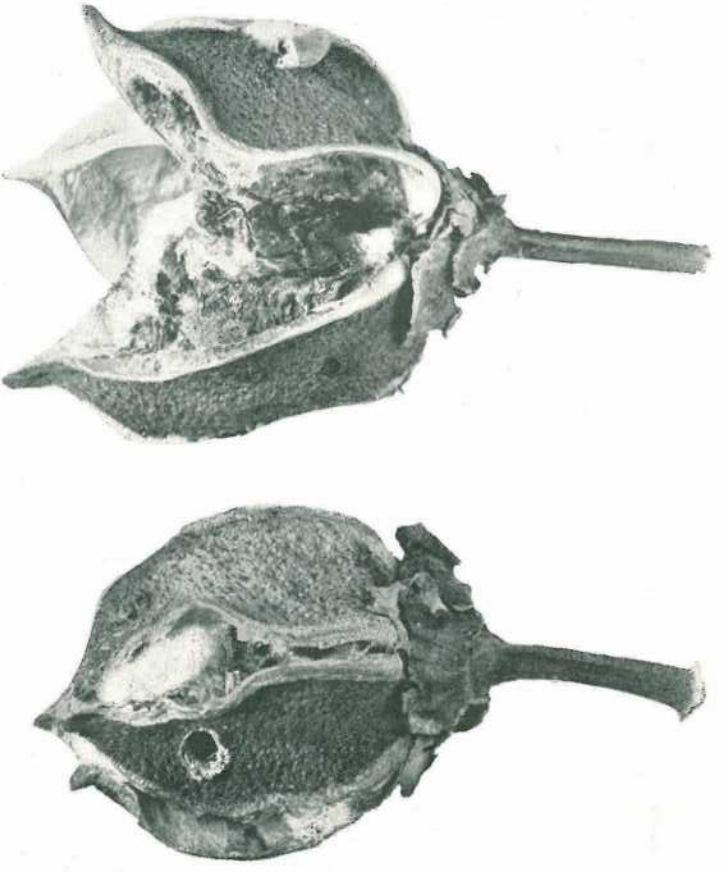


FIG. 5.—Left: Boll showing characteristic hole in carpel made by *Heliothis obsoleta*. Right: Boll showing two characteristic openings in carpel made by Pink Boll Worm.

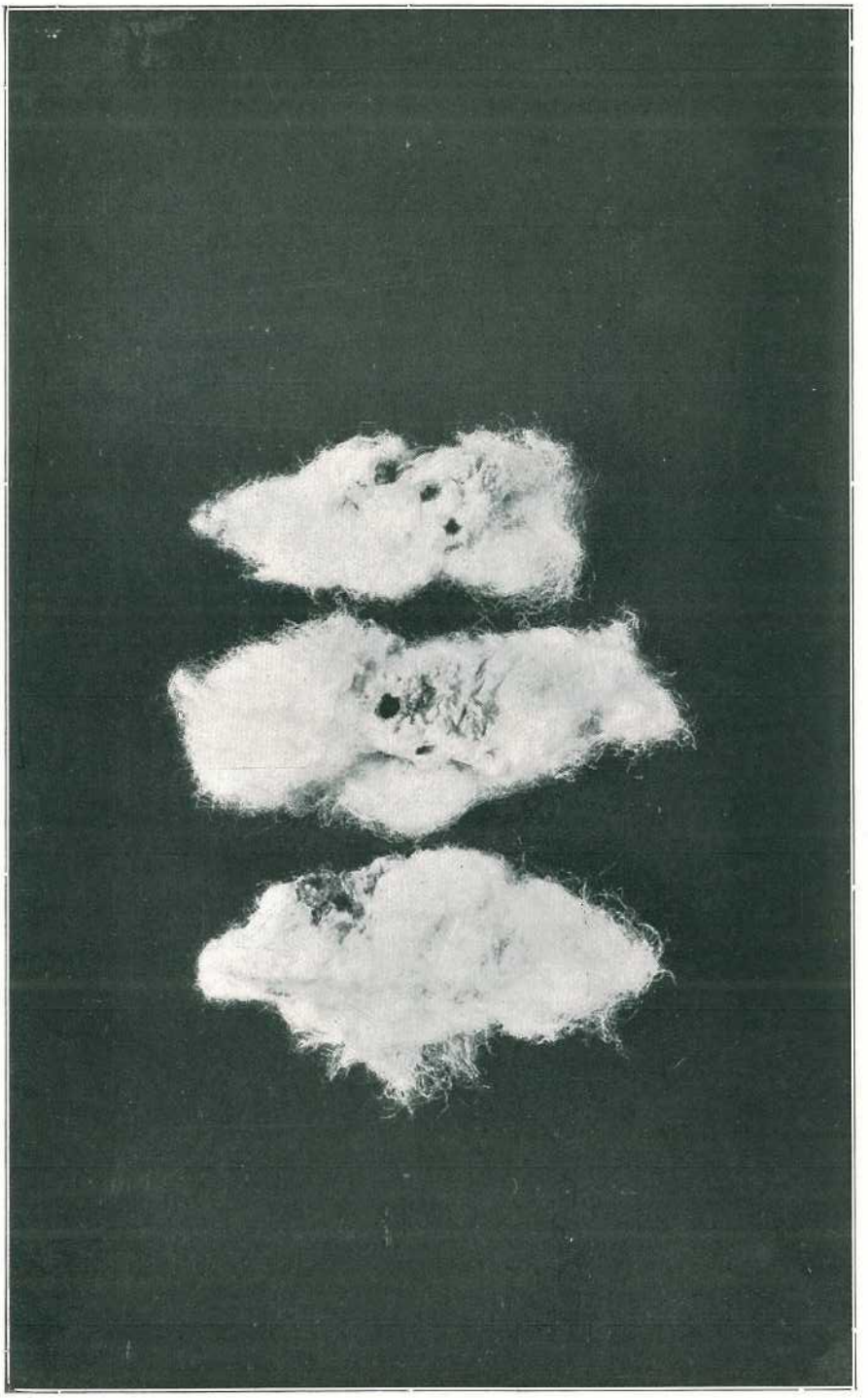


FIG. 6.—Contents of three locks showing characteristic injury. Note the massing of the seed cotton and the "clean" character of the work.

QUEENSLAND SHOW DATES, 1926.

Stanthorpe : 3rd to 5th February.
Warwick: 9th to 11th February.
Allora: 17th and 18th February.
Clifton: 24th and 25th February.
Newcastle (N.S.W.): 23rd to 27th Feb.
Killarney: 10th and 11th March.
Milmerran: 31st March.
Sydney Royal: 29th Mar. to 7th April.
Herberton: 5th and 6th April.
Miles: 7th and 8th April.
Pittsworth: 8th April.
Chinchilla: 13th and 14th April.
Kingaroy: 15th and 16th April.
Toowoomba: 20th to 22nd April.
Nanango: 29th and 30th April.
Dalby: 29th and 30th April.
Taroom: 3rd to 5th May.
Oakey: 6th May.
Toogoolawah: 6th and 7th May.
Murgon: 6th and 7th May.
Goombungee: 13th May.
Boonah: 12th and 13th May.
Kilkivan: 12th and 13th May.
Roma: 19th and 20th May.
Wondai: 19th and 20th May.
Ipswich: 19th to 21st May.
Wallumbilla: 25th and 26th May.
Esk: 26th and 27th May.
Maryborough: 25th to 27th May.
Childers: 29th to 31st May and 1st June
Marburg: 2nd and 3rd June.
Bundaberg: 3rd to 5th June.
Gin Gin: 8th to 10th June.
Woombye: 16th and 17th June.
Lowood: 18th and 19th June.
Gatton: 30th June and 1st July.
Kilcoy: 1st and 2nd July.
Laidley: 7th and 8th July.
Biggenden: 1st and 2nd July.
Woodford: 8th and 9th July.
Wellington Point: 10th July.
Maleny: 21st and 22nd July.
Rosewood: 23rd and 24th July.
Royal National: 9th to 14th August.
Crow's Nest: 25th and 26th August.
Coorparoo: 28th August.
Wynnum: 3rd and 4th September.
Zillmere: 11th September.
Rocklea: 25th September.

REPORT ON THE COTTON BREEDING OPERATIONS IN QUEENSLAND.

By W. C. WELLS, Cotton Specialist.

The recent revival of the cotton growing industry in Queensland on a scale of some importance quickly brought up the problem of the supply of pure seed of varieties of cotton suitable for the climatic and soil conditions of the State. Importations of seed of many varieties of the American Upland and the Egyptian types had been made on several different occasions by the Department of Agriculture, but these supplies of seed had been used mostly in variety tests with a consequent mixing, not only by the process of cross-pollination in the field but also in the process of the ginning of the seed cotton.

Early History of Durango Cotton.

Realising that such a mixture of the seed of the varieties and the hybrids thereof would produce a very uneven lot of cotton, the Australian Cotton Growing Association in 1921 imported 327 lb. of the Durango variety of American long-staple Upland cotton. This variety had been bred by the United States Department of Agriculture from seed imported from Mexico, and had given excellent results over a wide range of climatic and soil conditions. Most of the seed obtained in this importation was planted by Mr. A. S. Bailey on his place at Capella, an area of 3 acres being planted, which produced 2,116 lb. of seed cotton.

Season of 1922-23.

This seed was distributed in the following season (1922-23) to farmers who agreed to grow small plots of the variety under conditions of special isolation—land not previously in cotton and at a distance of at least a mile from any other cotton being required. These plots were located so as to test the variety under a wide range of climatic and soil conditions.

Unfortunately, the season of 1922-23 was characterised by a severe drought existing in nearly all of the districts in which the Durango test plots were located, so that many of them were complete failures, due to lack of sufficient moisture to obtain a germination of the seed. However, enough of the plots came through to maturity to produce a total of 32 bales of lint—which were fairly representative of the various sections of the cotton belt.

Samples of these bales were drawn and forwarded to the British Cotton Growing Association in England for a report on the merits of the lint. This Association

kindly secured the services of Messrs. Wolstenholme and Holland, an old Liverpool firm of cotton brokers, to report on the cotton, which was as follows:—

Mark.	Classification, &c., by Wolstenholme and Holland.	Grower.	District.
1	Barely Middling Fair. Staple full 1⅛ in., strong	Hunt Brothers ..	Alton Downs
2	Barely Good Middling. Staple about 1 3/16 in., fairly strong.	Drummond, W. H. ..	Springsure
3	Fully Good Middling. Staple about 1⅛ in., irregular, rather soft	Grey Brothers ..	Wetheron
4	Fully Middling. Staple 1 3/16 in., irregular, rather soft	Prichard and Wannop	Archer
5	Fully Good Middling, Staple 1⅛ in., not very strong	Grey Brothers ..	Wetheron
6	Middling Fair. Staple full 1⅛ in., strong and regular	Suley, J.	Wallumbilla
7	Fully Good Middling. Staple barely 1 3/16 in., strong	State Farm	Roma
8	Barely Middling Fair. Staple 1 3/16 in. to 1¼ in., fairly strong	Park Brothers ..	Yamala
11	Fully Good Middling. Staple full 1⅛ in., strong	Prichard and Wannop	Archer
12	Good Middling. Staple irregular, average 1 3/16 in., rather weak	Hall, F. R.	Samford
14	Fully Good Middling. Staple 1 3/16 in., very strong	Turner, A. J.	Ubobo
15	Fully Good Middling. Staple 1⅛ in. full, wasty	Prichard and Wannop	Archer
16	Fully Good Middling to Middling Fair. Staple 1⅛ in. full, rather soft	Rosenburg, —. ..	Ma Ma Creek
17	Fully Good Middling to Middling Fair. Staple about 1 3/16 in., fairly strong	Gibb, R.	Mecandah
18	Fully Good Middling to Middling Fair. Staple 1 3/16 in., strong	McKenzie, A.	Mecandah
19	Fully Good Middling. Staple 1 1/16 in., weak	Bailey, A. S.	Capella
20	Fully Good Middling. Staple 1⅛ in. to 1 3/16 in., strong	Turner, A. J.	Ubobo

The Season of 1923-24.

The report on the samples and the prices received for the bales of Durango were considered to be very satisfactory, especially when the climatic conditions of 1922-23, under which the variety had been grown, were taken into consideration. Accordingly the Department of Agriculture felt justified in further distributing the seed of this variety, and in the next season, 1923-24, sufficient seed was distributed to plant approximately 3,000 acres at the rate of 10 lb. of seed per acre.

The spring of 1923-24 was exceptionally dry and a large acreage was not planted, or if planted failed to develop during the extremely hot weather of November. General rains falling in the middle of December relieved the situation to a marked degree, and it appeared by the middle of January as if a heavy yield could be expected. Unfortunately, severe attacks from various boll worms and insects were experienced during the latter part of January, and in many cases all of the crop of fruit was destroyed. This period was followed by an extremely wet February in many parts of the cotton belt, the effect of which was to develop a very rank-growing type of plant, the foliage of which was so dense as to preclude any possibility of the sunlight penetrating to the lower parts of the plant. In consequence, the excessive humidity greatly assisted the development of various boll rots and any bolls remaining on the lower branches were attacked, resulting in a total loss of the bottom and lower middle crops.

There are no records available as to the acreage of Durango which was picked that season, as many of the growers did not pick over the whole of their crop, the yields in parts of the fields not warranting the expenditure of labour. It is impossible, therefore, to state the acreage actually picked, but a rough estimate of 1,200 to 1,500 acres would be somewhere near the mark. A total of 257 bales of lint were produced from this acreage, which on the whole was of good quality.

The quality of the ordinary Queensland cotton of the 1923-24 season was so distinctly inferior to that of previous crops that it was very apparent the supply of seed of the Durango variety should be increased rapidly in order to have sufficient to enable the Durango cotton to supplant the ordinary Queensland cotton.

Season of 1924-25.

Accordingly the old areas which grew Durango in 1923-24 were planted solidly to Durango in 1924-25 and several new areas were taken in as well. The distribution can be divided roughly into the following districts:—Marlborough, Mount Larcom, Raglan and Marmor areas, Boyne Valley, Miriam Vale, Yarwun, &c., Dallarnil and Mount Perry, Gayndah line, Kingaroy line, Upper Burnett, Callide Valley, Lockyer.

Generally speaking, great difficulty was experienced in obtaining good strikes of Durango in nearly all the districts south of Bundaberg until the latter part of October. This was due mostly to the desire of the growers to get an early planted crop, as the experience of the previous season had shown that the early planted cotton had given the best average results. The season gave promise of being an early one—the days warming up appreciably in the latter part of August. The night temperatures, however, remained at a low level and, following a series of light general rains during the first half of September, the weather turned decidedly cooler and was not favourable at all to the securing of good strikes. This condition was further aggravated by heavy storms occurring in the southern areas, with such force, in some cases, as to wash the seed out of the ground. The crusting of the surface soil, in conjunction with the cold temperatures, necessitated a large percentage of the early sown crop being replanted, so that as a whole it might be said that the crop of the past season was planted in October and the first half of November.

The growing period of the 1924-25 season has been characterised by very favourable to excessive rainfall conditions during the early part; very poor rainfall conditions in the southern portion, good in the Gayndah, Kingaroy, Upper Burnett, Dallarnil, Boyne Valley, Mount Larcom, Raglan, and Marlborough areas, and poor to fair in the Callide areas, in the middle of the season up to the end of January; and extreme droughty conditions, broken by light showers of no value, in nearly all of the belt during the latter part.

The erratic climatic conditions in some areas had a marked effect on the yield and the quality of both the Durango and the ordinary Queensland cottons. The southern portion, with the exception of a few areas, experienced a severe drought and heat wave at the critical stage in the development of the fruiting system, resulting in very low yields being received. The lint of the Durango crops varied from 1⅛ to 1 3/16 in. in length, was of light body, somewhat weak in strength and of a tendency to softness. The ordinary cotton was also affected in similar manner, the length of fibre being less than 1 in. in many samples.

In the areas of Durango cotton which enjoyed better growing conditions at the critical stage of development, very good yields were received—the Upper Burnett and the Boyne Valley districts in particular being fortunate in this respect. The Upper Burnett Settlement Scheme had roughly 640 acres of pure Durango come to maturity, with yields varying from 600 to 1,500 lb. per acre. The State Farm at Monal Creek in this area approximated 1,350 lb. per acre over the whole crop of 21 acres, which consisted of many kinds of experiments, &c. In the regular plantings similar to the commercial system of spacing, &c., as high as 2,190 lb. per acre were recorded.

The quality of this cotton was excellent, the length of fibre being of 1⅛ full to 1 3/16 in., of good sound body and strength. The major portion of the consignments from the district received A, B, or C grades at the ginnery, with a small amount of X, indicating that very little cotton was received which was of a tender or immature staple.

The average yield per acre in the Boyne Valley was slightly less, due to the extreme heat wave which that section experienced during the latter part of February, causing a total loss of top crop in many instances; yields from 600 to 1,000 lb. were obtained, however, the quality of which was somewhat affected by the above-mentioned heat wave. The fibres were of good length—1⅛ to 1 3/16 in., but on the tender side, with a fair amount of immature fibres from the upper bolls of the middle crop. If this valley had not experienced the heat wave, undoubtedly a cotton of good sound quality would have been received from most of the crops.

The crops of Durango in the Callide Valley suffered from the heat wave as well as a long period of drought, which existed from early December to the latter part

of January—the critical stage of the development of the fruiting system. The crops of the farmers were planted somewhat on the late side, due to late occupancy of the land; but in spite of this handicap and the heat wave, made as much as 800 lb. of seed cotton per acre. Under more favourable conditions many of the crops would have exceeded this return.

The Cotton Research Farm at Biloela, in the Callide Valley, made as high as 1,400 lb. seed cotton per acre on early October plantings on well prepared land, and 800 lb. seed cotton on late prepared newly-cleared land, so that as far as yields per acre are concerned the variety seemed to be suited to the area.

The quality of the fibre was affected by the heat wave and droughty conditions, the staple being 1⅛ to 1 $\frac{3}{16}$ in. in length, but of decidedly light body, of a tendency to be soft and somewhat lacking in strength. This was not surprising in view of the droughty conditions under which the cotton had been grown.

The cotton crops in the Marlborough, Raglan, and Mount Larcom areas, as well as any individual planting between these districts, were as a whole somewhat disappointing on account of the attacks of the Pink Boll Worm. This applied to both the ordinary and the Durango cottons. The Durango fibre produced under such conditions while of good length, was weak and wasty, and often was tinged with spots of discoloration from boll rots, &c., entering the bolls at the point of attack of the Pink Boll Worm. The Mount Larcom area in particular suffered heavily from the depredations of this insect, many of the crops being complete failures.

It is interesting to note that the system of ratooning the previous crop had many advocates in this section, and that the majority of the farmers left their crops standover until as late as October, when examination showed that as high as 70 per cent. of the plants in some fields were dead from winter-killing. The crops were uprooted and burned then and the ground prepared, but sufficient rains for planting did not fall until November, the result being a very late planted crop for most of the district. As the Pink Boll Worm had been in the crops of the previous season, such a delay in destroying the old crop must have been of assistance in carrying over a large population with the consequent heavy infestation of the new crop, which resulted in a total loss (as has been pointed out) over most of the Mount Larcom area.

This same situation was met with in the Bajool and Marmor areas, and the question now arises as to the possibility of controlling this pest in these areas sufficiently to enable the farmer to grow a profitable crop.

All of the seed issued for planting purposes has been treated in the Simon's Heater for this and last season's requirements, in order to insure the distribution of only insect-free seed. The final solution of the control of the Pink Boll Worm rests with the farmer, however, as the early eradication and burning of the old crop of stalks offers the best means of combating the spread of this insect.

The results received from the Durango variety in the other areas mentioned, such as Thornton Valley in the south, Goomeri and Murgon on the Kingaroy line, and Wetheron and Degilbo on the Gayndah line, indicated that under proper cultural conditions equally good or better yields could be obtained on any of the soils where the ordinary cotton could be grown successfully. This, in conjunction with the fact that the Durango lint is of a superior texture and staple, and highly suitable to the securing of good premiums over the prices obtained for the ordinary cotton, has led the Department of Agriculture and Stock to feel justified in distributing Durango seed to everyone desiring seed of this variety for the season 1925-26. In some cases the growers have asked for the old seed. One thousand acres of seed has been issued up to 1st October, 1925, as against 40,000 acres of Durango seed.

The Department has never maintained that the Durango variety is the most suitable for Queensland conditions, but as the variety is the only one of any large amount of pure seed that is here and the various tests having shown good results, this variety has been distributed in preference to the ordinary Queensland seed which is of such a mixed nature and of a poor class of staple.

Breeding Operations.

Realising that an imported variety would develop slight irregularities in plant and fibre, characters due to the "new place effect" from being grown under new and different conditions, the Cotton Office has been doing selection work in this variety for the last two seasons. In 1923-24 a 30-acre field of well-grown Durango at Miriam Vale was carefully inspected, plant by plant, and fifty-seven plants of exceptional promise were selected for further progeny material.

In addition to these special selections a bulk selection of plants approaching the true Durango type, was made in order to have sufficient seed of a uniform type to plant the 30-acre field in the following season. Some 337 lb. of seed cotton were selected in this manner and ginned on a special small gin to ensure that no mixture of seed occurred during the ginning operations.

The seed from this cotton was planted in the 30-acre field this past season, but, unfortunately, this section experienced a very wet season, with the result that the grass choked out a fair percentage of the strike and the boll rots accounted for a good portion of the crop from the remaining plants. Sufficient seed was obtained to plant approximately 130 acres—100 of which are being planted with selected farmers in the Boyne Valley in the season 1925-26.

A portion of this area will be carefully inspected and a sufficient bulk selection made to plant another isolated plot next season. The seed cotton from the crops of the selected growers will be segregated and ginned separately, and will be distributed to the Boyne Valley areas next season in order that a pure seed area may be established from which to supply a good portion of the whole of the coastal areas' requirements.

It is realised that such a system does not produce a pure strain of cotton but it does assist in developing on a large scale, and in a comparatively short space of time, a stock of seed which is sufficiently uniform to produce a good commercial cotton, and thus meet the pressing need for supplying a better cotton than the existing varieties.

The Technique of Selection Work.

When selecting material for progeny investigation in a variety of cotton which is showing "new place effect" or "splitting up," it is necessary to attempt to classify the plants in the field under observation into definite types before making any selections. This familiarises one with the degree to which the variety is splitting up, and also assists in determining just what type appears to be the most suitable for further investigation.

Durango Plant Types.

Careful analysis of the plants in the field of Durango at Miriam Vale in 1923-24 showed that although the variety was breaking up into several types, two of these were especially well defined, and the majority of the plants conformed to one or the other in approximately equal numbers. These, while entirely different as regards the structure of the plant, were both desirable, and as many especially promising individuals of each were secured as could be found.

The type of plant most closely approaching that to which the variety was bred to in the United States was described as A. This is an erect plant of open habit of growth, due to the length of distance between the joints of the main stalk bearing the fruiting branches and the long spaces between the joints of the fruiting branches where the bolls are borne. As the fruiting branches of this type of plant are often of 6 to 8 joints in length, the sunlight and air are allowed to penetrate to the bottom part of the plant, and thereby be of marked assistance in reducing the damage caused by boll rots during periods of excessive rainfall. This type is considered to be especially suitable to the coastal areas and the selections of this nature have been kept in the coastal districts.

The other major type of plant was of a more decided stiff, erect, appearance, the joints on both the main stalk and the fruiting branches being set closer together than those of the A type. The leaves were somewhat larger and the fruiting branches of fewer joints in length. There was also more of a tendency to produce vegetative branches. This type, which was called B, appears to grow well in the more inland areas, so that its behaviour is being tested out carefully in the Callide Valley and at the Warren State Farm.

Investigations conducted at the Monal Creek Demonstration Area and at the Callide Cotton Research Farm during this past season showed that the two types of plants were existing in the crops at these inland areas, so that there appears to be a well-defined division of types in the variety. Curiously enough the B style of plant occurred in far greater numbers in the inland areas than on the coastal areas, except on light sandy soils near the creek banks, where nearly every plant was of a good A type.

Durango Progeny Centres, 1925-26.

During the coming season there will be progeny investigation in Durango cotton at the Callide Cotton Research Station, at the Warren State Farm, at Mr. A. J. Turner's, of Ubobo, and Mr. J. Monaghan's, of Nagoorin. These areas represent soil and climatic conditions as follows:—

Callide.—Alluvial soils under the dry inland climatic conditions, with a rainfall of 28.6 in.

Warren.—Mixed forest soils of a light grey clayish nature, and a rainfall of about 29 in.

Ubobo and Nagoorin.—Sandy loam alluvial soils under semi-coastal conditions, with a rainfall of about 35 in.

In addition to these areas it is anticipated that progeny work will be commenced this season at a representative centre on the Gayndah line and in the Thornton area in the southern district, so that next season will see all the main areas of the State having progeny investigations in Durango cotton under way.

Technique of Laboratory Investigations of Selections.

Not only are the selected plants carefully described in the field, but material for laboratory studies is collected as well. This generally consists of a collection of five average bolls of the number of locks that the majority of the bolls on the plant contain. The rest of the bolls are picked in bulk, keeping each plant separately.

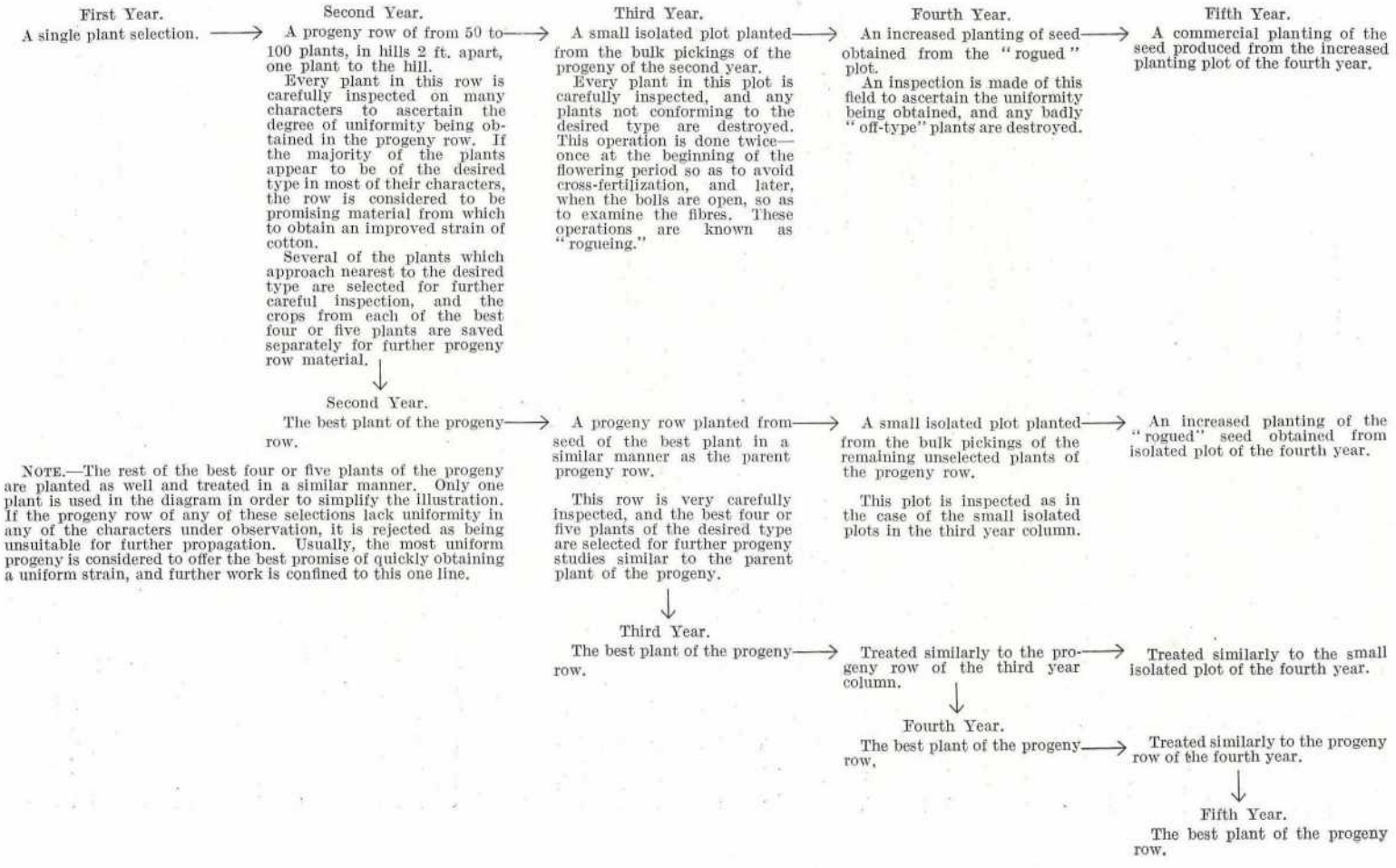
Later in the season when all of the material has conditioned to about the same degree, the five-boll samples are worked up in the laboratory on the lines shown in the sample chart illustrating the various characters studied.

The results of these determinations are then studied in conjunction with the plant descriptions which were made in the field, and the most promising of the selections from each district are reserved for further progeny study in the following season. Under the progeny system, fifty hills of each reserved selection are planted—one selection to a row, the rows spaced 4½ feet, and the hills 2 feet apart. The selections are arranged in the order of their value, so that the best has the next best to it, &c.

These progeny groups are inspected carefully before the flowering season has commenced and any rows showing a marked diversity are eradicated in order to prevent any possible cross-pollination taking place with the more uniform progenies.

The block is examined again at the time of maturity, when the fibres of every plant are examined. The most uniform row containing the characters of the desired type is considered as offering the most promising material for further investigations. The best plants in this row are reserved for progeny material in the following season, and the rest of the row is picked in bulk for planting as a seed increase plot under isolated conditions in the next season.

The following chart illustrates the system being used by the Cotton Office in developing strains of pedigreed seed. Under such a system a stock of carefully bred seed is being propagated for distribution in the particular district in which it has been developed, so that the grower is assured of receiving acclimatised seed suitable for the general soil and climatic conditions of his own section.



NOTE.—The rest of the best four or five plants of the progeny are planted as well and treated in a similar manner. Only one plant is used in the diagram in order to simplify the illustration. If the progeny row of any of these selections lack uniformity in any of the characters under observation, it is rejected as being unsuitable for further propagation. Usually, the most uniform progeny is considered to offer the best promise of quickly obtaining a uniform strain, and further work is confined to this one line.

Investigations in other Upland Cottons.

The Department of Agriculture has not devoted the whole of the breeding work to the Durango variety. It has been realised all of the time that this variety may not be the most suitable cotton for Queensland conditions. Accordingly, other American Upland varieties with habits of growth thought suitable to the conditions here have been introduced. These include the following varieties:—Acala, Lone Star, Webber 49, Delta-Type Webber, and Lightning Express.

Acala Variety.—This is an Upland type of cotton of original Mexican origin which has been developed by the United States Department of Agriculture. In that country the variety has been found suitable for a wide range of conditions, some of which closely approach those existing in Queensland. The plant is of an erect growth, of average open structure, a heavy cropper, and bearing bolls averaging 50 to 60 to the lb. of seed cotton. The lint is of 1⅛ to 1 $\frac{3}{16}$ inches in length, strong, heavy-bodied, and of excellent character.

The seed of this variety was obtained from the United States Department of Agriculture Experiment Station located at Shafter, California, in 1923. The breeding operations in it have been confined to the Queensland Agricultural College at Gatton. Selections were made in the first season that it was grown, 1923-24, and some twenty-one were reserved for further investigation. These were planted under isolated conditions during the season 1924-25, and of the group one progeny was found to be of good promise, both in lint and vegetative characters. Several good plants were selected in this row and will be planted in progeny groups this coming season.

In addition to these, some 150 new selections were made in the bulk increase planting, sixteen of which have been retained for further study in the progeny blocks of this year.

This variety appears to be well suited to the conditions of the Southern districts, and for this season, small isolated test plots covering practically all of the soil conditions, have been arranged to ascertain the behaviour of the variety under such a wide range of conditions. Several small plots have also been arranged in which the Acala and the Durango varieties are grown side by side in five-row plots.

Similar programmes have been arranged in the Gayndah-Kingaroy areas and in the Central district, so that by the end of the present season considerable data will be at hand as to the comparative merits of the two varieties. It is pointed out, though, that neither of these two varieties is thoroughly fixed as regards uniformity of type, &c., so that final judgment may have to be reserved until pedigreed seed of both varieties is available. It has been the aim of the department to study the behaviour of each variety separately, and to develop the best strains appearing in the varieties before making any definite decisions as regards the suitability of the varieties. In another season it is anticipated that considerable progress in this work will have been accomplished, so that it appears desirable that the preliminary work of comparing the varieties may be commenced this season, bearing in mind that the results must be interpreted in relation to the types which are being evolved.

Lone Star Variety.—This is a big boll type of Upland cotton bred by the United States Department of Agriculture in the State of Texas. It has been found to be very suitable to climatic conditions closely approaching the inland sections of Queensland. Unfortunately, the average length of the fibre of this variety, which has been grown the last two seasons, has been of 1 $\frac{1}{16}$ to 1⅛ inches. Owing to the attractive premiums being obtained for cotton of 1⅛ inches and upwards in length and the fact that the costs of production of cotton are high in this country, it is believed that every attempt should be made o produce cotton of hese classes rather than shorter lengths. The development work in this variety will consist, therefore, of attempts to obtain a type of plant containing the desirable features of the variety as regards growth and size of bolls, but with an increased length of staple.

Webber 49.—This variety has been tested for two seasons and the results obtained have been so unsatisfactory that no work will be conducted in it in the future. The original seed imported was obtained from Mr. Coker, the President of the Coker Seed Co., of South Carolina, U.S.A., the company which is maintaining the standard of this variety. Under the eastern coastal conditions of the U.S.A. excellent results are obtained from this cotton, but when planted in Queensland only average yields have been obtained and the quality of the fibre has been inferior, being very tender and weak, with a high percentage of waste.

Delta-Type Webber.—This seed was obtained from Mr. Coker at the same time as was the Webber 49. The variety is of the general medium-sized boll, long staple type of cotton, being 1 $\frac{3}{16}$-1¼ inches in length. Only study of a preliminary nature has been attempted in this variety so far, but it is anticipated that in the coming season selection work will be commenced.

This variety is grown in the U.S.A. in sections resembling our coastal areas, and being somewhat of the same general type as Durango, intensive work has been postponed during the developing and training of our staff.

Lightning Express.—This is another Coker cotton, and the results obtained so far from it, while not entirely satisfactory, indicate that further careful work is warranted. Selections of this variety were made last season, the best of which will be planted in the progeny row system in a plot in the southern area. It is anticipated that by the end of the coming season ample evidence will be at hand to determine more accurately the true merits of the variety.

In general, it is a desirable type of plant, bearing a medium-sized boll, containing a fibre averaging a good 1⅛ inches in length, strong, and of a nice body and colour. The main attractive feature claimed for the variety is earliness of maturity, which warrants further investigations being made.

Community One Variety Production.

The experiences of every other cotton-producing country have shown that it is highly desirable to limit the number of varieties to as few as possible and still meet the full requirements of all areas. The ordinary Queensland cotton, which is being replaced to a great extent this season by the Durango cotton, offers an excellent illustration of the results of growing many varieties in a district. Not only does cross-pollination take place in the fields during the flowering season, but the ginning operations as well assist in the mixing of the varieties. This has occurred to such a degree in Queensland that the ordinary seed has deteriorated to the point where the lint is of a very inferior quality, owing to the irregularity of the length of the fibres and the varying character.

The Department of Agriculture hopes, therefore, that the production of cotton in this State can be limited to one variety. It is anticipated that by developing strains for each general area of the most suitable variety for all conditions, no one district will be penalised. Under such a system every attempt will be made to keep the character of the lint as nearly alike as possible and at the same time develop the productivity of the strain to the highest point.

The production of only a uniform style of fibre over the whole of the cotton-growing areas would be of marked value to the industry as a whole, as the problems of ginning, marketing, and maintaining the purity of the variety, &c., would be greatly simplified.

QUEENSLAND'S PRODUCTS IN NEW ZEALAND.

DEPARTMENTAL DISPLAY AT THE DUNEDIN EXHIBITION—PRESS TRIBUTE.

The Acting Premier and Minister for Agriculture and Stock (Hon. W. Forgan Smith) has received an interesting report from Mr. H. W. Mobsby, the Queensland representative at the Dunedin Exhibition, on the Queensland Court and the Agricultural Department's display at the Exhibition, from which is taken the following notice from a leading New Zealand journal:—

"In the Queensland Court there is probably assembled the greatest range of primary products from any one State or country that is to be seen in the Exhibition. Queensland runs from temperate zone to tropical products on account of her size and the variety of her climate. The agricultural display of this court will be of particular interest to farmers, for there are shown in various stages of growth cereals and plant products with which New Zealand is little acquainted. Much maize is grown, and the production of this corn is illustrated by examples of it in various stages. Examples of merino and crossbred wools are on show. Tobacco, sugar, and cotton in the different stages of their evolution are interesting features. The by-products of cotton (meals, seeds, and crude and refined oils from the seed) give the person interested in its cultivation an insight into the operations of the industry. The cassava root, the subject of possibly far-reaching experiment in power alcohol production, is on view. At present starch and tapioca are obtained from the root, and these in crude and finished form are shown. Queensland hopes that she will be able to add considerably to the value of the cassava root by solving the problem of producing power alcohol in commercial quantities.

"A great variety of minerals is shown in a special exhibit, including original gold, silver, lead, and copper. A piece of silver-lead ore from the famous Mount Isa field, the discovery of which caused a sensation in Australian mining circles last year, is on view. In this section there is much to interest the geologist."

LEGISLATION REGULATING THE SALE OF SEEDS, FERTILISERS, STOCK FOODS, AND PEST DESTROYERS.

A BRIEF EXPLANATION.

By F. F. COLEMAN, Officer in Charge Seeds, Fertilisers, Pest Destroyers, and Stock Foods Investigation Branch.

Under the Acts regulating the sale of fertilisers, stock foods, and pest destroyers dealers are required to make certain returns during the month of January in each year, and for their information the following brief outline of the Acts referred to is given.

"The Fertilisers Acts of 1914 to 1916."

Every person who desires to sell fertilisers during 1926 should fill in an application for license form and enclose therewith the prescribed fee of £1 1s., sending same to the Under Secretary, Department of Agriculture and Stock, Brisbane. Licenses under the Fertilisers Acts remain in force until the thirty-first day of December of the year of issue.

On or before the thirty-first day of January in each year, every licensed dealer is required to fill in and forward to the Under Secretary, or Officer appointed for that purpose, a Certificate of Registration of Fertilisers, setting out the ingredients of each brand of fertiliser that he is selling or proposes to sell, and the percentage of nitrogen, phosphoric acid, and potash, and the forms in which these ingredients respectively occur.

In addition to the above, every producer of fertiliser is now required to forward a schedule setting out the following particulars:—

(1) The brand under which the fertiliser is known;

(2) The price per ton of the fertiliser, free on rail at Queensland works, or at Brisbane;

(3) The name and address of the manufacturer or importer of the fertiliser;

(4) The place of manufacture; and

(5) The raw materials from which the fertiliser is manufactured or prepared; and if the fertiliser contains mineral rock phosphate, Nauru phosphate, or any organic material such as leather, hoof, horn, hair, wool waste, peat, garbage, tankage, or similar material, the percentage by weight thereof, and a statement as to the treatment or process (if any) to which the organic material has been subjected.

It should be noted that a producer within the meaning of the Regulations is "Any licensed dealer who, whether as manufacturer, importer, or wholesale dealer, is primarily responsible for putting on the Queensland market any fertiliser, and in the case of a producer whose place of business is not within the State of Queensland, the agent of such producer who is resident in Queensland."

Producers of fertilisers are also required, within seven days of registration, to furnish to the Under Secretary, or other officer appointed for the purpose, a specimen of the printed label for each fertiliser registered.

"The Pest Destroyers Act of 1923."

Every wholesale dealer in pest destroyers must before selling any pest destroyer, or on or before the thirty-first day of January in each year, fill in and forward to the Department Forms 3 and 4. Every notice on Form 3 must be accompanied by a fee of 5s. for each pest destroyer mentioned therein, provided that the total sum payable by any dealer in any one year shall not exceed £1. Every notice on Form 3 must also be accompanied by a statutory declaration (Form 5). Each such statutory declaration must be accompanied by—

(1) A sample in the original package, or if usually sold in bulk in a sealed glass or earthenware jar or bottle, bearing the prescribed label, and in every case it must not be of less weight than half a pound.

(2) A specimen copy of the prescribed label and directions for use.

(3) A specimen copy of the invoice given to a buyer under section 5 of the Act.

A wholesale dealer in pest destroyers is any person who, whether as manufacturer, importer, or wholesale seller is primarily responsible for putting the article on the Queensland market. If the manufacturer or wholesale merchant is not resident within the State of Queensland, the requirements of the Act may be complied with by a duly authorised agent who is resident in Queensland; such agent for the purposes of the Act is deemed to be the wholesale dealer.

Retail Sellers of Pest Destroyers.

Every retail seller of pest destroyers is required each year, on or before the thirty-first day of January, to fill in and forward to the Department of Agriculture, Brisbane, Schedules 1 and 2—printed on blue paper.

It is well to note that the term pest destroyer includes such articles as:—

Arsenate of lead, arsenic, cattle dips, copper soda, copper carbonate, copper sulphate, cyanide of sodium, cyanide of calcium, formalin or formol, iron sulphate, lime sulphur, nicotine, nicotine compounds, phenolic insecticides, germicides and disinfectants, phosphorous pest destroyers, prickly-pear poisons, arsenical weed destroyers, insecticides, red oil preparations, sheep dips, strychnine, sulphur, tobacco dust, tobacco powder, and any insecticide, fungicide, vermin destroyer, or weed destroyer.

The particular attention of retail dealers is directed to the labelling of each package of pest destroyer. The label on each package received by them from the wholesale dealer should state:—

1. The distinctive name of the pest destroyer.

2. The net weight contained in the package or, in the case of liquids, the true volume content expressed in Imperial gallons or fractional parts thereof.

3. The names of the active constitutents, and when so required by the prescribed standards, the percentage of such active constituents and (or) the impurities contained therein.

4. All directions for use of the pest destroyer.

5. The name and address of the Queensland wholesale dealer.

Every dealer must, on the sale of any pest destroyer of a greater value than five shillings, on or before delivery of such pest destroyer, give to the buyer an invoice setting forth:—

1. The name and address of the dealer.

2. The net weight or Imperial measure and name of the pest destroyer.

3. A warranty in the following words:—Nothwithstanding any agreement to the contrary, this invoice shall be deemed to be and shall have effect as a warranty by me, the seller, that the constituents of the pest destroyer sold, and the percentage in which each constituent is contained therein and the percentage of each constituent contained in that part thereof which is soluble in cold water, accurately corresponds with the constitutents and percentages respectively stated in the statutory declaration furnished to the Under Secretary, Department of Agriculture and Stock, Brisbane, as prescribed with respect to the pest destroyer of the same name by "*The Pest Destroyers Act of* 1923."

The Act provides that no purchaser is bound to accept delivery of any pest destroyer unless it is labelled and invoiced in accordance with the above; further, the buyer is not bound to take delivery of any package of pest destroyer which upon weighing does not correspond with the weight as set out on the label and invoice.

"The Stock Foods Act of 1919."

Under the Stock Foods Act every wholesale seller, that is to say every manufacturer, importer, or other person primarily responsible for putting on the Queensland market any mixed, concentrated, or prepared stock food, must, on or before the thirty-first day of January in each year, send to the Department of Agriculture a fair average sample of each mixed, concentrated, or prepared stock food or prescribed by-products.

(1) Each sample must be in a sealed glass jar or bottle bearing a label, with the distinguishing name or trade mark of the Stock Food, and containing at least two pounds in weight:

(2) Be accompanied by a statutory declaration made in a personal capacity on the prescribed form, stating that the sample is a fair average sample of the Stock Food it represents, and is not substantially different from the Stock Food which such seller and his agents will supply throughout the year, under such distinguishing name or trade mark, and stating the specific name and proportion or amount of each of the original grains, or seeds, or materials, or ingredients:

(3) Be accompanied by a specimen copy of the Invoice relating to such food, on which the Vendor must cause to be legibly printed the word "Invoice." All Invoices given to a buyer under Section 6 of the Act must state specifically the materials of which the food consists, also the number of packages and the gross weight of the Stock Food included in the sale:

(4) Be accompanied by a specimen of the printed label, affixed to every package, which label must clearly certify:—

The number of net pounds in the package.

The distinguishing name or trade mark of the Stock Food.

The name and principal address of the wholesale seller.

The chemical analysis of the Stock Food expressed in the following terms:—

Minimum percentage of crude protein,

Minimum percentage of crude fat,

Maximum percentage of crude fibre.

The specific name of each of the original grains, or seeds, or materials, or ingredients, and the specific name and proportion or amount of the foreign ingredients, if any.

(5) Be accompanied by a specimen copy of all directions, if any, for the use of such food.

Section 3 of the Act applies to the following Stock Foods and to foods of like nature, all of which require to be labelled:—Bran, pollard, linseed meals, cocoanut oil cake or meal, cotton seed cake or meal, by-products of barley, maize, and rice, maize gluten meal or feed, dried skim milk, calf meals or calf foods, poultry foods and mashes, condimental stock foods, lucerne meal, molasses feeds or meals, fish oils and meals, dried brewers' or distillers' grains, malt sprouts, blood and meat meals, digester tankage, maize-germ meal, dried butter-milk, horse, cattle, and pig foods, chick feeds, any mixture of meals, and maize and cob meal.

Meals made directly from the entire grain or seed of:—Barley, buckwheat, broom corn, beans, cotton, cowpeas, linseed, maize, *mixed bird seeds, millet, oats, peas, rape, rice, rye, sorghum, wheat, and *mixed poultry corn.

Every seller should make himself fully acquainted with the Regulations now in force, and before making out statutory declarations on the prescribed forms, or having the necessary labels printed, it is advisable to ascertain if the proportions are correct, and in accordance with the materials now used. The minimum amount of crude protein and crude fat, also the maximum amount of crude fibre, declared on the labels should be based on a recent chemical analysis of the actual food now being offered for sale.

Every seller of stock foods is required to keep a copy of the Regulations constantly affixed in or on some conspicuous place in every shop, shed, or warehouse where he or any employee cuts, sells, or distributes chaff or any stock food.

"The Pure Seeds Acts of 1913-1914."

A vendor under these Acts is any person who sells or offers or exposes for sale or contracts or agrees to sell or deliver any seeds.

The Acts require that on the sale of any such seed of not less than 1s. in value, the vendor shall at the time of the sale give to the buyer, or, if the buyer is not present at the time of sale, forward to him an invoice containing the statements required by the Acts.

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*With mixed bird seed or mixed poultry corn composed solely of whole grain or seeds, the chemical analysis need not appear on the labels, the specific names of the different ingredients, with proportion or amount of any foreign ingredients, complies with the Act.

"The wording of the invoice should be to the following effect:—

> "The kind or kinds of seeds mentioned on this invoice are for planting or sowing, and contain no greater proportion or amount of foreign ingredients than is prescribed for such seeds."

In the case of seeds in pictorial or other made-up packets, such packets must be clearly and indelibly marked upon the outside with the year in which the seeds were grown.

The amount of foreign ingredients allowed in the various kinds of seeds are set out in the Regulations, a copy of which can be obtained on application to the Department of Agriculture, Brisbane.

Although buyers and sellers are able to form a good idea of the market value or price, experience shows that they are frequently misled as regards purity and germination of the seeds that they have purchased and are offering for resale.

The Regulations further provide for the examination of samples at the Seed Laboratory, Brisbane, the cost being the nominal one of 2s. 6d. for each Certificate of Analysis. When sending such samples it is of the utmost importance that they be drawn by the sender from seeds in his actual possession, care being taken to make them truly representative of the bulk. The weight of each sample and marking required are fully explained in the Regulations. In case of any complaint regarding purity or germination, the vendor should at once send a sample of the seed together with the name and address of the person from whom the goods were purchased together with a covering letter to the Department advising of the despatch of the sample.

Unless the sender is careful to forward a truly representative sample the certificate is valueless. Under no circumstances is it a guarantee by the Department of Agriculture as to the bulk, but an analysis of the sample received, giving a plain statement of its condition at the time when such analysis was made.

PRESCRIBED WEIGHT OF SAMPLES.

Kind of Seed.	Weight Required.
Barley, Beans, Cowpeas, Maize, Oats, Peas, Rice, Rye, Tares, Wheat ..	8 oz.
Canary, French Millet, Japanese Millet, Linseed, Lucerne, Prairie Grass, *Setaria italica* (Foxtail Millet), *Sorghum Sudanense* (Sudan Grass), Sorghum, White Panicum	4 oz.
Couch, Paspalum, Rhodes	2 oz.
Beet, Cabbage, Carrot, Onion, Parsnip, Radish, Tomato, Turnip, and Vegetable seeds of like size	½ oz.
Vegetable seeds in made-up packets	3 packets
Agricultural and Vegetable seeds other than those included above ..	2 oz.

All samples must be plainly written on in ink giving the following particulars:—

(1) Kind of seed.

(2) Quantity the sample represents.

(3) Marks on bags or growers name.

(4) Name and address of sender.

Each sample, with a covering letter enclosing the prescribed fee of 2s. 6d., should be addressed to the Under Secretary, Department of Agriculture, Brisbane.

For the purpose of ascertaining if the legislation regulating the sale of Seeds, Fertilisers, Pest Destroyers and Stock Foods is being complied with, Officers of the Investigation Branch inspect and take samples of the various stocks held by dealers in all parts of the State. Details of this work appears in the Department's Annual Report, and for the information of both buyers and sellers a reprint of that portion of the Report dealing with these matters is available for distribution.

It cannot be too widely known that the Seed Laboratory examines free of charge all samples representing seeds that farmers have purchased for their own sowing. Both buyers and sellers are urged to examine all goods on the day of delivery, and when in doubt regarding any seeds, fertilisers, pest destroyers or stock foods to write at once to the Department of Agriculture, Brisbane, in order that the matter may be at once investigated.

Photo.: G. B. Brooks.]
PLATE 4.—A FINE CROP OF DWARF KAFFIR, GROWN BY MR. T. SEICRUP, SCRUBBY CREEK, GRACEMERE, CENTRAL DISTRICT.

(*Continued from page 6.*)

CANE PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (23rd December, 1925), from Mr. W. Cottrell-Dormer, who is investigating diseases and pests of sugar-cane.

The last few weeks of the year are proving a most unsatisfactory period in which to make observations of the kind attempted, since the leaf streaks diagnostic of some of our most important diseases and of the greatest value in disease detection, either do not show up or are obliterated by drought effects.

Tully.

Diseases.—Allowing for the inauspicious weather conditions, which, as I have already stated, have made it almost impossible for me to detect certain diseases in their early stages, the cane in this district appears to be on the whole rather healthy and disease free. However, Leaf Scald is present and deserves interest on the part of the farmers, while a fairly common scrubland disease, which I shall describe further on, was observed on one farm.

Leaf Scald.—Leaf Scald was found doing quite considerable damage to some late cut and slightly grub affected Badila (N.G. 15) on one farm, about 2 miles north of Banyan, though cane grown from the same plants but not cut late and unaffected by grubs is but slightly infected on the same farm. The disease was found on a neighbouring farm on my visit to this district last year. At Euramo, on the south bank of the Tully River, the disease was found to be doing very slight damage to otherwise healthy Badila, and serious damage to one or two small fields of Clark's Seedling. The soil in this locality is rather good, so that, unless the infected cane is cut very late and the ensuing ratoons used for plants, the disease should not do any serious damage. At El Arish several slightly infected fields of Badila were encountered; and Clark's Seedling and Green Goru were found to be very badly infected on two farms.

Brown Rot.—I have mentioned in certain of my reports the finding of an acute cane disease which, in my notes, I have for convenience referred to as St. Helen's disease, as it was first observed by myself at St. Helens; however, this is not really a suitable name, especially as this disease is probably fairly widely distributed, so I propose that the name "Brown Rot" be applied as being easier to memorise and more or less descriptive.

Description.—A stool of cane severely affected by Brown Rot is very similar in appearance to one which is being vigorously attacked by grubs—*i.e.*, its leaves are badly wilted or even quite dead and dry although they are fairly normal in size. A strong pull at the stool shows, however, that grub damage is not the cause of the trouble, as the stool is quite firmly rooted in the soil.

If, in the case of young cane (*i.e.*, erect cane whose "top" is touching, or in proximity to, the soil) the leaf-sheaths be examined, it is found that the outer ones are quite disintegrated at the portion which should join the cane stem, and are cemented together at their base by a thick stroma or layer of fungus mycelium. This stroma is of a strong felt-like consistency and surrounds the cane stem in the vicinity of these leaf-sheath bases. The stroma would seem to vary in colour according to its age, that found on the outer leaf-sheaths and on the more or less developed portions of the cane stem nearby is of a rich dark brown, while on the inner leaf-sheath bases it is white, intermediate colours being found as one approaches the older leaf-sheaths.

Buds, root eyes, and adventitious roots in this region and below it are quite dead soft, and more or less dry, while the stem at this region is also dead. If the dead portion of the stem be now sliced transversely at an internode it is found that the whole of the parenchymatous (*i.e.*, fleshy) tissues are of a pale russet-brown colour, while the vascular bundles, or fibres, are of a similar colour, but a good deal darker. To the touch these dead tissues are dry and have the feeling of tough polyporous pith. In the case of tall cane this dead portion is found near the soil surface. On slicing the stem longitudinally it is found, where the stem is not entirely killed, that this dead tissue is separated from tissue of a normal appearance by a narrow region, say, ½-in. in depth, which is of a very dark brown, almost black, colour.

When the stool is dug out it is seen that the roots are all dead and in many cases invested in a soft felt-like layer of light brown to saffron-coloured mycelium. No thick white mycelial strands occur.

Sufficient information not being available the early symptoms of the disease cannot be described, but the above description will suffice to acquaint farmers with it, and reports from the latter relating to its occurrence would be very welcome.

Distribution.—The disease has been found on one farm in each of the following localities during the past fourteen months:—Upper Mowbray River, near Mossman, in plant Badila; Upper Sawmill Pocket, near Gordonvale, in plant Badila; Euramo, Tully River, in plant Badila; Kolijo (St. Helens), near Mackay, in plant Badila; and at Mount Pelion, near Mackay, in first ratoon D. 1135.

The above list gives the impression that Badila is the most susceptible variety, but this is not necessarily so as the disease has been found in every case on "new" cane-holed scrub soil, where Badila is almost invariably planted in the North.

Damage Done.—In the outbreaks recorded to date the disease has only been responsible for the death of patches of cane in the infected fields. All infected stools appear to eventually succumb, as no case of mere stunting was observed. Surrounding cane was always in perfect health and soil in good mechanical order, though containing a large quantity of decaying timber.

Insect Pests.

Serious damage was being caused on one farm at Euramo by a small pale-brown field ant measuring about ⅛ in. This ant, which I have not yet succeeded in identifying, is a most persistent mound builder—it will build a mound of loose earth as big as an ordinary hand basin in the course of one night, and if this mound be broken down during the day, another will be found to have taken its place on the following morning. It is in this way, to a large extent, that it does its damage, as it builds these mounds around the growing shoots of young cane, thus preventing the latter from stooling. On digging the soil beneath these mounds interminable tunnels are found, which lead to large nurseries and pupal chambers where the young ants are reared and, perhaps, initiated into the mysteries of ant-craft. It seems probable that the colony's food supplies are largely drawn from the tender and more succulent parts of the young cane roots, as these were found to be very much pitted and often devoid of hairs. The natural habitat of this insect, in this district at least, appears to be in fields of bladey grass (*Imperata arundinacea* Cyr.), in which situations it quite commonly undermines the soil to such an extent as to make it unsafe to cross the field on horseback; needless to say the grass does not prosper under these conditions. The affected portion of the farm under discussion was a field of young first ratoon Badila, and a very large area of it had, owing to the activities of the ants, failed to produce any crop at all. Meanwhile, the ants are moving out of this unproductive region and extending their operations to fresh cane. Previous to planting the field had been an old banana block and was growing nought but bladey grass. The field adjoining it is still in this condition, and is similarly very severely infested by the ant.

Control.—Sugary poison baits having failed to produce any effect, fumigation of the soil with a mixture of paradichlor. and carbon bisulphide (as successfully used by Mr. H. Freeman against the white grub at Greenhills) was recommended.

Other Insects Observed.—*Lepidiota caudata* and *Anoplognathus punctulatus* (kindly identified by Mr. A. Burns, Acting Entomologist at Meringa), were on the wing at the time of my visit, as were also *Repsimus æneus, Lepidoderma albohirtum,* and *Anoplognathus boisduvali.*

So far grubs have done but little damage in the Tully River district. Army worms and moth borers are slightly prevalent.

Herbert River.

During the three weeks spent in this district fifty-four farms were visited in the following localities:—Stone River, Long Pocket, Hawkins Creek, Trebonne, Fairford, Ingham, Ripple Creek, Seymour, Macknade, Halifax, Cordelia, Victoria, Toobanna, Francis Creek, and Waterview.

Gumming Disease.—Gumming disease is undoubtedly causing far less damage now than it was some two or three years ago, this being mainly due to the discarding of the very susceptible variety Clark's Seedling. However, a few fields of badly gummed cane remain, especially at Toobanna (where Clark's Seedling is still being

planted in spite of the experience of the Victoria and Macknade growers), the Halifax, Nelson's Creek, near Macknade, and Victoria. According to the observations of the Colonial Sugar Refining Company's Disease Staff Q. 813 is showing great resistance to gumming disease, this variety is therefore being planted very widely this year.

Increased attention to drainage on the part of farmers is a noticeable feature of the campaign against gum in the Herbert River district.

Other Diseases.—Early symptoms of Top Rot were seen in two fields at Macknade on which the plant crop suffered rather severely. Red Rot was found causing severe damage in one field of Green Goru, on the Upper Stone River, and in one field of Clark's Seedling at Long Pocket. Foot Rot is doing slight damage on many farms.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By A. N. BURNS, Acting Entomologist.

Grey-back cane beetles (*Lepidoderma albohirtum* Waterh.) are still emerging in moderate numbers, and females are engaged in oviposition. Should soaking rains fall within the next week or two, a larger and probably final emergence of these insects should occur. Hand collecting of beetles from feeding trees—Figs (*Ficus* sp.), Paper Bark (*Melaleuca leucadendron*), and Moreton Bay Ash (*Eucalyptus tesselaris*)—is to be recommended from examples of any of these trees growing adjacent to cane fields, and in places where flights of beetles are nightly observed.

Keep soil well worked and open, for clean cane fields are much less attractive to egg-laden female beetles than weedy ones, and loose open soil proves a hindrance to them when burrowing in to oviposit. In working soil as close to plants as possible, many young first-stage grubs of the "grey-back" will be unearthed during cultural operations whilst they are feeding on roots close to the surface; this will give the cane plants a better chance to build up a strong root system to withstand later attack from second and third stage grubs of the same pest, and will destroy a good many of the young grubs.

Canefields in which grubs of the "frenchi" cane beetle (*Lepidiota frenchi* Blackb.) are active, will now be beginning to show the effects of its depredations, though probably only in patches here and there. Whilst the weather is still dry and the soil not too moist, fumigation where necessary with paradichlor. or other fumigant should be carried out. As these grubs are more local than those of the grey-back, areas which are known to be affected year after year should be watched and the cane fumigated before the grubs have done too much damage to the root systems of the stools to effect a profitable recovery. Frenchi beetles will very probably emerge in large numbers after the next rains; odd specimens have already been observed, the first being noted in flight at Meringa on 20th December.

Farmers who have cane lands—either plant cane or ratoons—that are troubled every year with grey-back beetle grubs are requested to please communicate with the entomologist at Meringa Laboratory, so that field experiments to test the values of various fumigants may be carried out during the next month or two whilst the grubs are active.

Growers having cane badly infested with the bettle borer (*Rhabdocnemis obscurus* Boisd.) are requested to get in touch with Meringa Laboratory for the purpose of obtaining Tachinid fly parasites to combat this pest. Where there is standover cane infested with borers, conditions are very suitable for the establishment of these flies, there being a supply of borer larvæ to tide the flies over till the young plant crop and ratoons make cane, some of which will doubtless become borer infested.

These flies unfortunately received a check in the breeding insectaries owing to the presence of an entomogenous fungus which destroyed numbers. It is expected, however, that further supplies of these "useful parasites" will very soon be available for liberation. Liberations are effected free of cost to growers, on condition that they are prepared to leave at least a quarter of an acre of borer infested cane as standover in order to give the flies a chance of establishing themselves.

FIELD REPORTS.

Mr. E. H. Osborn, Central Field Assistant, reports (22nd December, 1925):—

Proserpine.

During a short visit to Silver Creek several paddocks of new land were noticed under crop, amounting to 50 acres in one instance and 22 acres in another. The canes M. 1900, Q. 813, and H.Q. 426 had made an excellent strike, and should develop into good crops. Nearby, a 6-acre plot of first ratoon H.Q. 426, and a 2-acre piece of first ratoon M. 1900 showed careful cultivation.

In the Conway area, both the pasturage and cane looked surprisingly green; probably more rain had been registered here than in other parts of the Proserpine area, and the young plant as well as recently cut ratoons compared more than favourably with cane seen elsewhere.

Several soil samples were taken here, and much interest is being taken in the work of the Experiment Station.

Disease.—Leaf Scald was noticed in N.G. 24B in ratoons at Cannon Valley, and also near the town area, whilst Red Rot in H.Q. 426 was seen in several places to a slight degree. As regards Leaf Scald, its dangers have been so fully described in the November 1924 issue of the "Sugar Journal" that it should need no further comment.

Cultivation has improved very much in this district within the past few years, labour-saving devices being given a fair trial, and any implement that promises well finding a ready sale.

Green Crops.—Several good crops of cowpea were noticed, but there is yet room for a much further acreage being put under. Liming should also be of great benefit to the heavy type of soil found in parts of the area.

Cane Varieties.—M. 1900 and Q. 813 are still giving great satisfaction, whilst H.Q. 426, although a favourite in many parts, is not so in other localities. Probably the use of only the very best and healthiest plants of this useful variety will again restore its popularity. Respecting E.K. 28, Quod Brothers were so satisfied with the results obtained from a few lines of this cane that they have a further 10 acres planted up.

Bowen.

Diseases.—A couple of paddocks of B. 208 were noticed to be suffering from Leaf Stripe (Downy Mildew) when last this area was visited. Upon inquiry it was learnt that good results both in tonnage and density were obtained from the cane, but the resultant ratoons are now full of stripe, and want ploughing out.

Lower Burdekin.

Very unfavourable weather conditions were being experienced in this district, for only 24.76 inches of rain had been registered at Ayr up to 10th December, and of this 20.61 inches were registered in January, February, and March, leaving only 4.15 inches for the remainder of the period. What with dry weather, necessitating continual expensive irrigating, reduction in price of sugar, shortened working hours, delay in harvesting caused by railway and shipping strikes, the life of the usually optimistic Burdekin canegrower has been a very strenuous one.

Harvesting the large local crops is also a problem. Pioneer and Kalamia expect to have about 80 per cent. of their crop off by Christmas; but, unfortunately, Inkerman will only have some 50 per cent. of their huge tonnage crushed by that time.

The worst feature of the standover cane is that a large proportion of such is now very heavy cane, and what sort of a return the grower is likely to receive from it next year is problematical.

Varieties.—Despite such conditions, some remarkably good crops of cane have been, and are still being harvested. B. 208 has once again given some extraordinary high density returns, no less than five samples of this cane analysing from 20.0 c.c.s. to 20.5 c.c.s. at Kalamia.

Green Goru (24 B.)—Has not been as satisfactory this year as usual in many cases. Dry weather has played havoc with its results, and for a standover crop it would be very poor indeed.

The Northern Field Assistant, Mr. A. P. Gibson reports (21st December, 1925):—

INNISFAIL AND TULLY.

A Rich District.

The wonderfully rich sugar-producing district of Innisfail commences some 4 miles back from the sea and is adjacent to the Johnstone River with its many tributaries. The soil is of two distinct types and compositions, namely: (1) Fertile alluvial deposits, often shallowing as it recedes from the river; and (2) undulating to hilly volcanic scrub red soil, possessing here and there outcrops of basaltic rock. The many unproductive depressions noticed (more so in the Goondi alluvial deposits) grow prolific crops of panicum and other grasses; these are ideal spots for harbouring rats. This pest, however, is being kept well under control by systematic poisoning and clean farm surroundings.

Weather.—Very hot days and moderately cool nights with a few refreshing showers at intervals have been experienced, and such conditions have enabled harvesting and the necessary cultural operation to be continued without interruption. In this great basin of the Johnstone, frosts and prolonged droughts are practically unknown, and it is therefore rather difficult to realise the full value of rain and its influences on the producing effects of the crops.

Cane Culture has made remarkable progress since the year 1881 when its founder, T. H. Fitzgerald, first erected a mill and manufactured some 40 tons of sugar from 129,125 gallons of juice. The remains of the old factory may yet be seen on what is known as the Innisfail Estate. To-day there are three big mills—Goondi, Mourilyan, and South Johnstone, and the estimated tonnage to be crushed is 550,000 tons.

Crushing.—Goondi and South Johnstone mills commenced crushing early in the year and have made good progress. The former is through with its crop of about 170,000 tons, and the latter may carry on until the end of January; the final date of crushing depends entirely on the weather and what relief the new Tully mill can give. Mourilyan is handling a record crop, and owing to early machinery mishaps had not crushed as great a tonnage as desired. Some 105,000 tons had been crushed, and the management is hoping to treat about 140,000 tons before the season ends. Should this be realised some 30,000 tons must stand over. Their hopes may be shattered by early continuous rains making the fields unfit for speedy crop removal and reducing the c.c.s. to such a degree that further crushing would be unprofitable. South Johnstone mill is rather handicapped, being situated on its northern boundary and separated from its main supply by some broken country through which a heavy and well-constructed line with its many branches pass. This lengthy and somewhat heavy haulage on a single track sometimes causes delays. The mill is now working 44 hours a week, and it is expected that 212,000 tons will be crushed. The cane being received at these mills is as clean as can be expected. A great quantity of sugar yet remains in store. The c.c.s. has been very good, but is now fluctuating and, on the whole, declining in quality.

Harvesting.—The weather, although hot, has been suitable for harvesting operations, and the conditions described, coupled with good and abundant labour, has enabled satisfactory progress to be made. Pests have been responsible for higher harvesting rates, and an increased number of burning permits. Several paddocks of N.G. 15 (Badila) at South Johnstone were so badly damaged by grubs and borers that they were left uncut. After the fire had passed through the area many of the remaining stems were examined; the beetle and its larvæ were located, but they were all dead.

Fires.—Great areas of cane have been burned, more especially in the Mourilyan and South Johnstone areas. Many fires are unpermitted and often result in great loss to the unfortunate owner.

Transportation.—The district crop is entirely removed by a wonderful network of tram lines, connected with portable lines which bring forward the loaded cane cars from the several paddocks. The railway system and its rolling-stock are important units, but, as a rule, do not receive the same careful consideration and attention as do other lesser ones, resulting in lengthy delays in field and mill, and great truck destruction. Some of the South Johnstone farmers have the difficulty of surmounting and descending steep grades with their loaded cane trucks. This takes a bit of manœuvring and adds to production costs.

Ploughing.—Most of the ploughing is carried out by the disc plough drawn by animal or motor power. A red-soil farmer was endeavouring to plough in a crop of N.G. 15 (Badila) having some 3 or 4 ft. of stem; the resulting work was only fair. The soil was dry and friable and did not offer much resistance to the disc, therefore the action was rather a rolling instead of a cutting one.

Planting.—Little planting was in progress. Farmers often plough out the exhausted stubble and replant as soon as possible. This is not a practice to be recommended, but when performed the grower should satisfy himself that the land has been thoroughly prepared before planting, in preference to planting and hoping to improve its condition later. The drills of newly-planted cane are often filled in with soil too quickly. The mother plant is the storehouse of food for the infant roots and shoots, and should the primary stool be delayed in reaching daylight (by over-much soil covering) and prevented from providing food for its future nourishment from the surrounding air and soil, it often becomes exhausted and dies.

Cultivation.—Great activity prevailed on the farms, implements of all kinds were in use loosening up the soil between cane rows and same time freeing same of weeds. Subsoilers are favoured. These, as a rule, do good work, but sever the newly developed root system which, as previously stated, must temporarily retard crop growth and may permit the ingress to plant of fungi and other pests.

Ratooning or Off-barring.—The object of this is to loosen the soil in order that lighter implements later may work. It is important to do this preferably immediately after burning off before many shoots are formed, and it is recommended to follow off-barring by light cultivation, thereby returning the loosened soil back against the stool. As a rule dry area farming is somewhat different to a wet one; in the former the fields should be kept practically level, thereby exposing the least surface to winds and sun. In the wet the cane is left in ridges, the depressions between help drain off the excess water and permit some of the roots to dry, in long continued periods of wetness. The main object of the grower should be to see that his cane crops get a good start in life; it will then itself eventually control the weeds.

Pests and Diseases.—Grubs, rats, and the beetle borer (*Rhabdocnemis obscurus*) are the most common and more destructive pests found here. The former had done much damage to cane growing on the volcanic porous red soils. Rats have injured crops bordering unclean headlands and depressions. The borer apparently is very well established in the South Johnstone mill area; the increase may be attributed to the great quantity of recumbent and decaying unpermitted cane remaining in this area. It is recommended to liberate freely the Tachinid fly. This fly is doing good work in the Goondi area at present. Many grey-back beetles were being captured from the feeding trees in a river side scrub adjacent to Daradgee ferry. Leaf-eating insects, caterpillars, aphis, sacchari, and sooty fungus were noticed. Leaf Scald was rather bad in places. This is a serious disease, and can be reduced if the growers will only exercise more care in plant selection. South Johnstone Sugar Experiment Station was visited. It is prettily nestled at the foot of Mount Basilisk, and for the greater part possessing very level fertile alluvial deposits, but rather inconveniently separated from the mill by the South Johnstone River. Many experiments were in progress and the raising of the seedlings was found interesting. This entails much patient work.

Improvements.—Roads here are bad. A stonebreaker is at work now, and a good sort of broken metal is being placed on some of the roads. Two reinforced concrete hotels are being constructed and when completed will, it is hoped, help to reduce the worries of those seeking accommodation. A very fine concrete bridge is being placed over the South Johnstone River, near the mill. This will span what can be a very nasty crossing.

Manuring.—Growers here realise the importance of maintaining the fertility of the soil. This is necessary, more so in localities where rains are sometimes heavy and continuous. This has an injurious effect on the soil, chiefly perhaps, by leaching out the nitrate, one of the most valuable of plant foods. The cover crop mostly planted and favoured is Mauritius bean; cowpea and corn are also planted together, the corn acting as a support. B 3, Howe's mixture, and sulphate of ammonia are applied to the farm at various rates and with beneficial results.

Varieties.—The principal variety raised is N.G. 15 (Badila); a little H.Q. 426 (Clark's Seedling) and 7 R 428 (Pompey) is also raised. H.Q. 426 is now a condemned variety at Goondi, and the latter mentioned grown only by permission, on

approved land. N.G. 15 (Badila) is a low-fibred cane, and in consequence is preferred by rats and borers. We must strive to secure a deeper rooting variety and one possessing a tougher skin and yet possessing the sugar and growing qualities of the N.G. 15.

Bananas are being grown in these parts. The past has proved they will do well; the future must decide if they can be profitably grown under existing conditions.

The plant and ratoons are growing vigorously and look remarkably healthy, but urgently require rain. The husbandry on the whole was found satisfactory, and the present prospects are again bright for 1926. It is evident that much cane will be left to stand over; the actual tonnage left of course depends on how long the mills can profitably work.

Tully.

Tully is the home of Australia's newest and most modern sugar-mill. Surrounding it is an extraordinarily fast growing little town. It is some 35 miles distant by rail from Innisfail, and is conveniently sandwiched between Mount Tyson and the Banyan Creek. To realise the importance of our great sugar industry it is necessary for one to see the busy sugar fields and a modern factory at work. Most of the machinery in the mill was made in Queensland. It commenced crushing on the 9th November. There have been delays, which, as a rule, are expected in a maiden run. The allotted weekly cane tonnage had not been fully crushed, therefore a huge stock of burnt cane was on hand, some of which was in a fermented condition. The greatest weekly tonnage treated to date (12th December) was 3,500 tons—15,000 tons had passed through the rollers. The local crop is estimated at 13,000 tons. The management expects to extend crushing until the end of January, when over 30,000 tons will probably have been crushed. Relieving South Johnstone of this amount will considerably help all concerned. The refuse from the mill is badly polluting the lower waters of the Banyan and Tully River. This must inconvenience the settlers concerned. Many and varied are the reports in circulation regarding the quality and future of the Tully lands. Scrub is being felled and the land being prepared for cane—the whole operation including scrub brushing and falling, logging, holing, and plants. The variety N.G. 15 (Badila) is mostly grown. Some heavy crops were being harvested and some good plant strikes were noted. The crop on the whole, at present, is rather poor and urgently requires rain. Farmers should be careful in securing seed free from pests and diseases, more especially in a new district. Leaf Scald was noted; also a few grubs.

PLATE 5.—YARDED AT LAST. SHEEP MUSTERED IN THE YANBURRA WOOLSHED YARDS, BEXLEY STATION.

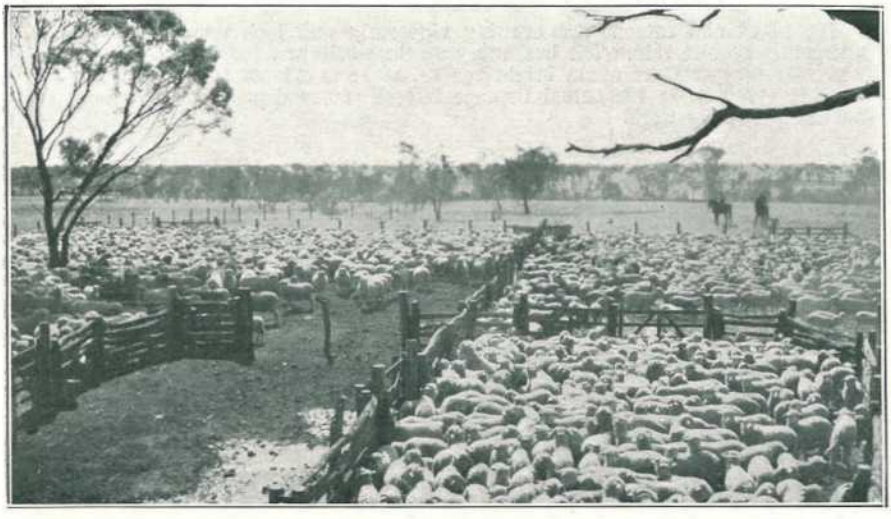


PLATE 6.—EWES AND LAMBS MUSTERED FOR LAMB-MARKING, YANBURRA YARDS, BEXLEY STATION, MR. E. G. BLUME'S PROPERTY, NEAR LONGREACH.

PLATE 7.—THE WOOLLY WEALTH OF WESTERN PASTURES.
Ewes and lambs yarded at Yanburra House, Bexley Station, in the Central West.

COTTON STAINERS.

By E. BALLARD, B.A., F.E.S., Commonwealth Cotton Entomologist.*

The so-called "Cotton Stainers" are to be found in most cotton-growing countries and are of first importance among the many pests which prey upon the cotton plant.

The damage which they do is often attributed to weather and other causes and cotton-growers do not realise how the stainers are lowering the value of their crop.

Stainers belong to the order Hemiptera, which includes all the bugs, scale insects, mealy bugs, cicadas, &c.

They vary from just under to rather over ½ inch in length. All are very similarly coloured, being greyish-brown to orange on their heads and forewings and barred with black and white on the under side. On the forewings is generally either a dark spot or a bar. There is a number of species and all belong to the genus Dysdercus. The main points of their life histories are similar. Eggs are laid in the ground or under the débris of leaves generally lying in a cotton field. These eggs are yellowish objects easily seen with the naked eye, and are laid in masses and so are readily visible. From them hatch out small red or orange-red nymphs, very similar in shape to the parent bugs but without wings.

They find their way up to the open cotton bolls and feed on the seeds by thrusting the needle-like stylets of the proboscis through the outer seed coat. The main food of these bugs is the seed of cotton or of plants related to cotton. To return to the just hatched nymphs—as time goes on they cast their skins and grow bigger after each moult, getting more and more like their parents. The wings begin to show as dark pads, and finally after the last moult (fifth) they become adult. The adult bugs, males and females, coupled together soon become a familiar sight to the cotton-growers.

As a rule, no stainers are to be found in the field until the first bolls open. The invasion increases as more and more bolls mature. Generally the bugs confine their attention to the seeds in the open or just opening bolls, but they feed on green bolls as well, striving to get at the seeds inside; it is this which causes so much damage to the crop. As has already been stated the stainer sucks and cannot bite. The apparatus by which it feeds consists of a jointed sheath (rostrum) holding four needle-like structures, two of which form a groove in which lie the other two. These are also grooved and form two tubes, up one of which the food is drawn. At the end furthest from the head these stylets, as they are called, have sawlike teeth. The jointed sheath simply serves as a guide, and is not thrust into the seed or boll. The four stylets alone are pushed in, and through the minute channel which they form when

* In a Bulletin issued by the Department of Home and Territories.

lying together the food is sucked up. When not feeding the stylets lie in their sheath, the proboscis or rostrum, and are carried folded under the body.

When the stylets are withdrawn a wound is naturally left in the boll wall. Before this can heal fungus spores and bacteria enter, or are carried in on the stylets. These fungi feed on the developing lint, and, where a seed has been pierced, feed also on the developing embryo.

The lint becomes weak and stained, and when it comes to be marketed is always severely penalised on that account. Attacked seeds, whether in the open or in the green boll, often fail to germinate and become infected with fungi and bacteria. In a general way the first opened bolls escape from stain, but once the stainers are in the field numbers of the green bolls are pierced, and when they open the lint is seen to be stained a dirty brown or black.

On any heap of newly-picked seed cotton lying in a store numbers of stainers will be seen feeding on any seed which may be exposed. It is the cotton seed which exerts such an attraction on them. It is therefore worth while trying the effect of putting heaps of seed in a cotton field with a view to attracting the stainers to them and away from the cotton bolls. These should be visited at frequent intervals, and the bugs collected and then destroyed. Frequent visits are a necessity for otherwise these seed heaps will serve simply as breeding grounds. Hibiscus bushes in the vicinity of cotton fields should be destroyed as far as is practicable.

Besides wild species of Hibiscus, Dysdercus will be found on the cultivated species, *H. cannabinus,* and *H. sabdariffa,* as well as on Sida spp. and Eriodendron and Bombax trees (Kapok).

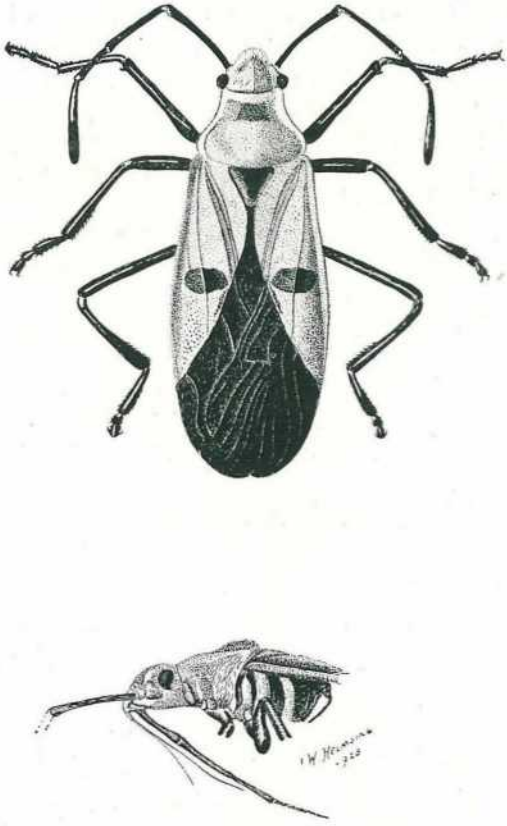
There are other bugs which have the same effect on green bolls as have the stainers. Amongst the chief of these is the large yellow or yellow and orange coloured Harlequin bug. (At certain times of the year these bugs produce individuals with varying amounts of blue and red.)

The Harlequin bug (*Tectacoris lineola*) is a large shield-shaped bug nearly 1 inch in length. It comes into the cotton field under Queensland conditions very early or before flowers are open, and lays its eggs in clusters round leaf stalks. It feeds on squares and green bolls, having the same effect on the latter as the "stainers." This insect has not yet become a pest in Papua or New Guinea, but it is evidently acquiring a taste for cotton, and should on that account be watched. It is easily controlled by hand picking, as it is lethargic in its habits, and does not fly about much. The young bugs, too, tend to collect in great clusters and can easily be seen and destroyed.

The stainers and Harlequin bugs are very serious pests, all the more so in that the damage they do often passes unnoticed. In a climate with

a high humidity, as is the case even in the dry belts of Papua and New Guinea, fungous diseases must play a large part. For that reasor stainers are probably more to be dreaded than boll worms.

Traps, and above all clean cultivation, and a dead season of at least two months between one crop and another, will go far towards keeping these pests under reasonable control.



EXPLANATION OF PLATE.

(The upper figure shows an adult.)

Dysdercus cingulatus, magnified four times, the lower one is a profile view of the head, the four-jointed rostrum, and the stylets. In the figure these stylets look like a single organ. There are actually four closely applied to one another, forming a tube.

Dysdercus sidæ is similar in appearance and habits to *D. cingulatus*, but the large black spots on the wings are much reduced to a small dot on each wing or they may be absent.

HINTS ABOUT BEES.

BY RUPERT HOLMES, Instructor in Poultry Raising and Beekeeping, Queensland Agricultural High School and College.

Natural swarm should be prevented from issuing, as far as possible, as in many cases they are lost; and even if safely hived, their formation not only interferes with nectar collection at the height of the season, but weakens the parent colony to such an extent that its value for producing surplus honey is reduced to very low limits.

Under those circumstances every endeavour should be made to increase colonies artificially. New colonies formed artificially have every chance of becoming strong and active honey producers, besides which, the strength of the parent colonies is reduced sufficiently to prevent them swarming naturally, but not to an extent which will interfere with the honey production.

Preparation for Increase.

Colonies must be carefully nursed to bring them to full strength early in the season. Syrup should, if necessary, be given to induce the queen to lay more eggs. This feeding is only required when the bees are solely dependent on the supply of nectar from the few flowers then in bloom. Artificial pollen should also be supplied. Most colonies have an abundance of food stored and need not be fed.

To assist the bees to increase their number rapidly, they must be crowded together and given no more comb than they can cover thickly. Crowding is attained by means of the division board, but as the strength of the colony increases the combs should be added, singly, as required.

Before dealing with the general methods of artificial increase three points must be made clear—

(1) Bees locate the position of their home, and not the hive to which they belong. Thus, if a stock is removed to a new position and is replaced by another hive, those bees on the wing return to the new hive in the original position.

(2) Natural swarms are made up of the oldest bees of the colony together with the old queen.

(3) Only strong colonies (those in which the bees are densely covering ten combs) must be utilised as the bases for artificial increase, and only colonies free from any disease must be used.

Methods of Increase.

1. *Formation of a nucleus.*—When the warm weather sets in about September, October, and November, a nucleus can be made from each strong colony in the following manner:—Open the hive about midday, when the old bees are away foraging, and remove two combs of brood and two of food, with the young bees, replacing them with four frames filled with sheets of foundation comb. It is necessary to have about a quart of bees and if this amount is not present on the combs removed, the number may be obtained by shaking the bees from two or three other combs into the nucleus.

Great care must be taken not to remove the queen with those combs. The two outer combs of the present body usually contain the most food, and should therefore be selected for use in the nucleus.

The combs containing the brood must be placed together between those containing the food in the new hive to provide warmth.

Close up and confine the bees in the nucleus hive for forty-eight hours. Close the entrance with wire gauze and the bees in the nucleus, discovering they are queenless, will rear a queen.

If a fertile queen, a virgin queen, or a ripe queen-cell is available it should be given. This will enable the nucleus to build up much more rapidly. With care this nucleus could be built up into a strong colony to winter successfully.

2. *Increasing the strength of the nucleus.*—When the queen in the nucleus formed in the manner mentioned in Method 1 has been mated and has commenced to lay, open the hive, find the queen and cage her on the comb.

When this is accomplished, fill up the hive containing the nucleus with either drawn out combs or frames fitted with full sheets of foundation comb to its full complement of ten frames. Transpose a strong stock to that of the nucleus, because

bees only locate the position of their hive, and not the hive itself, and consequently bees out foraging from the strong stock will return to the nucleus. Thus the hive containing the nucleus will become fully populated and sufficient young bees will be left in the old colony to enable it to recover strength rapidly. The queen cage and the nucleus are released after being confined for forty-eight hours.

About a fortnight after this operation has been carried out each hive will be sufficiently strong to receive a super, if favourable conditions have prevailed. Artificial increase by the combination of methods Nos. 1 and 2 is strongly recommended as producing the best results, owing to the fact that at no period when the colonies are strong they are queenless.

3. *Making one extra strong colony by utilising a number of others.*—In this method the increase is obtained by utilising several strong colonies of bees. From each of two of the colonies remove three combs of brood without the bees, and replace them with frames fitted with full sheets of foundation comb.

The six combs of brood thus obtained should then be placed in the centre of a fresh hive, with two of combs fitted with full sheets of wide foundation comb, on either side, thus making the number of frames up to ten. The third colony, from which no brood has been removed, is removed to a new site and is replaced by the hive containing the brood combs, which hive is then populated by the flying bees from the stock that has been removed to a new site.

Those bees will rear a new queen from the eggs in the combs. If, as stated in Method 1, a fertile or virgin queen or ripe queen-cell can be given, it will be a great advantage. The principle can be applied to a larger number of colonies by taking pure-brood combs from each, always arranging for one colony from which no brood combs have been taken to supply the bees.

The parent colonies used in forming the nucleus will be reduced in strength sufficiently to prevent them, in the majority of cases, from swarming naturally, and, provided care is exercised, they will not be weakened to such a degree that honey production is decreased to any great extent.

An Artificial Swarm.

4. *Formation of an artificial swarm.*—Open the hive containing the selected colony about 10 o'clock on the morning of a fine day. Search for the queen and when found, place the comb on which she is, together with the adhering bees, in a fresh hive in the centre of nine frames filled with full sheets of wired foundation comb.

Remove the parent stock to a new site and stand the fresh hive in its place. The bees from the parent stock which are out collecting nectar will return to this hive and form a new colony.

The young bees left in the parent hive will rear a queen, or a fertile, a virgin queen, or a ripe queen-cell can be given with advantage.

5. *To obtain surplus honey and yet retain increases of stock in the case of a colony swarming naturally.*—When, in spite of all precautions, a colony having a super or supers on it throws off a natural swarm, first hive the swarm in a temporary hive, then remove the parent stock to a new site, replacing it with the fresh hive containing ten frames fitted with sheets of wired foundation comb. Remove the supers, with their occupants, from the parent stock and place them over the frames in the new hives.

Then run the swarm into this "supered" hive in the usual way. By this method two strong colonies will be obtained, and, as all the foraging bees from the parent stock will join the swarm hived on the old location, the population will be increased sufficiently to enable them to complete the work of filling the supers.

6. *Casts or second swarms.*—Should it so happen that a cast swarm issues from a colony after it has swarmed naturally, provided it is known from which colony it issued, it should be returned.

Although casts can be built up strong enough to winter successfully their departure reduces the population of the parent colony to a dangerous degree.

Cast swarms should be returned in the same manner as a hived swarm on the second evening after the day of issue. If more than one cast swarm issues at the same time and it is not known from which colonies they came, they should be united so as to form one strong colony. This is accomplished by hiving them at the same time into their permanent hives. The excitement caused by throwing on to the hiving board together causes them to intermingle without fighting.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1925 AND 1924, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Nov.	No. of Years' Records.	Nov., 1925.	Nov., 1924.		Nov.	No. of Years' Records.	Nov., 1925.	Nov., 1924.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	2·13	24	0·60	6·79	Nambour	3·84	29	5·37	4·20
Cairns	4·02	43	2·16	7·01	Nanango	2·60	43	4·73	5·86
Cardwell	4·01	53	3·18	8·47	Rockhampton ...	2·22	38	1·50	3·83
Cooktown	2·70	49	1·39	4·09	Woodford ...	3·14	38	6·94	2·94
Herberton	2·49	38	1·61	10·02					
Ingham	3·60	33	0·43	2·99					
Innisfail	6·20	44	2·02	9·89	*Darling Downs.*				
Mossman	3·68	17	2·90	6·43					
Townsville	1·85	54	0·82	5·84	Dalby	2·64	55	3·83	4·14
					Emu Vale ...	2·65	29	5·17	4·27
					Jimbour	2·31	37	3·01	3·49
Central Coast.					Miles	2·43	40	2·17	4·42
					Stanthorpe ...	2·73	52	4·23	5·95
Ayr	1·74	38	0·27	2·08	Toowoomba ...	3·25	53	4·38	5·51
Bowen	1·30	54	0·39	3·59	Warwick	2·55	60	5·51	4·08
Charters Towers ...	1·51	43	...	1·49					
Mackay	2·93	54	0·86	6·53					
Proserpine	2·91	22	1·35	5·05					
St. Lawrence ...	2·28	54	1·75	2·39	*Maranoa.*				
					Roma	2·07	51	3·78	6·72
South Coast.									
Biggenden	2·68	26	2·66	3·82					
Bundaberg	2·55	42	1·29	4·03	*State Farms, &c.*				
Brisbane	3·69	74	8·53	6·29					
Childers	2·78	30	1·39	3·63	Bungeworgorai ...	2·25	11	2·57	7·79
Crohamhurst ...	4·39	30	7·47	4·21	Gatton College ...	2·58	25	5·94	3·93
Esk	3·12	38	5·45	3·98	Gindie	2·10	26	2·15	5·10
Gayndah	2·80	54	2·75	4·19	Hermitage ...	2·64	19	5·08	4·56
Gympie	3·13	55	5·46	2·19	Kairi	1·93	10	0·56	4·39
Caboolture	3·19	38	8·59	3·25	Sugar Experiment Station, Mackay	2·59	28	0·53	5·91
Kilkivan	2·59	46	2·41	3·47					
Maryborough ...	3·08	53	6·41	4·36	Warren	3·13	11	5·30	3·51

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year, and for the same period of 1924, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Meteorologist.

STORAGE CHARGES AT HAMILTON COLD STORES.

A deputation representing the Queensland Co-operative Dairy Companies' Association, in the personnel of Messrs. J. T. Tod (President), W. T. Harris (Secretary,) F. J. Dobson, W. Dearling, and J. Mulcahy, waited on the Minister for Agriculture (Hon. W. Forgan Smith) recently and discussed with him matters appertaining to the charges to be imposed for the storage of dairy products at the Hamilton Cold Stores. The deputation requested that a reduction of the proposed charges be made.

The Minister intimated that the charges to be imposed at the Hamilton Cold Stores would be the same as already prevailed at Roma Street Cold Stores and at other cold stores in the metropolitan area. Mr. Smith pointed out that the storage charges must have relation to the operating costs, but intimated that the whole matter would be reviewed at the expiration of six months, when the Department would have the benefit of actual experience in operating costs at the Hamilton Stores.

The deputation also requested that provision be made under the Primary Producers' Co-operative Associations Act for the purpose of affording fuller protection to debenture holders. Mr. Smith informed the deputation that this question had already received his consideration, and that it was proposed to issue a regulation under the Act to give the desired relief. He thought such would meet the position as outlined by the deputation.

PIG CLUBS.

THEIR VALUE IN QUEENSLAND AGRICULTURE.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

Pig Clubs? What are they? What are they intended to convey or teach? Could they be successfully initiated in Queensland? How much would it cost and what staff would be required to carry them on? These and a host of other queries a year or two ago appeared to present a mountain of difficulty to the person to whom they were addressed, for Pig Clubs were not well understood then. They had not been tested out under local conditions, and there was but the published experience of American and Canadian Pig Clubs' specialists to fall back upon.

Since that date, however, a great deal of useful pioneering work has been attempted in initiating this popular and profitable educational activity, the result being that Boys' and Girls' Pig Clubs are now recognised as quite an attractive and interesting line of work in the curriculum of Queensland Rural and State Schools, particularly where these schools are favourably located in dairying, mixed farming, and fruitgrowing centres.

In an interesting speech at the Mapleton State School Pig Club fete recently, Mr. J. D. Story, Public Service Commissioner—to whom is due the credit of having emphasised the importance of these clubs and the urgency of having them put into operation—said that the Rural School movement and the schemes attendant upon their development (Pig Clubs, &c.) really had its birth in Queenlsand in the Mapleton district, although that was not generally known. He had spent a good many of his leisure hours in that famous mountain resort on the Blackall Range, and in pondering over various subjects had made a speciality of inquiring into movements which would specially interest children attending country schools, where they had not the many and varied conveniences and attractions of the city and the city schools. He was anxious that Queensland's country boys and girls should become leaders in these up-to-date movements, for it was highly desirable that these young folks should learn to love the country and their work so that the drift to the city and to city employment should at least be stemmed. Mr. J. B. McKenna, the Under Secretary to the Department of Public Instruction, also voiced Mr. Story's sentiments in regard to the Pig Club schemes. He expressed pleasure at seeing such tangible results of the efforts that had been put forward in the direction of fostering this branch of the Home Project Scheme. Mr. F. Watt, the Head Teacher of the Mapleton State School, joined in congratulating the boys and girls on the splendid results obtained in this their fourth School Pig Club. Reference was also made by Mr. Story to the work of the late Mr. Wm. Rowlands, Fruit Packing Instructor, and to the work of his successor Miss Nina Dunning, who had specially interested themselves in another branch of the scheme—viz., that relating to the proper grading and packing of fruit.

Mr. W. R. M. Steele, the Head Teacher of the Rural School, Nambour, and other teachers were also particularly interested and had done a great deal in fostering these several schemes.

The Pig Club movement has much to commend itself to the children of farmers who are interested in the raising of more and better pigs, for it aims first and foremost at educating the children, and at giving them an intensely practical acquaintance with the many and varied aspects of the breeding and management of pigs. That Pig Clubs can be initiated and carried through successfully has now been demonstrated on more than one occasion in this State, and the keen, intelligent interest taken in them by the junior farmers is definite proof that the movement is here to stay.

The Mapleton Pig Club Results.

Fifteen children competed together at the Mapleton Pig Club fete, held in the school grounds at Mapleton, on Saturday, 28th November, and the results herewith speak for themselves.

Some added explanation may not, however, be out of place in describing these details.

It will be noted from Table I. that the first column gives the number allotted to the competitor, this being purely for record purposes. Column 2 gives the name

of the competitors. They were all scholars of the Mapleton State School with the exception of John and Bowden Harding, children of an enthusiastic Pig Club worker, Mr. S. Harding, of Flaxton, at which centre these two children attend school. Column 3 quotes the name given to the pig by the competitor, while column 4 gives the breed or cross. It will be noted that there were some purebred pigs—viz., Victor Cordwell's pedigree Poland-China boar, and so on. It is one of the objectives of the Pig Club to be the medium through which purebred and better quality pigs might be introduced into the district and State.

Columns 5 and 6 state the age of the pigs when purchased and their weights. The weights were, in some instances, the estimated weight, but they were checked over by the Instructor in Pig Raising and may be taken as fairly reliable.

Column 7 gives the price paid, and in this connection see also Note A at foot of Table I.

Column 8 states the number of days the pig was fed for the purposes of this competition; the number of days varies considerably. This has been one of the most difficult problems associated with the development of the Pig Club scheme. Some parents are more cautious than others, and they desire to see the club in full swing before they will permit their children to join in. In some instances, owing to shortage in the supply of store pigs, club members found it quite a difficult matter securing satisfactory pigs with which to compete in the club. Several pigs were available but their purchase price was beyond the means of the child. In earlier clubs one or two pigs developed rickets and had to be culled out, while in later clubs some children were able to induce their parents to arrange for the purchase of purebred pigs and the purchase and delivery of these animals was, in one or two cases, much delayed. Thus it was that some members fed their pigs for as long as 121 days, whilst others had them less than two months, and in one case less than one month, but these are matters in which a good deal of judgment had to be exercised on the part of the organisers; they are all part of the game and we had no desire to prevent any child entering the club who had sufficient interest and enthusiasm to wish to join up.

Columns 9 and 10 give the actual age of the animal on Pig Club Day, 28th November, 1925, and the actual live weight. Every pig was carefully weighed "over the scales," and for this latter purpose another Pig Club enthusiast, Mr. T. M. Forster, of the Forster Engineering Works, Mary street, Brisbane, has kindly donated for the use of these clubs, one of their Forster Patent Pig Grading Machines, a machine which embodies both a slide, a set of scales, and a portable pig crate, a combination providing a very useful apparatus for weighing, and in this way grading pork and bacon pigs.

For further particulars *re* this machine, see pamphlets on "The Marketing of Pigs in Queensland," obtainable on application to the Department of Agriculture and Stock, Brisbane, where also many other useful Pig Raising pamphlets may be procured. It will be noted that the age of the pigs and their actual live weight also varied a good deal, but as there are no hard and fast rules in these Pig Clubs, pigs of varying ages and weights are catered for, and on judging day they are classified and penned and are judged accordingly.

Some pigs were classified as very light porkers, some as medium and heavy porkers. Others again as light and as medium or prime baconers. The judging and classification of the pigs at the Mapleton Fete was in the hands of Mr. F. W. Martin, secretary of Stock Agents Limited, of Roma street, Brisbane (an organisation representing the various proprietary bacon factories in Queensland), and of the Instructor in Pig Raising to the Department of Agriculture and Stock, Brisbane, the writer of this series of articles.

Column 11 is of very great interest as it shows the actual daily increase in weight of each animal over the period of days during which it was competing in the club. These figures will be of very wide interest also, for they show what is possible in the direction of profit making by feeding and caring for pigs on the proper lines. The most profitable animals in the competition in this regard made a daily increase in weight of more than 1 lb. per day, whilst the slowest growers gained at the rate of pretty well half a pound per day.

We are indebted to Mr. F. Watt, the Head Teacher of Mapleton School, for acting in the capacity of Controller of the Club and as a sort of clerk of the course or master of ceremonies on Club Day.

TABLE I.—MAPLETON STATE SCHOOL PIG CLUB.

Number for Record Purposes.	Name of Competitor.	Name of Pig.	Breed or Cross.	Age when Bought.	Weight when Bought.	Cost (see Note A).	Number of Days Fed.	Age 28th Nov.	Actual Live Weight 28th Nov.	Average Daily Increase.
				Weeks.	Lb.	£ s. d.			Lb.	Lb.
1	James Cramb	Spot	Berkshire-Tamworth	6	22	1 0 0	121	5½ months	165	1·18
2	Victor Cordwell ..	Broxburn Rover..	Poland-China ..	9	60	6 6 0	16	3 months	81	1·3
3	Alwyn Neville ..	Biddy	Berkshire	5	18	1 0 0	107	4¾ months	126	1·0
4	Ronald Watt	Jill	Berkshire	5	15	1 0 0	82	4 months 5 days	85	0·86
5	Lillian Tucker ..	Daisy	Tamworth ..	6	20	5 5 0	51	3 months	72	1·0
6	Reginald Tucker ..	Laddie	Tamworth-Yorkshire	6	20	2 10 0	51	3 months	98	1·5
7	Fred Bruhn	Betty	Tamworth-Berkshire	6	20	1 0 0	121	5½ months	146	1·04
8	Dennis Herron ..	Brindle ..	Tamworth ..	5	15	1 0 0	59	3 months 1 week	81	1·12
9	Arthur Kuch ..	Lassie ..	Berkshire-Yorkshire	8	40	0 15 0	82	4½ months	121	1·0
10	Stanley Herron ..	Brownie ..	Tamworth-Berkshire	5	15	1 0 0	59	3 months 1 week	75	1·02
11	John Harding ..	Richard ..	Tamworth-Berkshire	7	15	0 18 0	109	5½ months	103	0·81
12	Bowden Harding ..	Gatton Rose ..	Berkshire ..	10	50	2 2 0	40	4 months	116	1·65
13	William Jeffs ..	Mabel	Berkshire ..	5	12	1 0 0	77	4 months	64	0·67
14	Rowland Bruhn ..	Bob	Yorkshire ..	6	25	1 0 0	130	6 months	155	1·0
15	Nellie Jeffs	Blackie ..	Berkshire ..	5	10½	1 0 0	77	4 months	45	0·45

NOTE A.—The figures shown in this column represent in the case of crossbred pigs or pigs purchased as stores the actual sum paid by the club member for the pig. In the case of the higher priced animals, the figure in the case of No. 2 is the actual stud value paid for the animal, in the case of No. 5 the price realised when this young sow was sold on Club Day, in the case of No. 6 the actual meat value on Club Day, and in the case of No. 12 the stud value as a weaner.

E. J. SHELTON, Instructor in Pig Raising.

30th November, 1925.

F. E. WATT, Head Teacher, Mapleton.

TABLE II.—MAPLETON STATE SCHOOL PIG CLUB.

Number for Record Purposes.	Name of Competitor.	MARKS AWARDED.										Total.	Place in Competition.
		1	2	3	4	5	6	7	8	9	10		
1	James Cramb ..	14	9	15	10	5	10	5	10	10	10	98	1
2	Victor Cordwell ..	15	9	15	9	5	9	5	8	10	9	94	2
3	Alwyn Neville ..	15	8	14	9	5	10	5	9	8	10	93	3
4	Ronald Watt ..	14	7	15	10	5	10	5	10	10	7	93	3
5	Lillian Tucker ..	15	8	15	8	5	9	5	7	10	10	92	5
6	Reginald Tucker ..	13	10	15	8	5	9	5	8	10	8	91	6
7	Fred Bruhn ..	14	9	14	9	5	10	5	7	9	9	91	6
8	Dennis Herron ..	14	9	13	9	5	8	5	7	10	9	90	8
9	Arthur Kuch ..	14	8	14	9	5	9	5	8	7	9	88	9
10	Stanley Herron ..	14	9	13	9	5	8	5	8	8	8	87	10
11	John Harding ..	13	7	13	8	5	7	5	9	10	10	87	10
12	Bowden Harding	15	10	13	8	5	7	5	2	10	9	84	12
13	William Jeffs ..	13	7	12	6	4	7	5	8	8	9	79	13
14	Rowland Bruhn	13	8	14	8	5	5	5	..	10	10	78	14
15	Nellie Jeffs ..	12	6	12	6	4	7	5	10	7	8	77	15

Table II. reads in conjunction with the Pig Club Award Card, giving the following details. It was on this Score Card that the final results were based, and every competitor was supplied with a copy of this Award Card on becoming a member of the Club.

PIG CLUB AWARD CARD.

Points were awarded as follows:—	Possible Points.	Points *Awarded.
1. Type and quality of animal selected	15	
2. Rate of increase in weight of animal	10	
3. Cost of production; the use of home-grown foods being an important consideration	15	
4. Sanitation, condition of pig sty and grazing area ..	10	
5. Health of animal, freedom from parasites (lice, &c.)	5	
6. Interest shown in management of the animal by the club member	10	
7. Arrangements for marketing, exhibiting at show, &c.	5	
8. Essay on "How I Selected, Fed, Managed, and Exhibited my Pig"	10	
9. Market value of animal. Actual live and actual dressed weight and value per pound to be taken into consideration	10	
10. Order of Merit in Prize List at Show	10	
Possible	100	

* For points awarded, see Table II.

In connection with Table II. some added explanation is also necessary.

In Column 3, for instance, it will be noted that some children secured the maximum points (15); full points were awarded where the children had really good purebred pigs, for it is, as stated above, one of the objectives of the club to be the medium through which better pigs may be introduced into the district. Some of the purebreds were, however, not quite as good as the others, hence their total points were lower.

The rate of increase column (4), carried points in accordance with the daily increase as estimated on judging day. It will be noted that all the competitors scored very high points in the cost of production column. This is important, for it was shown that these pigs had cost little or nothing to produce—*i.e.*, they were fed on foods that would very largely have otherwise been classed as of little or no commercial value. Herein lies the great value of the pig as an asset on the farm, for he is, as history records him to be—

"The Husbandman's most useful scavenger,
The Housewife's most useful sink."

At any rate, the pigs were fed almost entirely on foods produced on the farms or on household scraps willingly donated by the parents and neighbours of those children residing in the township itself or thereabouts.

It has been a special objective in Pig Club work—and this has been specially emphasised by Mr. Steele, of Nambour, and his co-workers, in the Maroochy Shire Pig Clubs—to show that there is "Money in Pigs," and to demonstrate that the best way to make more money out of them is to produce them at a cheaper rate than heretofore, and this in its turn demands that the pigs must be fed on food produced on the farm in preference to food purchased at comparatively high prices from the storekeeper or the miller. It is admitted that the judicious use of concentrated foods, which in most instances have to be purchased, is often a payable proposition, but the amount of purchased food used in the Pig Clubs has been negligible, hence from that standpoint the objective of the club has been gained when it has been demonstrated that the pigs were almost entirely "home fed." The column giving points awarded for sanitation, &c., show that in almost every instance the pigs were kept under ideal conditions. This especially so as on official inspection day, on which day these points were awarded, heavy rain fell almost continuously and the inspection was carried out under anything but favourable conditions in so far as the competitors were concerned, for it is hardly to be expected that a pig's sty and its grazing area would be as clean and spic and span on a day during which, and prior to which, heavy rain had fallen (and it can rain up on the heights of Mapleton), and the red soil soon churns up into a good old mud bath. It will be noted also that the points awarded for health of animal, freedom from parasites (lice, &c.) were excellent. This indicates that the pigs were a very healthy lot, free from parasites of any description, a most important aspect and one well worthy of note in the children's essays, several of which will appear in the Pig Club pamphlet.

The lowest points awarded in the column allotted to interest shown in the management of the animal—viz., 5 points—was awarded to a little chap seven years old, who was awarded a special prize for the best exhibit shown by the youngest member of the club. His pig did not compete with the others for it was felt that he had not reached an age at which he could be charged with any responsibility in so far as his particular pig was concerned. He did very good work, however, in showing the interest he did.

The points awarded for the essay on "How I Selected, Fed, Managed, and Exhibited my Pig" varied somewhat, though all the essays were very creditable.

The little chap securing two points out of a possible ten was but a novice exhibitor; it was his first attempt, yet he showed a very fine Berkshire sow, a pedigree sow from the Gatton College stud. The points awarded for market value of the animal varied according to the quality and condition. It was a general remark that the whole of the pigs exhibited were of a very high standard, a standard which left little lacking in regard to quality and commercial value.

The total points awarded indicate that the principal prize winners scored very well. It might be remarked here that in the case of James Cramb, the winner of the championship in the open class, he had the assistance of a very enthusiastic schoolfellow, Fred Hill, of Mapleton. Fred did not have a pig in the contest, so it was

agreed that he and James Cramb would run a "company" pig, and as all the other club members were agreeable, they set to work determined to win and they put up a very fine record; as also did Victor Cordwell, the winner of the prize sash for the champion pig of the show exhibited by a novice exhibitor—an exhibitor who had not won a prize in any previous Pig Club. Victor showed a very fine Poland-China boar bred by Mr. J. H. Whittaker, of Victoria Park Stud, Broxburn, an animal who put a great record in the fortnight or more in which he was competing. In fact, each of the competitors did work of which any pig farmer might well be proud.

The list of prizes awarded were as follows:—

MAPLETON PIG CLUB, 28TH NOVEMBER, 1925—PRIZES AWARDED.

Name of Competitor.	Prize Awarded.
1. James Cramb (in partnership with Fred Hill)	Pedigree Berkshire Boar, donated by Mr. J. S. Jacobsen, of Mount Larcom, Q.
2. Victor Cordwell	Prize sash, donated by John S. Shaw, Ltd., of Ann and George Streets, Brisbane, per Mr. H. L. Griffiths.
3. Alwyn Neville	Gold Medal, presented by the Queensland Branch of the Australian Stud Pig Breeders' Society, Mr. R. G. Watson, Secretary.
3. Ronald Watt	Gold Medal, presented by the Queensland Branch of the Australian Stud Pig Breeders' Society, Mr. R. G. Watson, Secretary.
5. Lilian Tucker	Book Prizes, to the value of £1 1s., presented by Messrs. J. C. Hutton, Ltd., and Foggitt, Jones, Ltd., Brisbane, per Mr. F. W. Martin, of Brisbane.
6. Reginald Tucker	Cash Prize, £1 1s., donated by Mapleton School Committee.
6. Fred Bruhn..	Cash Prize, £1 1s., donated by Mrs. Ekin, of Mapleton.
8. Dennis Herron	Bag of Fertiliser, donated by Manager of Queensland Co-operative Bacon Association, Murarrie.
9. Arthur Kuch	Bag of Protein Meal, donated by Thos. Borthwick & Sons, of Wharf Street, Brisbane.
10. Stanley Herron	Cash Prize, 10s. 6d., donated by Mapleton School Committee.
10. John Harding	Cash Prize, 10s. 6d., donated by Messrs. Overells Ltd., The Valley, Brisbane.
12. Bowden, Harding	Cash Prize, 10s. 6d., donated by Mr. J. C. Dixon, of Flaxton.
13. William Jeffs	Cash Prize, 10s. 6d., donated by Mr. W. Anderson, of Mapleton.
14. Roland Bruhn	Cash Prize, 10s. 6d., donated by Mr. Thos. Walker, of Obi Obi.
15. Nellie Jeffs	Book Prizes, to value of 10s. 6d., presented by Messrs. J. C. Hutton, Ltd., and Foggitt, Jones, Ltd., Brisbane, per Mr. F. W. Martin.

Future Clubs.

A club is in operation at present at the Jarvisfield State School, *viâ* Ayr, Queensland, and it is expected that this will terminate during this half year.

Clubs will be initiated as early as possible at various centres along the North Coast Line in Queensland, and in as many other districts as time and circumstances will permit.

Those interested in this movement are invited to communicate with the writer at the Department of Agriculture and Stock, William street, Brisbane.

Copies of this article in Pig Club pamphlet form will be available towards the end of January or early in February, 1926.

DIPLOMA DAY AT GATTON.

THE WORK OF THE QUEENSLAND AGRICULTURAL HIGH SCHOOL AND COLLEGE.

"The Courses at the College are so arranged that it turns out, not only Students trained in the practice and science of Agriculture, but men, worthy citizens of this great agricultural State.

"The efficient farmer, who was a working man, was as much entitled to skilled wages as the maker of Australian ploughs, harvesters, or shirts."—*Principal J. K. Murray.*

The ceremonies of Diploma Day at the Queensland Agricultural High School and College at Gatton on 15th December were a fitting closure to a successful academic year, and the college surroundings were enlivened by the decoration of the various buildings and the presence of many parents and friends of students. The visitors attended from many centres, and were entertained for the day by the Principal (Mr. J. K. Murray) and Mrs. Murray. After the heavy showers of the previous night, the weather conditions were pleasant, and the visitors enjoyed the outing immensely. They were met at the college siding by cars and drags from the college, and conveyed to the institution. After morning tea a tour was made of the several departments. The visit to the farm was abandoned owing to the moist condition of the soil, but the visitors found plenty to interest them in the exihibits of saddlery and harness, and sheet metal work, the butter factory, the animals, and the laboratory.

Among those invited were: The Federal Speaker (Sir Littleton E. Groom) and Lady Groom, the Minister for Public Instruction (Hon. T. Wilson) and Mrs. Wilson, the Under Secretary for Public Instruction (Mr. B. McKenna), the Assistant Chief Inspector (Mr. J. Riddell), and the Minister's private secretary (Mr. J. N. Larcombe), Messrs. W. J. Affleck (Chairman of the Council of the Royal National Agricultural and Industrial Association), W. E. Lingard (The Queensland Times Limited), H. W. Watson (Secretary of the Q.P. and A. Society), C. H. Jamieson (Chairman of the Queensland Butter Pool Board, J. F. F. Reid (Editor of Publications, Department of Agriculture and Stock), Councillors A. G. Kluck (Chairman) and A. McAllister, Laidley Shire Council; Councillors J. T. Yates (Chairman), J. Logan, and J. H. Raub, Tarampa Shire Council.

The Distribution.

The Minister for Public Instruction (Hon. T. Wilson) distributed the prizes, certificates, and trophies won in the sporting events. The ceremony took place in the gymnasium hall, which was packed.

The Principal (Mr. J. K. Murray) pointed out that this was the first occasion on which he had submitted a report such as he presented that day, to a similar gathering. He expressed thanks to the tractor companies for their support of tractor schools, and to the donors of prizes. He expressed appreciation of what the Royal National Association and the Commissioner of Irrigation had done for the students. Dealing with experiments, he said the college would do some valuable work in that direction, but the results would not be announced until they had been given an exhaustive trial. He expressed appreciation of the conduct of the boys, and he was confident that the standard of conduct of Gatton College boys would lose nothing by comparison with that of any other institution. He hoped they would realise that to belong to the college was a peculiar privilege, and that they had behind them the State of Queensland.

Minister's Speech.

The Minister expressed his gratification with the progress that the college was making. He was satisfied the boys were receiving an education that would make them a credit to the college. He recognised that the primary industries were of first importance in Queensland, and the value of the work at the college in combining

practical and scientific work. On that day they were making history, and he was sure the work of the college would make the institution loom greatly in the public eye. He congratulated winners of diplomas. In addition to the honour, these diplomas would be passports for their entry into the world of work. In 1914, the total vote for education was £675,658, and last year it had increased to £1,750,000. They could spend another £500,000, and then the schools would not be anything like up-to-date; but this institution, he believed, was making a name for itself throughout the world.

The College Spirit.

Sir Littleton Groom moved a vote of thanks to the Minister, and to Mr. Murray and his assistants for the interesting day they had given the visitors, and for the hospitality they had shown. The Minister had properly pointed out that this was an historic day for the students. They would take away ineffaceable memories of their stay at the college, and the culmination of their studentship there. He was pleased to hear the Principal say that there should be a spirit at the college, and that the boys should feel that they belonged to a society where men were being trained, and where they would breathe a spirit that would carry them through their lives, perhaps all over Australia. That spirit was formed by the friendships they would form at the college. The true spirit of friendship was formed there—a spirit that would make them feel that they would do anything rather than turn down those who had been their friends at the college. (Applause.) There was also at the college the spirit of good—the spirit of playing the game, in the sporting field as well as the class room. This spirit would make them feel that it would not be worth while if the mastery were not obtained by fair play. Then there was the spirit of idealism—the spirit that made them feel, after they left the college, that they would do something more. That idealism was given them by the example of those in whose charge they were placed. They had men at the college of high character, who tried to leave their impress on the boys. The college was training them to be citizens—that they must be prepared to stand alone. Their training at college would teach them to do a thing because it was right. Science did not humbug them. The laws of Nature could not be humbugged, and the idea of their training was to enable them to see accurately and deal justly. Their training also showed them that they could not go through the world alone; team work was necessary, and they had to act with other people in the world. He advised them not to be disappointed because they might once be turned down. There were many opportunities in life if they only would take them. They were grateful to the department which gave them such excellent opportunities for training. They lived in a scientific age, and the value of the college teaching largely lay in the research side.

Mr. Lingard seconded the motion of thanks, and voiced the congratulations of parents and scholars to Mr. Murray and members of his staff for the excellent work on which the coping stone had been placed that day.

Cheers were given for the Minister, the Principal, and the staff.

Principal's Report—Record Attendance.

The Principal, in his report, stated that the number of students attending courses during the year had constituted a record. The particulars were—Regular students, 80; short course students, 8; tractor school, 74; teachers' school 51; total, 213. Accommodation was overtaxed, and immediate increase in classrooms and dormitories was essential. He quoted from a leading article in the "Queensalnd Times": "When a boy leaves any school, the test is not his achievements in various examinations, but what he is himself." The courses were so designed, he said, that the Agricultural High School and College would turn out not only students trained in the science and practice of agriculture, but men, worthy citizens of this great agricultural State. In the curricula of agricultural colleges, the vocational side had generally been strong, but the cultural side weak, and graduates of the colleges had too frequently presented appalling English in their final examination papers. The curricula now in operation there ensured that the training in English was such as would remove this defect. Students were given ample practice in debating class work and essay writing. The class room and laboratory accommodation of the college had been neglected, a point stressed by committees which had made inquiries into the working of this institution. With a more sympathetic understanding of such needs, characteristic of an educational department, this deficiency would soon be a thing of the past. Already splendid progress had been made in the reconditioning and equipment of the chemical laboratory. A new bacteriological laboratory, the superior of any such laboratory attached to an Australian agricultural college, was in working order.

Improvements Needed.

A botanical and plant disease laboratory was required, and could be arranged in the main laboratory building as soon as a classroom block had been constructed. The room set aside in the laboratory building for the lecturer in plant breeding and genetics would require to be fitted and equipped in accordance with his ideas. The classroom block needed to contain a room which would accommodate 200 people comfortably. At the tractor schools, 140 people had been present at a lecture held in the gymnasium under uncomfortable conditions. The staff and students now numbered 90 people, and no suitable meeting place was available. The water supply of the college required improvement. Steps were taken this year to raise the main supply tank. This was found impracticable. The necessity for an increased storage and head was appreciated by all concerned with college welfare, and it was hoped that the matter would be proceeded with early in the new financial year. The Lecturer in Plant Breeding and Genetics (M. J. R. A. McMillan, B.Sc.Agr., Sydney; M.Sc., Cornell) would take up duty in the first week in January, and a private laboratory was being equipped to meet his requirements. He would be mainly engaged in the breeding of maize suited for Queensland conditions. Generous space had been devoted to college activities by the metropolitan and country Press. Very good progress had been made in fitting the college for its work in agricultural education. Noteworthy improvements had been effected in each department.

The staff had become a well-balanced one, though improvement was needed in some directions.

Tractor School.

The teacher's school, held in January, was attended by forty-four teachers drawn from most parts of the State. The enthusiasm of those attending made the instruction a distinct pleasure. A selected group of six teachers was now doing a six months' course in agriculture and farm crafts. The second tractor-school surpassed the first, and set a new record for attendance at farmers' instruction classes in Queensland. The machinery agents co-operated splendidly, forwarding nine tractors which, with the college three, made twelve available. Of these eleven were used, two were stripped for demonstrations in engine timing, valve grinding, decarbonising, &c. The remainder were used for field demonstrations in tractor driving. The machinery agents each sent a mechanic to instruct farmers in driving. School enthusiasm and Press tributes emphasised the value of this extension of college activities to meet the needs of the adult farming population.

The moral and spiritual welfare of the students was the especial and earnest care of clergymen of the several denominations represented within the district.

The conduct of the students had been very good during the year, and they maintained a standard of conduct worthy of the State College of Agriculture. The health of the students probably was on a higher level in the institution than in most other similar schools. The college was largely dependent on itself for social life. It was hoped to place a wireless plant and cinematograph at the college. Carefully selected pictures were essential for the junior boys.

College Sports.

The main recreations had been cricket, tennis, and Rugby League football. The college was leading in the competition of the Lockyer Cricket Association. Friendly games in Rugby League football had been played with the associated secondary schools.

The College Farm.

Some splendid crops had been grown. Florence wheat yielded 33 bushels per acre, and Huguenot 3 tons of hay per acre. The lucerne was yielding heavily. Variety and fertiliser trials in cotton, maize, wheat, and lucerne were being conducted, but it was much too early to give definite guidance. Some very good additions had been made to cattle, pigs, and sheep during the year. Full advantage was taken of the splendid facilities offered students by the council at the Royal National Show, at which the college had an extensive display of its activities.

Needs of the Day.

The outstanding requirements to-day of farming were: (1) More efficient production; (2) more efficient distribution; (3) better treatment by the community of farmers in the matter of prices. More efficient production could be effected by using better animals and plants, cows of higher production, pigs of quicker and more

economic growth, of maize and other crops. Better and more efficient cultivation was required. Australia's problem was not rainfall, but conservation of rainfall. The Lockyer received more rain in a year than London did. The early breaking up of paddocks to let rains into the soil, instead of running into creeks; the stirring of the soil surface after rains to check the huge loss of water through weeds and by evaporation from the surface—these measures were essential. The better education of the rural community, adult and child, was required. The attitude of the farmer to agricultural education was peculiar. He commonly stated that if a boy wanted to learn farming he should stay at home. As well might a doctor learn his profession from his father rather than at a university. Such an attitude, if widely adopted, would give us medicine men in place of medical men, and in respect to farming it was responsible for keeping the standard of farming much below that consonant with the available world knowledge of scientific agriculture. The Agricultural High School needed the farmers' sons and the State's interests required that they should come. Better distribution was required. The inefficiency of distribution of farm products was a byword. There was more than this, however. The farmer was again and again referred to as the backbone of the country. Like their own backbones, it was convenient to have, but given little consideration. It were better if they were able to refer to the farmer as the brains of the country. There was more than standing room for brains in agriculture. If the farmer used his head more they would have better farming, improved distribution of farm products, and a return (for Australian-consumed products) based on cost of production plus a fair profit. Now such a return required, as a *sine qua non*, efficient farming. Price-fixing could only be based on the costs of production of an efficient farm.

It could not be gainsaid that the average farmer in that district was not receiving the basic wage based on returns over an average of years. To put the matter bluntly, butter was being sold to well-paid Australians at rates which spelt sweated labour for farmers, their wives, and children. It was a state of affairs which was not compatible with our national honour. The efficient farmer, who was a working man, was as much entitled to skilled wages as the maker of Australian ploughs, harvesters, or shirts.

PRIZE LIST.

AGRICULTURE V.

J. A. Kerr: The Queensland Diploma in Agriculture (second class honours), dux. "Queensland Times" prize; best practical student, the Royal National Agricultural and Industrial Association's prize.

S. Dodds: The Queensland Diploma in Agriculture, second aggregate prize.

E. McCarthy and H. McK. Davie: The Queensland Diploma in Agriculture.

DAIRYING V.

D. H. Stephens, Q.D.A.: Queensland Diploma in Dairying, with first class honours, dux; "Queensland Times" prize.

M. R. Muller and J. E. Maher: Queensland Diploma in Dairying.

AGRICULTURE III.

R. McAllister: First aggregate and first in botany, engineering, horticulture, veterinary science, poultry, agriculture, dairying, and equal first live stock; second practical chemistry; and third English.

R. A. Price: Second aggregate; second in botany, English, engineering, mensuration; and third in chemistry and agriculture.

J. C. Spencer: Third aggregate; first in chemistry and practical chemistry; second in agriculture and horticulture; third veterinary science; and equal third in poultry.

J. T. Tod: Fourth aggregate; equal first in live stock and mensuration; second in chemistry, veterinary science; third agriculture; and equal third in botany.

G. Sigley: Fifth aggregate; equal first mensuration; second poultry and dairying.

A. Hulme: Equal first live stock; and equal third botany.

A. Nixon Smith: First English; third dairying; and equal third botany and poultry.

P. W. Hamon: Equal first mensuration.

T. G. Graham: Third practical chemistry.

AGRICULTURE I.

T. H. Ayles: First aggregate; first in geometry, English, arithmetic, and botany; third in agriculture.

R. Burns: Second aggregate; first dairying and agriculture; second horticulture, botany; equal second English; third in live stock and poultry.

C. R. Grieve: Third aggregate; first chemistry; second algebra, soil physics, arithmetic, and live stock.

M. Reeve: Fourth aggregate; first poultry; equal second chemistry and geometry; and equal third engineering.

K. McLennan: Fifth aggregate; first engineering; second dairying; and third horticulture.

R. Baxter: Sixth aggregate; equal second English; third algebra, soil physics; and equal third in engineering.

S. Reeve: Seventh aggregate; first in horticulture; second chemistry, poultry; and third geometry.

R. Burns: Essay on "The National Show," R.N.A. and I.A.'s prize.

J. Martin: First algebra and soil physics.

N. Hill: First live stock; and second agriculture.

H. S. Smith: Equal third chemistry.

W. Steele: Equal second English.

A. M. Himstedt: Third English.

A. R. Wallace: Third arithmetic.

B. Bannikoff: Third dairying and botany.

A. Hing: Second engineering.

AGRICULTURE IV.

C. A. Schroder: First aggregate; first chemistry, engineering, live stock, veterinary science, agriculture, and milk and cream testing; equal second in practical agriculture and sheep and wool.

C. S. Christian: Second aggregate; first in practical sheep and wool; second in engineering, live stock, horticulture; equal second in sheep and wool; and third in chemistry, English, bookkeeping, veterinary science, and agriculture.

D. O. Atherton: Third aggregate; first in sheep and wool; equal first bookkeeping; second in chemistry and veterinary science; equal second practical agriculture; and third practical chemistry, live stock, and practical sheep and wool.

V. J. Brimblecombe: Best practical student, R.N.A. and I. Association prize; third in bookkeeping; and equal third in practical sheep and wool.

W. Aplin: First in practical chemistry; second practical sheep and wool; third in practical agriculture; and equal third English and sheep and wool.

F. C. Coleman: Equal first in bookkeeping; second in practical chemistry; equal second sheep and wool; equal third in engineering; and third in cream and milk testing.

A. F. Moodie: Equal first in bookkeeping; second in English, milk and cream testing, and agriculture; equal second practical sheep and wool; and third horticulture.

The following students passed the fourth year examination for the Diploma in Agriculture:—C. A. Schroder, 78·4 per cent; C. S. Christian, 77·6; D. O. Atherton, 77·3; A. F. Moodie, 75·8; W. Aplin, 71; V. J. Brimblecombe, 67·5; F. C. Coleman, 67·2; A. R. McKenzie, 58·3; F. P. Harvey, 56·4; W. Horneman, 54·6.

The comments of outside examiners had been favourable.

Students who passed the third year examination for the Diplomas of Agriculture:—F. McAllister, 80·5 per cent; R. A. Price, 75·9; J. C. Spencer, 73·9; J. G. Tod, 70·9; A. Hulme, 66·4; P. W. Hamon, 64·7; J. Ferguson, 64·6; T. G. Graham, 64·6; O. Pommer, 56·8.

Students who passed the first year examination for the Diploma in Agriculture:—T. H. Ayles, 79·1; R. Burns, 76·6; C. R. Grieve, 75·5; M. Reeve, 74·8; K. McLennan, 71·8; R. Baxter, 71·7; S. Reeve, 71; H. S. Smith, 69·4; A. M. Himstedt, 69; A. S. M. Hing, 68·8; A. R. Wallace, 67·7; N. Hill, 66·8; W. G. Steele, 66·3; G. Horn, 65·3; J. Martin, 65; B. Bannikoff, 63·2; R. C. Gregory, 62·9; I. G. Meddleton, 62·6; W. Akers, 59·6; G. Espie, 57; J. Griffith, 55; J. Ladewig, 54·7; E. Ladewig, 54; J. Rea, 52·7; R. Gillies, 51·3; V. Cooper, 50.

Students who have followed special courses:—C. H. Thiele, T. O'Connell, G. Litfin, G. F. D. Wadsworth, R. MacHardy, A. Wearing, W. Rahilly, G. Morgan.

FERTILISING EXPERIMENTS.

APPOINTMENT OF A DEPARTMENTAL ADVISORY COMMITTEE.

A Departmental Manurial Experimentation Advisory Committee has been formed with the object of designing and supervising fertilising experiments and other related activities. The chiefs of the several branches concerned form the personnel of the committee, which held its first business meeting in the Library of the Chemical Laboratory on 4th December. There were present Messrs. J. C. Brünnich (Agricultural Chemist), chairman, E. Graham (Under Secretary), H. C. Quodling (Director of Agriculture), A. H. Benson (Director of Fruit Culture), F. F. Coleman (Officer in Charge of Pure Seeds, Fertilisers, and Stock Foods Branch), J. F. F. Reid, Editor of Publications).

The Under Secretary (Mr. Graham), in outlining the objects for which the committee has been set up, said that it was expected to give full consideration to all manurial experimental work that came within the purview of, or that was undertaken by, the Department of Agriculture and Stock. Sugar and cotton fertilising experiments were excepted, as they are already fully covered by the Bureau of Sugar Experiment Stations and the Cotton Branch respectively. In constituting the committee he had kept in mind the fact that manurial work had two aspects, the technical or laboratory side and practical work in the field. Its object was to promote efficient team work. The co-operation of laboratory technicians with field officers was absolutely necessary. Co-ordinated effort and a combination of those skilled in both processes were essential to success. Both sides were represented fully on the committee, the personnel of which was not, however, limited to those appointed. It had the power to co-opt other officers when necessary. As the work progressed it might become necessary to invoke the assistance of the Government Botanist, particularly in relation to pasture improvement, and also other officers when any specific problem in which they are especially interested is being considered. While the functions of the committee would for the present be limited to manurial experiments, that did not mean that they may not be extended later to embrace other spheres of work. The economical use of fertilisers would be their especial concern. Generally farmers did not use manures economically with a view to obtaining maximum results. Manure, as they all knew, could be so applied as to produce high yields; but high yields were often obtained at too great a cost. It would be the task of the committee to devise plans by which fertilisers may be applied economically—that is to say, to yield a profit to the farmer.

Referring to the relationship of field officers to the committee, Mr. Graham said that it might be permissible, advisable, and indeed necessary for field men to become associated actively with its work. They might be empowered to initiate experiments and submit results to the committee through the chiefs of their respective branches. They might also submit proposals which could be sifted by the committee. It was not necessary, however, to directly co-opt field officers, as each branch by the constitution of the committee was already sufficiently and efficiently represented by its respective head. To invoke the co-operation of field staffs and utilise their services came already within the scope of the committee.

The heads of the branches concerned would naturally exercise a supervision over experiments in their respective zones of work. Fields for experiment could be provided on the several State Farms, special consideration, perhaps, being given to the provision of facilities at the Yeerongpilly Stock Experiment Station on account of its proximity and easy accessibility. Arrangements could also be entered into with farmers for the setting apart and utilising of certain areas on which work could be followed up to finalisation. Results and conclusions could be described, tabulated, and presented in readable and easily digestible form in the "Queensland Agricultural Journal" and other departmental publications. That particular work would, of course, come within the range of the Editor of Publications (Mr. Reid).

No funds had been set aside specifically for the work of the committee, and it would have to rely on the provision made in existing votes. A special financial provision was, at that stage, not quite practicable, but no doubt it would be considered when the next Estimates were being framed. By that time the committee would be in a better position to say definitely what experiments would be necessary and what would be their probable cost. The work of the committee itself would be carried out during official hours. Experiments at present in progress would be brought under its control and be encompassed in its work.

General Notes.

Why Boys Leave the Farm.

In the course of a discussion on the city-ward drift of rural population at a meeting of the Goode Branch of the Agricultural Bureau of South Australia, it was stated that farmers had pioneered without agricultural knowledge, with poor implements, lack of finance, and many more difficulties which had to be surmounted before success could be attained. They often fostered the thought that some day their sons would relieve them of their past strenuous duties, and later on take full control when things were running more smoothly. But to the keen disappointment of the farmer the boys left the farm when they would be most useful, and went to the cities. To the farmer that was a calamity, but very often it was his own fault. The farmer might be a good worker and farmer, but too frequently he overlooked the social side of farm life. The paper then read as follows:—"Do we take our boys sufficiently into our confidence, tell them what we propose to do, and how the work is to be done? Do we give them any actual and practical interest, and responsible jobs to do, which in doing make them feel that they are doing something of practical use on the farm? Farming is a serious business, but do we take the trouble to initiate the boys into its mysteries of moisture conservation, soils, seasons, seed, machinery, sheep, buying and selling, &c.? If this is done, farmers would be gradually instilling into young minds the best knowledge of farming they can get. Then our sons will know why things have to be done, and will do the work intelligently and with added pleasure. Do we give the rising generation sufficient time for recreation and amusement? Do we keep them going six full days a week, and possibly a portion of the seventh? It is only natural that the young folk should be allowed to seek good company of others of their own age." Continuing, it was stated that the boys would be quick to realise that, during the busy seasons, they could not expect many afternoons off for recreation, but could do so during the slack periods. Even in the very remote districts, where football, cricket, or tennis would be practically impossible, hunting very often provided a healthy form of amusement for both old and young, and, with the advent of wireless, a very enjoyable evening could follow for the whole family. Wherever possible music should be in every home. A pianola was a valuable instrument, on which all the latest music could be played. Many farmers were apt to say, "Who gave us these amusements and time for recreation?" In the days of early settlement the entire family worked on the farm. Little time was spent in going to school, in reading, or in travel. The few farm tools were so crude, and the farming so poorly done, that a family raised little more in value than it consumed, worked as hard and as long as they could, and even then the family was often threatened with famine. In those days farming was largely a question of man and animal power persistently toiling hour after hour. Implements were primitive, motor cars were in their infancy, telephones an expensive luxury, lighting installations imperfect, super. untried and unpopular. To-day they were essentials. Conditions had changed, and the boys were living in a mechanical and scientific age, an age where everything was done to save time, to reduce expensive and irksome labour, to make life easier, and conditions more enjoyable. With better farming fewer farmers were needed, for statistics showed a greater production per head. That placed the present-day farmer in a position far ahead of his forefathers. Life to-day was more comfortable, more time was provided for recreation, and they found themselves in a position to partake of the essentials and sometimes of the luxuries that life now afforded. He thought it advisable to give each farm boy a choice of occupation, especially if he showed an adaptability to such occupation. They should, of course, first try to initiate him into farming pursuits, but should that prove fruitless, then the lad should be given his choice. It had long been recognised that for every farmer three men were required in the city to handle his products, and turn them into commodities. With the latest power farming, improved implements, and motor cars, it would probably take six men in town to handle his products and supply his wants. Therefore they should not be alarmed when a drift to the cities was noticed. The price of farm products would always have a great influence on the drift either towards the country or city. It could be deduced that it did not altogether rest with the farmer to find out the solution for retaining the young farming generation; much would depend on the foresight of the Government in finding suitable markets overseas before over-production was experienced.

Points about Pit Silos.

Some useful suggestions in relation to pit ensilage were made in the course of a recent conference of instructors of the Department of Agriculture, New South Wales. By conversation with men who had filled pits for some years, and by personal observation, said the writer of a paper on the subject, several points in connection with the work of filling and emptying pits had appealed to him as being possible improvements over the usually accepted methods.

It was noticeable that the general tendency of the novice in silage-making was to make the pits deeper and wider than was advisable. In one case which had come before his notice recently a farmer had excavated a pit 10 feet square and 10 feet deep by pick and shovel, and knew of no other way until put on the right track. But experience soon taught that deep pits increased the labour of filling and emptying, and the trend of the experienced was towards even shallower pits than were usually recommended, and the quality of the silage turned out seemed to be good.

Wheat, oats, or barley were generally used, but in one case last season silage was successfully made from a mixture consisting mainly of variegated thistles. The writer's advice was asked by a farmer who had sown 10 acres of lucerne on the Macquarie River flats as to how he could best get rid of a tremendous crop of thistles which had come up with the young lucerne plants, and which was threatening to kill out the lucerne by excluding the sunlight. This thistle crop was estimated to be at least 10 tons per acre. It was suggested that he kill two birds with one stone by cutting the thistles and lucerne with a mower while still green, and putting the mixture into a silage pit. As there was a possibility that the material would be too sappy and become mushy, about 10 acres of a wheat crop was cut and put in with the thistles, in the proportion of one load of wheat to two of thistles. The resultant silage proved to be excellent.

Most of the cereal crops were cut with a binder. There were differences of opinion as to the best methods of filling the pit. Some advocated putting the sheaves in crossways, the contention being that it made for easier work in emptying. The method did not appear to affect greatly the settling down of the material.

A good point that had come under his notice, and that had been gained by experience by two silage-makers of several years' standing, was that in building up the pit above the ground level the height should be made to correspond to the depth of the pit—*i.e.*, where the pit was, say, 6 feet deep, the material should be stacked 6 feet high, and then sloped off according to the slope of the batter. It had also been found that there was often a tendency for a shrinkage of the material away from the walls of the pit, allowing the covering earth to crack and open and permitting run-off water to get down the sides during rain; this, together with the air so admitted, tended to spoil a greater percentage of the silage than was usual in well-filled pits. In order to avoid this, the plan of over-lapping the sheaves about 6 inches beyond the sides of the pit when building up above the ground level had been adopted. Then the main mass of the material, on settling down by its own weight, dragged this over-lapping material in and down the sides, and thereby prevented any undue shrinkage from the walls.

A method of lessening the work when covering the material with earth could also be recommended. When topping off the portion stacked above ground level, it was built somewhat similar to a haystack, and a final double row of sheaves was over-lapped along the ridge. The earth excavated from the pit was first dumped along this ridge by means of a bucket scoop, putting sufficient on to bind the mass thoroughly, taking the earth up from the ends. Then the balance of the covering was done from the sides, commencing at ground level, and putting each successive scoop full on top of the preceding one, working from each side alternately until the material was covered with a sufficient layer of earth. This method tended to make the work of covering the pit less tedious than when all the earth was taken up from the ends, which was the method usually adopted.

Planting Bananas.

Bananas are planted at all seasons of the year, but October is considered the best month in this State, as the growth is much more rapid with early spring plantings than with later ones.

One of the most important points in the growing of bananas and one to which very little attention is given by the majority of growers is the selection and the treatment of suckers for planting. One hears a great deal about seed selection, say, of maize and wheat, and of increased crop returns and general improvement arising from any little attention to the matter, but one does not meet many banana-growers who recognise how largely the careful selection of suckers affects the future life of the plantation, not only in regard to the yield of fruit but more particularly in regard to freedom from disease.

Most growers know that the sucker with greatest vigour is the one with a good bulb and with small, narrow leaves; this type of sucker is always a good grower, and always produces a good bunch. The size of the sucker is not of so much importance as the size of the bulb. The bulb is simply food stored away, and therefore the larger the bulb the larger the amount of food there is for the plant to use to tide over the shock of removal and replanting, as well as in the production of fresh roots in its new home.

Always reject suckers with poor bulbs and trunks of uniform girth, and select only those with good bulbs and tapering (or "bottle-shaped") trunks; by so doing you will obtain vigorous plants and will make the best of the soil and weather conditions. Of course, one of the most vigorous plants of all is the old butt with all but one eye pruned away; a plentiful supply of food is assured by the old butt, and the young plant, besides overtaking larger suckers in the matter of growth, produces a larger and better bunch, and at a time when prices are good. It is a mistake to split the butts into four and six "sets" or "slips," as some do, for the effect is positively to check vigorous development, and also to expose a large surface to fungus invasion. The less cut surface there is the less liability to fungus and bacterial attack.

Damage from Dust—A Point for the Grazing Farmer.

The damage done to the prospective wool clip by unnecessary exposure of the flock to dust is the subject of reminder in a publication of the Western Australian Department of Agriculture. Too little attention is given to the sheep immediately after they are shorn, in preventing the mob from raising dust, which penetrates to the skin, and remains to form the tip of the staple. Not only does this dust spoil the appearance of the wool, but it absorbs the natural grease, which should flow to the tip of each fibre, keeping it healthy and sound. For the want of nourishment this tip becomes dry and fuzzy, greatly increasing the proportion of "noils" after the process of scouring and combing.

Every effort should be made when driving or mustering sheep to allow them as much spread as possible, for in their congregation by the rounding up with dogs clouds of dust are raised, and this earthy tip is worked deeper into the staple. The tip of the wool readily absorbs the slightest dust or foreign matter, and is seriously affected by driving along a dusty road for even a mile or two. Once this dust adheres to the tip it remains there, and this often accounts for the difference in price of wool where one farmer purchases part of another grower's flock and drives it a few miles to his own property.

The same difference often shows up where farmers buy sheep at a saleyard out of the same flock, dividing them and driving them home by different roads. The road having less traffic than the other is usually cleaner, and the sheep arrive with less dust in their fleeces, in consequence of which the wool when shorn is worth more per pound.

It is the care of the sheep, and the prevention of dust from getting into the fleece from the day they leave the shearing board until such time as they arrive to be shorn the next season, that makes the wool bright instead of dingy and shabby.

Station owners often complain that the remaining portion of their clip has not brought as much money as that first shorn. This is often caused by the yards becoming more dusty as shearing proceeds, or doing an amount of drafting and longer droving just previous to shearing.

Every atom of dust that adheres to the fleece reduces its yield and detracts from the appearance and brilliancy of the wool.

A Square Deal—The Plaint of the Discontented Dairyman.

In visiting the various butter factories, says a departmental worker in the New South Wales "Agricultural Gazette," Dairy Branch officials are frequently impressed with the amount of cream received from neighbouring districts in which butter factories are known to be in operation. In some instances it has been noted that cream has been sent 100 miles or more from the home butter factory, and during the journey has probably passed the doors of quite a number of other butter factories before reaching its destination. On various occasions inquiries have been made as to the reason—why suppliers send their cream away from the home factory—and in nearly every case so inquired into the factory manager concerned will state that these suppliers are discontented with the test grade or results, or both.

If the matter is taken further, and one gets into personal touch with the suppliers themselves, they will almost invariably state that they do not get a "square deal" at the home factory, that they are being "robbed" in weight, test, or grade; and in some cases not only do they state that the weights, tests, and grades are wrong, but that the error is made deliberately by the factory.

It is very difficult to prove the correctness of these assertions, so freely indulged in, especially in regard to the matter of weight and test, for rarely indeed are either scales or testing apparatus to be found on the farm. As for the grades, the factory grader, whose aim is to place as much cream into choicest quality as possible without injuring the resultant butter, is the more likely person to give an absolutely unbiassed opinion in regard to the standard of the cream. These graders, who are examined by the Dairy Branch and receive scientific instruction in this regard, have positively no reason to place a choicest cream into first or second grade, or *vice versa*. Whatever the grading of the cream, the result exhibits itself in the butter, and the Dairy Branch officials whose duty it is to examine the butter know very promptly whether the grading is being correctly carried out. So it is seen at once that incorrect grading, either on the generous or vicious side, speedily brings its own reward for the cream-grader concerned in the grading of his butter, every grader of cream being compelled to grade correctly or incur the risk of having his certificate cancelled.

In some instances, unfortunately, the disgruntled supplier is not satisfied with sending the cream out of the district, but patrols the neighbourhood, sowing seeds of discontent; often stooping to untruths in explaining to his fellow dairymen the treatment he imagines he has received, in the endeavour to induce others to forsake their own factory and send their cream to some particular factory or other at which the discontented one loudly proclaims he receives a "square deal."

The article is worthy of the notice of every dairy-farmer, presenting as it does a balanced argument for a zone system of cream supply. If zones or boundaries were agreed upon by the various factories for the collection of cream, and no factory would accept cream from another factory's zone, the class of discontented supplier described would immediately cease to exist. He would either have to supply his own local factory or treat his own cream himself, or so improve his methods as to produce a genuine, good quality article.

Lucerne Haymaking—When to Cut.

Lucerne is more difficult to cure than any other kind of hay crop, and greater loss occurs to it than any other when improperly treated. Careful handling is required from the time the crop is cut until the hay is baled for market. The eagerness with which buyers snap up well-cured lots of lucerne hay indicates the importance of curing and of marketing in the very best condition. They prefer hay that is bright, green, dry, free from weeds and rubbish, and that contains a large proportion of leaf. A dirty appearance, indicating careless handling in the field, or the slightest sign of heating in the bale, cause buyers to reject the lot or to only accept it at much reduced prices. Since quality is of just the same importance when lucerne hay is fed on the farm the same care is necessary in its treatment.

Lucerne should be cut just after the first flowers have appeared, though many growers prefer to watch the crown for the young shoots of the next cut. Much more depends upon the selection of the right time to cut lucerne than with other hay crops. In the latter cases loss is chiefly due to deterioration in digestibility, but in lucerne the loss is not confined to this but extends to actual loss of weight in the hay and to poorer growth in the succeeding crop. After lucerne flowers the nutriment in the stems and leaves is withdrawn and transferred to the upper portions of the plant, and the stems harden and become indigestible, and of less value as food. The leaves wither also and begin to fall, which results in loss of weight, and as these are the richest portion of the plant every effort should be made to retain them in the hay.

No advantage is obtained when the crop is allowed to remain uncut past the stage recommended. The only time when such a course is justifiable is when the weather is unsuitable for hay-making, and the crop is left standing until good weather is assured. A loss in the succeeding cuttings also follows when cutting is left past the time indicated. This loss is due to two things. When the crop is left uncut until past flowering it is found that the succeeding crop does not start away so quickly as it does when the cut has been made earlier. Secondly, loss occurs through the greater time which the crop occupies the land. Lucerne only grows during the summer, and, provided rain is plentiful, good crops can be obtained at frequent intervals. If the average time for a cut of lucerne be taken at six weeks, and five cuts are obtained in a season of thirty weeks, it means that if each cut is allowed to stand seven weeks only four cuts can be obtained, which means an actual loss of 15 cwt. to 1 ton of hay per acre per annum.

It usually happens that owing to the cool weather the first growth of the season is late in flowering, and the leaves begin to drop and the stems to harden before the bloom appears. The crop should be carefully watched and the cutting made when the lower leaves begin to change their colour.

Cutting is done with the mower or scythe. A time should be selected when the crop is at the right stage, and when there is a prospect of fine weather lasting

until curing is completed. Showery or cloudy weather renders curing difficult, and hay of the best quality cannot be made. The usual practice is to start the mower going in the morning as early as possible, but if a heavy dew is on the crop cutting should be deferred until it has evaporated. External moisture, owing either to rain or dew, is objectionable, and causes deterioration in the quality.—"Agricultural and Pastoral Notes," New South Wales Department of Agriculture.

The Extraction of Honey.

The term "extracting" is generally used to cover the combined processes of (1) removing combs from the hive, (2) uncapping the combs, and (3) extracting the honey by means of the honey extractor. There is no set period for extracting; there may be a honey flow fairly early in the season, while at times the apiarist will not extract any surplus until the autumn. Again, there are seasons in which the flow may last all through. A safe plan for the beginner who desires to know when to extract is, when the colonies are progressive and the super or supers nearly full of sealed stores, to place over the brood nest and under the supers a fresh super, the frames of which contain comb foundation or empty combs. When good progress has been made in this super, the apiarist can consider it is time to extract surplus from the sealed stores above.

The beginner should always keep in mind the fact that bees require a fair surplus of stores during early spring if they are to be progressive in brood raising, while in the late autumn ample stores should be left with the colonies to carry them safely over winter. Until experience is gained in regulating these matters, it is best for the beginner to keep a little on the safe side. The bees usually give an indication as to the supply of available nectar. For instance, if they are inclined to rush any combs left out of a hive for a minute or so, or endeavour to raid the extracting house to any extent during mild weather, the apiarist can be assured that there is a scarcity of nectar. The same can be said as regards pollen when the bees endeavour to obtain a substitute by raiding the bran, pollard, or flour bins; but in this case the substitute is useless. The beginner is advised to take notice of these indications, for even a practical apiarist is usually guided by them, especially in a new locality. Do not stint your bees during a dearth of nectar.

A Wire-holder for Apiarists.

There are various ways of disposing of the spool of wire while wiring beehive frames, but surprisingly few of them seem to be quite satisfactory, and the spectacle of the wire winding itself in all directions to the inconvenience and annoyance of all concerned is common.

A handy wire holder is quite easily made from a few bits of deal, a skewer, and a piece of thin steel for the spring. A rough box is made, through the sides of which the skewer is passed, the wire bobbin running free on the skewer between the sides. A small board, made so as to press on the bobbin, and held in place by the steel spring, completes the outfit, which can be hung on the wall in a convenient place. With the help of this holder the problem of where to put the bobbin while wiring is solved, and the wire is made available minus all objectionable kinks.

Spread of Noxious Weeds—How some Fruitgrowers Contribute.

Fruitgrowers and others who import parcels of plants from other States contribute largely to the spread of noxious growths by neglecting to burn packings and coverings which often contain weed seeds. These are dumped on the rubbish heap or allowed to be scattered around the farmyard. The near-sightedness of this practice is obvious.

Staff Changes and Appointments.

Mr. S. T. J. Clarke has been appointed a senior field assistant to the cotton section of the department.

The police magistrate, Bowen, and Mr. J. Taylor, stock inspector, Maryborough, have been appointed Government representatives on the Dingo Boards for the Dingo Districts of Bowen and Wide Bay respectively. Messrs. A. H. W. Cunningham, A. J. Hall-Scott, J. A. Rowan, and J. E. Kelly have been elected members of the Bowen Dingo Board; and Messrs. J. C. Evans, F. M. Hooke, H. J. Hyne, and F. G. Lavaring have been elected members of the Wide Bay Dingo Board.

Messrs. F. H. Hyde and R. T. Croker have been appointed deputies to act as members on the Atherton Tableland Pig Board as from the 1st December, 1925, in place of Messrs. H. H. Collins and C. R. Davidson respectively, who are on leave.

The Minister for Agriculture (Hon. W. Forgan Smith) has appointed Messrs. R. Swan, A. C. Krieg, B. C. C. Kirkegaard, T. Muir, and J. Archibald to be members of the State Wheat Board as from the 2nd December, 1925, to the 31st August, 1926.

Mr. V. T. Yabsley, of Yandina, has been appointed an officer under and for the purposes of the Animals and Birds Act.

Constables T. J. Appleby, L. L. Johnstone, and D. E. Corey, of Lowood, Urandangan, and Dalby, respectively, have been appointed Inspectors of Slaughter-houses.

Mr. J. G. Low, of Winton, has been relieved of duties as part-time Inspector of Slaughter-houses.

Mr. Henry Tryon, Entomologist and Vegetable Pathologist, will be retired from the Public Service as from the 31st December, 1925. Following on his retirement, Mr. Tryon has been appointed temporary Pathologist.

Messrs. J. Munro and W. D. Flitcroft, of Stanthorpe, have been appointed temporary Inspectors under the Diseases in Plants Acts for the Stanthorpe area.

Mr. L. P. Doyle has been appointed Inspector of Stock as from the 4th January, 1926.

Budding of Fruit Trees—Some Hints.

Provided the sap is running freely, budding of either nursery stock or old trees can be carried out this month. Where old trees to be worked were cut back at the end of the winter they should by this time have made plenty of young shoots mature enough to bud into.

The bark of these shoots is not thick, and should offer no difficulty even to the novice, but it is wise to work more shoots than will ultimately be required for the formation of the new tree, as there is likely to be some loss from heavy winds and other causes. Moreover, with thick limbs, if at least two (more are better) shoots are left (one on the top and one on the bottom side), the sap is kept moving on both sides, and there is no chance of the bark dying away on one side. If both are budded, both resultant shoots should be trained in the one direction, so that if one is lost the other will take its place. Two or three years hence, when the callus has crept well over the edges of the top wound where the original thick limb was cut back, one of the budded shoots can be dispensed with. This leaves a wound, but it is one which heals over very much more readily than the top wound referred to above.

Where it is desired, old trees that have not been cut back and have no young shoots low down can be budded direct into the old bark. Owing to the thickness of the bark and the pressure it exerts, it is more difficult to slip in the buds, and the work is slower. As a rule the bark on the lower side of limbs, owing to its more shaded position, will lift more easily than that on the upper side. In the following spring, when the limbs are cut back to start the buds, in the event of a shoot starting on the upper side, it should be checked to prevent it from sapping the shoot from the inserted bud, but it should not be rubbed right off, as it will serve to keep the sap moving on the upper side, and prevent any of the bark dying, as just described. Later it could also be budded and held as a safeguard in case the shoot from the bud inserted in the old bark be blown out or otherwise lost; as in the former case the secondary bud could be cut away after the callus has crept well over the edges of the wound where the old thick main limb was cut back.

Duck-Raising—Some Essentials.

The first essential to successful duck-raising is that cheap feed shall be readily available at all times. The time was when ducks could be made to pay by feeding them on mill offal, pollard, bran, &c., but that was when these foodstuffs were very much cheaper than they are now. Duck farming at present can therefore be regarded as likely to prove unprofitable unless the would-be farmer has command of plenty of cheap food, or at least of sufficient to represent a substantial adjunct to the more expensive foods; in other words, a cheap supply of animal or other concentrated food is essential to success. Kitchen scraps, restaurant refuse, or offal from slaughter-houses are the principal sources; nor should the prospective duck farmer delude himself that green feed, vegetables, and such like will take the place of more concentrated foods.

Again, the idea that ducks will lay anything like the same number of eggs as fowls, or even lay them in payable numbers, should not be entertained, except in the case of Indian Runner ducks, which are too small to be considered table ducks, though small lots are sometimes found profitable.

The prices realised for ducks at certain seasons of the year, especially at Christmas time, are likely to be attractive to the novice, but he is liable to forget that these prices are the result of a scarcity of eggs at another season, anterior by

a few months. Duck farming looks attractive, too, because ducklings can be reared in such a short time, are easier to handle, and require a less expensive plant than is the case with chickens.

The same general principles govern the hatching of duck eggs as those for hen eggs, except that it is advisable to run the incubator at about 1 degree of temperature lower than that necessary for hen eggs; most operators prefer to use the moisture trays when hatching duck eggs.

There is an almost general impression among beginners that ducklings should have access to water, but this is a mistake, and it is the cause of a good deal of trouble, particularly in cold weather. Ducklings are best kept dry while "in the down," *i.e.*, until they have got their adult feathers. Going wet to their camp at night is particularly fatal to young ducklings. While small numbers of ducklings may be successfully reared under almost any conditions, a good deal of shed room is required to rear large numbers successfully. Many duck farmers have bought their experience in this respect very dearly.

Dirt in the Dairy—A Deteriorating Factor.

"From 75 to 80 per cent. of the trouble in connection with second-grade cream in this district comes from the faulty washing of the utensils and separator parts."

So says one of a series of articles (by officers of the Dairy Branch of the New South Wales Department of Agriculture) reviewing what has been achieved by co-operation between dairy instructors, dairy factory managers, and dairy farmers for the advancement of cream quality.

In a number of cases, it is stated, the utensils, &c., are washed reasonably clean, but washing soda has not been used in the water, with the result that a greasy surface remains. This is most noticeable in the case of the discs, which are often hung up to dry, with the result that when the day becomes hot the heat produces a tallowy condition, or a greasy surface on the discs. In the afternoon the separator is assembled, often standing for half an hour or so before being put into action. During that time the smell increases, and when the process of separation begins the milk (passing into the bowl in a warm condition) absorbs the smells, and eventually an inferior cream results, which is often separated into a greasy tallowy-smelling benzine tin.

Then, again, in washing the separator parts, a cloth is more often used than a brush. This cloth, after being used, is frequently left in a wet heap on the bench inside of the wash-up vat, where it remains until it is required at the next washing. It very rarely dries properly, and being a cotton fabric it readily absorbs bad smells, and goes musty, rancid, and putrid, and imparts to all the utensils, separator parts, and water a smell sufficient to turn any cream. This is one of the most common sources of trouble met with.

The vat tap and connecting pipe are two places that are also frequently sources of high contamination, for if they are not taken to pieces after each use and thoroughly washed and brushed out, milk accumulates and decomposes, with injurious results. The case is quoted of a farm the cream from which was constantly graded second quality. Upon inspection the dairy and bails were found to be in a splendidly clean condition, but on examination of the vat tap it was found that it had been soldered on, and there was a cavity of about half an inch on the inside of the soldered joint which was filled with decomposed milk of a putrid nature. The vat tap was renewed, and the trouble cleared up.

Milking machines have given considerable trouble on account of both improper cleansing of the milk system and neglect to properly wash the vacuum system.

In connection with the cleansing of the milk system, the biggest trouble has come through the teat cups and rubbers. Very often the rubbers are used until they are in a perished state before there is any thought on the part of the farmer of renewing them. After instruction has been given in methods of washing, the farmer is always strongly advised to keep the rubbers in a clean solution of lime water. This keeps them sweet and greatly diminishes the rubber taint.

Neglect and oversight in keeping the vacuum tank sweet, says the article, have in more than one case been the cause of second-grade cream, a very striking illustration being afforded by a well-known estate. For a considerable period cream supplied by the estate to the local factory had been constantly graded second-class by the factory certificated grader. The manager of the estate had done his best to find the cause of the trouble, but could not, and he asked that an officer of the Department be sent out. As a result of the investigations made by the Dairy Branch staff, the dairy premises were found to be well kept, but the vacuum tank was found to be in a shockingly filthy state, being half filled with a decomposed milky substance, the smell of which was tremendous.

Samples of this decomposed substance were forwarded to the Department's Biological Branch, together with the connecting rubber tube from the vacuum tank to the distributor, the report on the putrid material showing that the addition of one drop to milk or cream would cause, in the course of twenty-four hours, objectionable flavours. The tube, too, was shown to be a potential cause of serious contamination.

The whole of the plant was dismantled and thoroughly cleaned, taking three days to properly sweeten, since when the cream had graded choicest quality, and no further trouble had been experienced.

Grazing Lucerne—Some Points to Remember.

In dry districts the value of lucerne as a grazing crop commends itself to stockowners. Being very drought-resistant, it often provides acceptable green feed when other succulent fodder is scarce or non-existent, and after a long, dry spell it is almost an axiom that lucerne is the first plant to grow when rain comes.

The pasturing of stock upon lucerne, however, is attended by two risks—one to the plants and one to the stock.

Lucerne should not be pastured during the first or second season of its growth, as the plants are not then sufficiently strong to withstand the inevitable trampling. Again, it will not stand continual grazing at any time; and the method should be to put sufficient stock on to eat it down quickly, and then to move them off before the young plants have commenced to shoot. The paddock should be subdivided into small lots for grazing, so that the stock can be moved from one to the other in quick succession. Temporary fences should be erected and shifted as required. This prevents injury to the plants and reduces the loss of feed.

Even with reasonable care the use of lucerne as a pasture will inevitably lessen the life of the plants. Lucerne not irrigated and fed off by stock in the drier districts will probably require to be sown after a very short period—perhaps as short as four years. Whenever possible, a cut for hay or green feed should be taken.

While grazing is permissible on the higher lands, it should never be practised on rich alluvial flats. It will inevitably result in the lucerne being thinned out, and with the further result that not only will the yield be reduced, but the hay will be of a coarse, rough quality, possibly full of weeds.

"Bloat," or hoven, is caused by feeding stock upon green, succulent fodder at a time when the stomach is practically empty, or by giving an abundance of gas-producing food before the digestive organs of the animal have been accustomed to dealing with such material. Cattle and sheep appear to be the only domestic animals subject to the danger. If the lucerne is wet at the time of eating, the liability to bloat is increased, and the danger is especially great when the crop is in the early stages of growth.

In the drier districts there is not as great danger of bloat as on rich alluvial flats, for the simple reason that there is not the same abundance of succulent fodder.

Stock should not be put on lucerne when it is wet. The danger is accentuated in humid and windy weather. If possible the animals should go on with a full stomach. They should first have their appetite appeased with grass, green maize, sorghum, or other similar food. Bloating usually occurs when hungry animals are put on the feed and eat large quantities, and it also occurs if they are put on and taken off for periods. They should be kept on continuously and never allowed to get hungry.

If the stock cannot be placed in the paddocks with full stomachs they should be taken on and herded for twenty minutes or so, and then taken off for about an hour, and put on for another twenty minutes, and the process repeated until the stock are no longer hungry. This practice is recommended whenever stock are being introduced to lucerne after other feeding. When they have become accustomed to the feed they can be left alone.—A. and P. Notes, New South Wales Department of Agriculture.

How Fallowing Removes Risks.

Fallowing removes risks, points out a farming paper, in the following ways:—

1. By insuring that the crop can be sown at the correct time.

2. By conserving moisture in the soil to augment any rain that may fall during the time the crop is growing.

3. By destroying weeds, such as wild oats, &c.

4. By destroying the spores of diseases, such as take-all.

5. By increasing the amount of available plant-food.

6. By sweetening the soil, and generally putting it into a condition that will promote vigorous growth.

Journal Appreciated.

The Editor has received many complimentary and appreciative letters on the Journal and its contents from country correspondents and readers in other States, New Zealand, and overseas, and which are gratefully acknowledged.

Proposed Honey Pool.

Referendum papers to decide whether or not a Honey Pool for the whole State shall be created have been despatched to those concerned.

The pool, if formed, will be for two years, and will apply to all beekeepers who have at least four hives and market the honey therefrom.

The following nominations have been received for the Board to administer the pool, if formed:—

Brown, Alexander Roy, Blythdale,
Dennis, Isaac James, Loganlea,
Gruhl, Herman Reinhold David, Pittsworth,
Peake, Matthew, The Gap,
Pickering, Edward, Eumundi,
Rosser, John Hall, Molendinar,
Simpson, John James, Buderim Mountain,
Spry, Augustus Frederick, Brisbane, and
Woodrow, Robert Victor, Woodford.

The ballot papers for the Board are also being sent with the referendum papers.

Both referendum and ballot papers are returnable at noon on the 11th January, 1926.

If any beekeeper concerned does not receive his paper, he should apply at once to the Under Secretary, Department of Agriculture and Stock, Brisbane, for same.

Egg Pool.

The counting of votes in connection with the Egg Pool referendum and ballot took place on the 4th January, under the supervision of Mr. M. L. Cameron, of the Department of Agriculture and Stock. Two postal votes were taken, one on the question whether there should be an Egg Pool in respect of the owners of fifty fowls and over, and one on the question of a Pool for the owners of 100 fowls and over, the owners of the latter number of fowls having a vote in both ballots.

The counting of the papers for the creation of a Pool embracing owners of fifty fowls and over was carried out first, and resulted as follows:—

For the making of an order for the Pool	939
Against the making of an order for the Pool	464
Majority for the making of an order	475
Informal	31

The necessary two-thirds majority has, therefore, been obtained.

The votes for the Board members for Nos. 1 and 3 Districts were also counted, with the following results:—

No. 1 District (comprising the petty sessions districts of Bundaberg, Gin Gin, Mount Perry, Eidsvold, Childers, Maryborough, Biggenden, Gayndah, Tinana, Gympie, Kilkivan, Wienholt, Nanango, Maroochy, Caboolture, Woodford, and Kilcoy)—

A. Moody (of Palmwoods)	104
A. Hunter (of Woombye)	83

No. 3 District (comprising the petty sessions districts of Wynnum and Cleveland and of that portion of Brisbane south of the Brisbane River)—

S. Luxford (of Wynnum)	65
M. H. Campbell (of Albany Creek)	57

Although it was not necessary to do so, the ballot papers in respect of the other proposed Pool for owners of 100 fowls and over were counted, and resulted as follows:—

For the making of an order for a Pool	500
Against the making of an order for a Pool	135
Majority for the making of an order	365
Informal	7

Cut Out the Waste.

Hawaiian pineapple growers have developed their industry to the stage where not a fraction of the fruit is wasted. The parts not suitable for regular commercial packs of canned pineapples are used as by-products, while the trimmings, cores, ends, and shells all go to sugar-mills, the juice being extracted and converted into sugar, citric acid, alcohol, carbon dioxide, and vinegar. The final residue is converted into stock feed.

Marketing of Stone Fruit.

Large consignments of stone fruit are now coming forward. To secure a good demand every attention should be paid to sizing, grading, and packing. The fruit should be picked when firm, but properly matured. Growers would do well to keep in mind the fact that some time elapses between the time the fruit leaves the orchard and the time it reaches the consumer, and if it is over-mature when it sets out it has little chance of reaching the market in anything like good condition. Stone fruits which are overripe or bruised cannot be sold at prices satisfactory to the grower. It is important to ensure when packing for market that cases are not packed too high or fruit forcibly squeezed into its place. Care in handling is of paramount importance, as in order to keep the fruit in proper condition it is absolutely necessary to see that its skin is kept intact.

Pasture Improvement.

Up to the present, points out a Crookwell (N.S.W.) farmer in an Agricultural Bureau paper, the sheep men of Australia have been content to ringbark, sucker, pick up and burn, and to conserve water, but the idea of supplanting the natural grasses with more succulent and heavier-carrying grasses and clovers has not received serious consideration. Improvement of pastures means not only two or three times the present carrying capacity, but also that the sheep will be well fed, and instead of the farmer struggling through with about one indifferently fed sheep per acre, he will carry two or three times that number of well-nourished animals. This means bigger sheep, heavier weight of wool—certainly not so high-yielding, but more money per head—a bigger percentage of lambs, and (perhaps one of the main assets) fat lambs.

It is the idea of most people on the land, as soon as they make sufficient money from their holding, to launch out and buy more land. What the farmer should do is to put the money he has made out of his land back into it and improve his pastures.

Standover Cotton.

The Minister for Agriculture (Hon. W. Forgan Smith) stated recently that it had been brought to his notice that considerable areas of standover cotton are to be found in certain parts of the State, particularly in the Central District. So far as can be gathered, these areas are all situated on newly burned scrub lands, from which a crop was harvested last year but which have become overgrown with weeds.

It is impossible obviously for the farmers to compete with the weeds in these large areas, since horse cultivation is prohibited by the presence of the stumps remaining in the land, and hand hoeing is impossible on any considerable scale on account of the expense incurred. Nevertheless, it is necessary to point out that the existence of these large areas of standover cotton is not in accordance with the provisions of the Cotton Industry Act, and steps must be taken to destroy them.

Standover cotton is a standing menace from the point of view of the spread of insect pests, since the insects are able to find harbourage in these plots throughout the winter and carry over in increasing numbers from one season to another. This is especially the case with the Pink Boll Worm, which is present in the Central district, and is one of the worst and most dreaded enemies of the cotton plant. In many cases these standover plots are so overgrown with weeds and grass that it should be easy to clean them up by burning the paddock at this time of the year.

For the future, scrub farmers who are planting large areas on newly burned country this season would be well advised to consider the following suggestion:—In March the cotton plants have become well established and are in full boll, and at this time Rhodes grass seed should be scattered over the paddock. Grass seed will germinate on the last of the March rains and will become established without interfering unduly with the growth of the cotton plants. After the cotton has been picked the Rhodes grass will produce a big growth of leaf and could be burned at the end of the winter at the same time as the old cotton bushes, and incidentally insects that they harbour would be destroyed. Most of the cotton-growers in this belt are dairy farmers, and their ultimate object in any case is to establish paddocks of Rhodes grass on newly burned scrub.

Calico for Fumigation Sheets.

The material from which the tents or sheets used in the fumigation of citrus trees are made should be a closely woven strong calico, one which will not show open patches when held to the light. A pocket lens is useful for examining a calico, which should show a uniform weave when inspected through the glass. The material may also be tested by holding it over one's mouth and trying to blow through it. Care should be taken to see that the calico does not only appear to be closely woven through carrying some dressing.

Poisoning Among Poultry—Common Causes.

The most common causes of poisoning among poultry are ptomaines, toxins, and common salt. The sypmtoms in each of these cases are much alike, so much so, that probably the layman would not be able to make a correct diagnosis; but investigation into the methods of feeding, and an examination of the foods fed, will generally lead to the right solution.

The symptoms present are those generally accompanying gastritis and enteritis. The fowl becomes droopy, refuses food, and digestion becomes arrested. The last condition can be detected by the fact that the crop will often contain food for days together, although the bird is not eating. Diarrhœa is usually present. There may be a large number of deaths or a very few, according to the severity of the trouble; usually comparatively few deaths occur, but most of the birds will be so affected as to put them in a precarious state of health for some considerable time, in consequence of which they will go off laying.

Ptomaine poisoning arises from putrefaction of various kinds of albuminous matter, and toxins are formed by pathogenic bacteria. The danger to poultry arises from cooked meat, meat meals, or blood meals. The chief danger is from cooked offal that has been allowed to ferment, as it will do if left to stand after cooling. The same thing may come about through careless handling in the preparation of meat or blood meal, but toxins may also be formed in well-prepared meals if they are allowed to get damp.

It should be understood that no amount of cooking is of any use to get rid of these poisonous substances once they have been formed. This is where the poultry farmer is often found making a mistake, in thinking that all deleterious matter is rendered innocuous by cooking.

There appears to be no useful practical antidote to this class of poisoning in poultry; the only thing to do is to stop feeding the suspected articles and treat as for diarrhœa.

In the case of poisoning by common salt the trouble arises not from a moderate use of salt, which is very necessary, but from its excessive use, or where it has been imperfectly mixed with the food; hence the advice that salt should be dissolved in the water with which food is mixed. When undissolved salt, even though in very small particles, comes in direct contact with the crop of the bird it acts much in the same way as a corrosive poison, destroying the lining membrane.

When salt poisoning is suspected, its use should be discontinued for a few days.—A. and P. Notes, N.S.W. Dept. Agr.

Dehorning Cattle.

The object of dehorning is to prevent cattle from injuring one another. Such injuries in a dairy herd not infrequently involve the udder, the flanks, and other parts, and the wounds made, especially when the udder is involved, may have a serious effect on the health of the animal. Among beef cattle considerable bruising is caused when the cattle are *en route* to the killing works, especially if they are travelling by rail. Besides the injury there is, of course, a considerable amount of pain inflicted at times on one animal by another.

In order to prevent injury, pain, and bruising, the practice of dehorning is being widely carried out in New Zealand and other countries, states a New South Wales departmental circular advocating the practice to members of the Agricultural Bureau. When performed on calves the operation is very simple, and certainly not as painful as castration, speying, or docking. It is while the animal is young that the operation is best carried out.

The method recommended is surgical, the instruments required being a sharp knife, a pair of claw forceps, and a pair of curved scissors. The calf is held in a steady position by an assistant. The bud is felt and the surrounding hair removed, leaving a clear field. The bud is then raised until the overlying skin is tense, using the thumb and forefinger, and an incision made with a sharp, clean knife over the centre of the bud, which is grasped with the forceps and pulled through the incision sufficiently far to allow the curved scissors to be inserted underneath, and clipped off.

No after treatment is required, but if the weather is hot or the wound appears dirty, a wash with a weak solution of any disinfectant should be given.

By the second method the hair is clipped off the skin overlying the buds, the parts washed with water, and caustic rubbed over the buds. The precaution must be taken to see that the whole of the bud, including its extreme edges, are so treated, otherwise small horns may grow. Wet weather should be avoided, or the strength of the caustic will be weakened.

The most suitable time for the operation is during cool weather, when no flies are about. Cows should be dehorned when the milking period is over or drawing to an end and before they are many months in calf. When the animal is young and the horns are green, it is best to use a pair of sharp, clean shears. In older animals, especially where the horns have a broad base, a sharp bone saw should be used. This obviates the risk of fracture of the frontal bones of the head, which is common when the horn is very solid or when the shears are blunt.

When a number of cattle are being dehorned, alteration to the breast bars of a race, one bar having a U-shaped notch in the centre big enough to accommodate the windpipe and gullet, is of advantage. Having the animal secured, grasp the horn with the left hand, and after selecting the part where the dehorning is to take place, commence sawing gently until a track has been made for the saw. Then saw quickly, but do not exert pressure downwards on the horn more than just enough to relieve the saw, as it is desirable to have a clean underneath cut. The other horn is similarly treated.

The correct distance from the head for taking off the horn is 1½ inches. If cut shorter than this the frontal sinuses of the head are exposed, while if cut longer the animal still retains weapons of offence. Any case of excessive bleeding should be attended to by the application of tar. After-treatment is seldom required, except in hot weather.

Primary Producers' Organisation.

His Excellency the Lieutenant-Governor (Hon. W. Lennon) has approved of a new regulation under the Primary Producers' Organisation Acts providing that the first Annual Sugar Industry Conference shall be convened by the President of the Council of Agriculture not later than the 6th February, 1926. As a result of this regulation, the Hon. W. Forgan Smith, President of the Council of Agriculture, has issued a notice convening the following meetings:—

The first Annual Sugar Industry Conference will be held in the Boys' School, Mackay, on Wednesday, the 20th January, 1926, at 10 a.m.

The first meeting of the Queensland Canegrowers will be held in the Boys' School, Mackay, on Wednesday, 20th January, 1926, at 2 p.m.

The first meetings of the District Executives of the Cairns, Innisfail, Herbert River, Ayr, Proserpine, and Mackay districts will be held in the Boys' School, Mackay, at 10 a.m. on Tuesday, 19th January, 1926.

The first meetings of the District Executives of the Bundaberg, Maryborough, and Southern districts will be held on Tuesday, 19th January, 1926, at 7 p.m., in the Boys' School, Mackay.

Meetings of District Councils of Agriculture.

The Minister for Agriculture and Stock (Hon. W. Forgan Smith), President of the Council of Agriculture, has issued a notice convening the first meetings of the District Councils, which shall be held on the dates and at the places respectively set opposite each, as follows:—

Name of District Council.	Date of Meeting.	Place of Meeting.	Hour of Meeting.
Central Queensland ..	Friday, 29th January	Rockhampton ..	10·30 a.m.
The Burnett	Thursday, 28th ,,	Maryborough ..	10·30 a.m.
South Burnett	Monday, 25th ,,	Kingaroy ..	11·0 a.m.
Wide Bay	Wednesday, 27th ,,	Gympie ..	1·30 p.m.
East Moreton	Friday, 29th ,,	Brisbane ..	1·30 p.m.
West Moreton	Friday, 29th ,,	Ipswich ..	11·30 a.m.
The Darling Downs ..	Wednesday, 27th ,,	Toowoomba ..	11·0 a.m.
The Western Downs ..	Wednesday, 27th ,,	Chinchilla ..	10·30 a.m.

The Feathered Friends of Man.

"The service that birds perform in protecting woodland trees," writes E. H. Forbush, State Entomologist of Massachuetts, "is more nearly indispensable to man than any other benefit they confer on him. . . . Were the natural enemies of forest insects annihilated, every tree in our woods would be threatened with destruction, and man would be powerless to prevent the calamity.

"He might make shift to save some orchard or shade trees; he might find means to raise some garden crops; but the protection of all the trees in all the woods would be beyond his powers. Yet this herculean task ordinarily is accomplished as a matter of course by birds and other insectivorous creatures, without trouble or expense to man, and without appreciable injury to his great woodland interests."

A Martyr to Science.

Referring to the untimely death of Professor Harold Maxwell Lefroy, a cable announcement of which appeared some weeks ago, the London "Daily Telegraph" says that in the records of heroic sacrifice and achievement, not the least honourable place must be given to men of science who, like Professor Lefroy, count personal safety as nought in the dangerous quests to which they dedicate themselves for the advancement of knowledge and the deliverance of mankind. In the light of such examples, who can gainsay that peace hath her victories not less renowned than war? And it is surely an encouragement to think nobly of the soul to know that men and women can, in ardent and unquenchable thirst for knowledge, cheerfully and deliberately put aside all that, for most of us, makes life most worth living. In many of those high deeds that not unworthily win the world's applause there is the support of a mood of exaltation and the sense of an immediately challenging crisis. It adds:—"Surely the time has come when some badge of honour should be devised and dedicated to men of science who risk so ungrudgingly life and health in extending 'the bound of human thought.' The Victoria Cross and the Albert Medal should have a counterpart to be reserved for the heroes of pure research."

The Wisdom of Solomon.

How clearly Solomon understood the value of intelligence as a factor in successful farming, for he says in Proverbs: "I went by the field of the slothful, and by the vineyard of the man void of understanding, and lo, it was all grown over with thorns, and nettles had covered the face thereof, and the stone wall thereof was broken down."

An Interesting Parchment.

The Government Botanist (Mr. C. T. White) received recently from Mr. W. L. Osborne, of Wondai, an interesting sample of a vegetable parchment. In a letter Mr. Osborne pointed out that quite a lot of material similar to the sample was taken from the centre of a bloodwood log about 3 ft. in diameter. The tree was green, and was felled and split into palings, the material being found encircling the heart of the tree. The heart was about 6 in. in diameter, and the space between it and the valuable wood of the tree was occupied by the parchment. Mr. Osborne said that he had exhibited samples at several country shows, and a piece had been taken to the old country. Mr. White stated last week that the specimen sent proved to be a fungus, of which only the roots were known, and had been given the name of *xylostroma giganteum*. It had been suggested that it was really only the roots of another fungus, *polporus eucalyptorum*, one of those large bracket fungi often seen on the sides of trees. This fungus usually attacked trees like the bloodwood as the roots travelled between the gum veins. In addition to those from the bloodwood he had received specimens taken from the coolibar.—"The Queenslander."

Making Cream Cheese.

The best method of making cream cheese is to place a quantity of fairly thick cream in fine textured linen cloth. Tie up the cloth bag fashion by taking the four corners and fastening with a piece of string, then hang up to drain in a draughty place. Twice daily, or more often if convenient, open out the cloth, and with a knife scrape down the hardened cream from the outside, and mix with that of softer consistency from the centre. This is repeated for two days, or less if the scraping down occurs frequently, until the cream is of a firm but pasty consistency. Turn the drained cream out into a basin, and thoroughly mix in a small quantity of salt. Cheese moulds can be obtained in various shapes, squares, oblong, or round. The mould is lined with a piece of grease-proof paper or butter muslin, into which the cheese is filled. After wrapping over the paper or muslin, the weighted lid is placed on top, and pressure is momentarily applied, when the shaped cheese is turned out, says an English farm paper.—"The Queenslander."

The Art of Agriculture.

Agriculture is an art, and it is an art that was practised centuries before the sciences were born with which it has become associated in modern times. Nevertheless, the farmer of to-day, working under modern conditions, cannot afford to neglect the teachings of science as far as they affect his own art; and that farmer will be the successful one who is able to understand what science has to tell him, and to utilise the weapons which she puts into his hands.—"Agricultural Gazette" of New South Wales.

Agricultural Education and Research in Britain.

The development of facilities for agricultural education and of equipment for agricultural research has been very great since the war. There are now fifteen universities, university colleges, and agricultural colleges at which higher education in agriculture is provided with the assistance of grants from the Exchequer amounting to £48,000. Capital grants have also been made to these institutions, usually on a "£ to £" basis, amounting to about £100,000. There are also fourteen farm institutes in England and Wales, at each of which courses, in some cases extending over one or two years, but usually of shorter duration, in general agriculture, horticulture, dairying, and poultry-keeping are given. Under the Corn Production Acts (Repeal) Act, 1921, one of the purposes to which the funds thereby authorised were to be applied was "the establishment of scholarships and maintenance grants for sons and daughters of agricultural workmen and others." During the past three years 350 scholarships have been awarded under this scheme. The parents of the students were in 80 cases agricultural workers, and in 81 other cases small holders. Altogether, it appears from the report recently issued by the Minister of Agriculture that over 10,000 students are now receiving agricultural education at the charge, either wholly or partly, of public funds. The recognition of the obligation of the State in regard to the endowment of agricultural research is of comparatively recent origin. The work carried on for so many years at Rothamsted and Woburn by private resources has been in a large measure taken over, and greatly developed, by the expenditure of public funds. Research in various branches of science relating to agriculture is conducted at twenty-three institutions in various parts of the country.

Fruit Syrup Making in China.

Fruit syrup is increasingly popular among the Chinese as a cold summer drink. Formerly, only imported syrups could be obtained; but now six companies in Shanghai are engaged in the manufacture. Fruit syrup does not involve many complications in manufacture. The process employed by local manufacturers generally consists of boiling the fruit in sanitary boilers, thereby extracting the liquid. With the addition of sugar and alcohol, the syrup is ready for sale after bottling. The quality of the syrup depends upon the fruit employed. The fruit must be fresh and the syrup must not be extracted in too great a quantity, or there will be sediment at the bottom of the bottles, so reducing the quality.

Chinese use fruit syrups in two forms. First, they are taken as a cold drink. For this one part of fruit syrup is mixed with ten parts of cold boiled water. This form of drink is popular in Shanghai because of the very many varieties of syrups to be had, and in the interior because in many places aerated waters are not available. Secondly, the syrup is very often mixed with Chinese kaoliang and other kinds of wine. Kaoliang wine is colourless, but with fruit syrup it turns into a brilliant colour. Bottles of fruit syrup are often given as presents to relatives and friends on festival days.

There are about twenty-one kinds of syrup sold by the Talow Canning Factory in Shanghai. They are lemon, almond, strawberry, peach, loquat, pear, banana, orange, apricot, cherry, mulberry, peppermint, apple, pineapple, grape, rose, olea fragrans, tender ginger shoots, sarsaparilla, bergamot, and aromatic grasses. Other manufacturers produce only from six to eight of the more common varieties. Fruit syrup is put up in bottles of approximately 28, 14, and 7 liquid ounces. Some manufacturers use only the large and medium sizes. The large bottle will make approximately twenty cups of cold drink.

The oldest manufacturer of fruit syrup in Shanghai is the Tai Foong Canned Goods Co., Ltd., which also cans fruits, meat, and vegetables, and also makes biscuits. This company produces eight varieties of the more common kinds like banana, lemon, orange, &c. The present retail price of these syrups is large bottle, 55 cents; medium bottle, 30 cents. (At the present rate of exchange the dollar is equivalent to approximately 2s. 1d.)

Answers to Correspondents.

"Ragwort" (*Senecio lautus*).

E.A.F. (Tara)—

The Government Botanist (Mr. C. T. White, F.L.S.) advises that the specimen is *Senecio lautus*, a species of "Ragwort." It is a native plant that occasionally overruns brigalow country to the exclusion of grasses and herbage, and in this respect is likely to become a pest. It is very abundant in parts of Central Queensland. It is not known to be poisonous, but seems to be rarely if ever touched by stock.

Cow Pox—Sun Scald.

"QUERIST" (Nanango)—Mr. Veterinary Surgeon A. McGown advises:—

1. The affected teats should be cleansed thoroughly with warm water, and when dry the affected parts should be treated with zinc ointment. Great care should be taken in the milking so as to prevent further cracking of the skin. All affected cattle should be isolated and they should be the last to be milked at each milking. The hands of the milker should be washed thoroughly in disinfectant solution after each milking.

2. The trouble supposed to be due to sun scald is most commonly found in white animals. When first noticed the animal should be placed in some shelter out of the sun. The affected part should be anointed with vaseline. Continue the treatment until the affection disappears.

Ipomopsis—Plant Identified.

E.G.J. (Brisbane)—The Government Botanist (Mr. C. T. White, F.L.S.) advises:—

The specimens sent with your letter of the 9th instant, *Ipomopsis elegans* (synonym *Gilia coronopifolia*), is a native of the warmer parts of North America. It is recorded as a biennial, but in Queensland is usually treated as an annual. It makes a great show in the garden and is not grown to the extent it deserves. It is generally listed by seedsmen as Ipomopsis. Seeds sown in autumn or winter flower in early summer.

Poland-China Pigs—Sow Eating Her Young.

A.J.L. (Coolabunia)—

At present there appears to be a great scarcity of Poland-China stock, and Mr. Shelton (Instructor in Pig Raising) doubts very much whether you will be able to secure a sow at the age desired in this State. We are trying to secure particulars of suitable sows in New South Wales. It will, of course, cost more to secure a sow in pig, though if you were fortunate enough to have the sow farrow safely a few weeks after purchase, her price would soon be made up.

Re the loss of Poland sow's litter through cannibalism—Mr. Shelton says that sows sometimes develop this peculiar characteristic, and it is an indication that the sow's ration has not been balanced properly. She has probably become over-fat and has had an over-supply of milk and corn and not sufficient green lucerne or other flesh-feeding foods, the absence of which sets up a craving which is apparently temporarily relieved by the sow devouring her young. It does not follow that the sow is likely to indulge in this same practice with future litters, but especial care and attention should be paid to seeing that she is kept in medium breeding condition only, that she has liberal supplies of green food, that she is compelled to take exercise freely, that her bowels are in good order and condition, and that she is not suffering from constipation or other bowel troubles.

It is reputed that a good cure for a sow that shows an inclination to eat her young is to give her several slices of salt (pickled) pork or some fat bacon, the salt apparently having the effect of satisfying the craving and thus overcoming any further loss. Nevertheless, the sow showing these tendencies should be separated from her litter, temporarily, at any rate, and the young pigs should only be allowed to suckle when an attendant is present. After suckling they should be removed to a separate sty right away from the sow until meal time comes round again. Cannibalism is an unnatural tendency, and is invariably the result of improper feeding. It is not desirable, however, to retain for breeding purposes any of the progeny of such a sow.

T.H.W. (Nambour)—Mr. Shelton advises:—

Do not allow the Poland-China sow to get too fat. Special attention will be necessary, and you must keep the green food up to her, even though she may show an inclination to go on strike. Hunger soon overcomes this tendency. As the sow is so accustomed to the sty, it should not be necessary to shut her up at all until a day or two before due date. Meantime, see that her bowels are in good order and that she does not suffer from constipation. About three days before due date give her a three tablespoonful dose of castor oil. Mix the oil in a small quantity of dry meal or bran, then thin the mixture down to the consistency of cream by adding skim milk. Just enough salt should be added to slightly flavour the mixture, say half a teaspoonful or less in the ordinary supply of food. Salt acts as a poison if used too freely in the food supplied to pigs, hence special care is necessary in using same.

You will be able to determine when the sow is likely to farrow by noting her udders. Milk will show on the point of the teats about twelve to twenty-four hours before farrowing, and by gently squeezing the teats a stream of milk will be noted. A few hours before the birth of the pigs the sow will be anxious to get together a quantity of grass or bedding to make a bed for herself. As the young pigs will be of great value to you, it pays to watch her closely, and if need be to do some overtime by being present if she farrows at night, for it is quite possible she may become rather excited over the event and may have an accident with one or other of the young ones. If she is too restless it is better to remove the young pigs, and keep them in a box in which some grass or straw is placed, and when she finally quietens down allow the young ones to suckle. It sometimes pays to follow this practice for a day or two if the sow is at all clumsy. All this may seem a lot of trouble, but as these young pigs will be worth from 4 to 6 guineas each as weaners it will pay to give the sow more attention than would be the case on most farms. The main point to be observed is that the sow must not be forced with food at farrowing time. Keep her on a very light diet until the young ones grow up a bit and can take all the milk she makes.

A PLANT SUSPECTED POISONOUS TO STOCK.

Mr. W. Dixon, Stock Inspector, Wondai, writes:—

"Under separate cover I send you a sample of a weed which grows luxuriantly on a cultivated land on the holding of Mr. P. Campbell, Tingoora.

"Mr. Campbell lost a number of milch cows recently under circumstances which pointed to vegetable poisoning, and it is thought that the weed in question might be the cause.

"I would be glad, therefore, if you would tell me if you have any knowledge of this weed being injurious to live stock.

"Thanking you in anticipation."

The specimen was referred to the Government Botanist (Mr. C. T. White), who reported as follows:—

"The specimen forwarded for identification and report is *Crotalaria incana*, a species of 'Rattle pod' or 'Rattle box.' The local name is derived from the fact that the seeds rattle in the pod when dry.

"This particular species has not previously come under suspicion, but various other species of Crotalaria or 'Rattle pod,' both in Australia and abroad, have been definitely proved poisonous to stock; therefore, your correspondent's suspicions regarding the plant have probably good foundation."

Farm Notes for February.

Reference was made in last month's Notes to the necessity for early preparation of the soil for winter cereals, and to the adoption of a system of thorough cultivation in order to retain moisture in the subsoil for the use of crops intended to be raised during the season. The importance of the subject, and its bearing in relation to prospective crop yields, is made the excuse for this reiteration.

The excellent rains recently experienced should have a heartening effect on all farming operations, as a good season may now be reasonably expected.

Special attention should be given to increasing the area under lucerne (broadleaf Hunter River), wherever this valuable crop will grow. Its permanent nature warrants the preparation of a thorough tilth and seed bed, and the cleansing of the land, prior to sowing the seed, of all foreign growths likely to interfere with the establishment and progress of the crop. Late in March or early in April is a seasonable period to make the first sowing providing all things are favourable to a good germination of seed.

Dairymen would be well advised to practise the raising of a continuity of fodder crops to meet the natural periods of grass shortage, and to keep up supplies of succulent fodder to maintain their milch cows in a state of production. Weather conditions, particularly the recent heavy and continuous rains, have interfered a great deal with farming operations. Although abundant supplies of grasses are in evidence, provision should be made for the inevitable period, at maturity, when these lose their succulence.

Many summer and autumn growing crops can still be planted for fodder and ensilage purposes. February also marks an important period as far as winter fodder crops are concerned, as the first sowings of both skinless and cape barley may be made at the latter end of the month in cool districts. Quick-growing crops of the former description suitable for coastal districts and localities, where early frosts are not expected, are Soudan grass, Japanese and French millet, white panicum, liberty millet, and similar kinds belonging to the Setaria family. Catch crops of Japanese and liberty millet may also be sown early in the month in cooler parts of the State, but the risk of early frosts has to be taken.

Maize and sorghums can still be planted as fodder and ensilage crops in coastal districts. In both coastal and inland areas, where dependence is placed largely on a bulky crop for cutting and feeding to milch cows in May and June, attention should be given to Planters' Friend (so-called Imphee) and to Orange cane. These crops require well-worked and manured land; the practice of broadcasting seed for sowing at this particular season encourages not only a fine stalk but a density of growth, which in itself is sufficient to counteract to some extent the effect of frost.

In most agricultural districts where two distinct planting seasons prevail, the present month is an excellent time for putting in potatoes. This crop responds to good treatment, and best results are obtainable on soils which have been previously well prepared. The selection of good "seed" and its treatment against the possible presence of spores of fungoid diseases is imperative. For this purpose a solution of one pint of formalin (40 per cent. strength) to 24 gallons of water should be made up, and the potatoes immersed for one hour immediately prior to planting the tubers. Bags and containers of all kinds should also be treated, as an additional precaution. "Irish blight" has wrought havoc at times in some districts, and can only be checked by adopting preventive measures and spraying the crops soon after the plants appear above the ground. Full particulars on the preparation of suitable mixtures for this purpose are obtainable on application to the Department of Agriculture, Brisbane.

Weeds of all kinds should be kept in check among growing crops; otherwise yields are likely to be seriously discounted. The younger the weeds the easier they are to destroy. Maize and other "hoed" crops will benefit by systematic cultivation Where they are advanced, and the root system well developed, the cultivation should be as shallow as possible consistent with the work of weed destruction.

First sowings may now be made of swede and other field turnips. Drilling is preferable to broadcasting, so as to admit of horse-hoe cultivation between the drills, and the thinning out of the plants to suitable distances, to allow for unrestricted development. Turnips respond to the application of superphosphate; 2 cwt. per acre is a fair average quantity to use when applied direct to the drills.

Where pig raising is practised, land should be well manured and put into good tilth in anticipation of sowing rape, swedes, mangels, field cabbage, and field peas during March, April, and May.

Orchard Notes for February.

THE COASTAL DISTRICTS.

February in coastal Queensland is frequently a wet month, and, as the air is often heavy with moisture and very oppressive, plant growth of all kinds is rampant, and orchards and plantations are apt to get somewhat out of hand, as it is not always possible to keep weed growth in check by means of cultivation. At the same time, the excessive growth provides a large quantity of organic matter which, when it rots, tends to keep up the supply of humus in the soil, so that, although the property looks unkempt, the fruit-producing trees and plants are not suffering, and the land is eventually benefited. When the weed growth is excessive and there is a danger of the weeds seeding, it is a good plan to cut down the growth with a fern hook or brush scythe and allow it to remain on the ground and rot as it will thereby prevent the soil from washing, and where the land is worked by horse power or chipped by hand it will be turned into the soil. This is about the most satisfactory way of dealing with excessive weed growth, especially in banana plantations, many of which are worked entirely by hand.

The main crop of smooth leaf pineapples will be ready for canning, and great care must be taken to see that the fruit is sent from the plantation to the cannery with the least possible delay and in the best possible condition. The only way in which the canners can build up a reputation for Queensland canned pineapples is for them to turn out nothing but a high-class article. To do this they must have good fruit, fresh, and in the best of condition.

The fruit should be about half-coloured, the flesh yellowish, not white, of good flavour, and the juice high in sugar content. Over-ripe fruit and under-ripe fruit are unfit for canning, as the former has lost its flavour and has become "winey," while the latter is deficient in colour, flavour, and sugar content.

For the 30 or 32 oz. can, fruit of not less than 5 in. in diameter is required, in order that the slices will fit the can; but smaller fruit, that must not be less than 4 in. or, better still, 4¼ in. in diameter, and cylindrical, not tapering, can be used for the 20-22 oz. can.

Bananas for shipment to the Southern States should on no account be alllowed to become over-ripe before the bunches are cut; at the same time, the individual fruit should be well filled and not partly developed. If the fruit is over-ripe it will not carry well, and is apt to reach its destination in an unsaleable condition.

Citrus orchards require careful attention, as there is frequently a heavy growth of water shoots, especially in trees that have recently been thinned out, and these must be removed. Where there are facilities for cyaniding, this is a good time to carry out the work, as fruit treated now will keep clean and free from scales till it is ready to market. Citrus trees can be planted now where the land has been properly prepared, and it is also a good time to plant most kinds of tropical fruit trees, as they transplant well at this period of the year.

A few late grapes and mangoes will ripen during the month and, in respect to the latter, it is very important to see that no fly-infested fruit is allowed to lie on the ground but that it is gathered regularly and destroyed. Unless this is done, there is every probability of the early citrus fruits being attacked by flies bred out from the infested mangoes.

Strawberries may be planted towards the end of the month, and, if early-ripening fruit is desired, care must be taken to select the first runners from the parent plants, as these will fruit quicker than those formed later. The land for strawberries should be brought into a state of thorough tilth by being well and deeply worked. If available, a good dressing of well-rotted farmyard manure should be given, as well as a complete commercial fertiliser, as strawberries require plenty of food and pay well for extra care and attention.

GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of peaches and plums, and of mid-season varieties of apples and pears, as well as of table grapes, will fully occupy the attention of fruitgrowers in the Granite Belt, and the advice given in these notes for the two previous months, with regard to handling, grading, packing, and marketing, is again emphasised, as it is very bad policy to go to all the trouble of growing fruit and then, when it is ready to market, not to put it up in a way that will attract buyers.

Extra trouble taken with fruit pays every time. Good fruit, evenly graded and honestly packed, will sell when ungraded and badly packed fruit is a drug on the market. Expenses connected with the marketing of fruit are now so high, owing to the increased cost of cases, freight, and selling charges, that it is folly to attempt to market rubbish.

During the early part of the month it will be necessary to keep a careful watch on the crop of late apples in order to see that they are not attacked by codlin moths. If there is the slightest indication of danger, a further spraying with arsenate of lead will be necessary, as the fruit that has previously escaped injury is usually that which suffers the most.

Fruit fly must also be systematically fought wherever and whenever found, and no infested fruit must be allowed to lie about on the ground.

Grapes will be ready for market and in the case of this fruit the greatest care in handling and packing is necessary. The fruit should never be packed wet, and, if possible, it is an excellent plan to let the stems wilt for a day at least before packing. This tends to tighten the hold of the individual berries on the stem and thus prevent their falling off.

In the western districts winemaking will be in progress. Here again care is necessary, as the better the condition in which the fruit can be brought to the press the better the prospect of producing a high-class wine.

Where necessary and possible citrus trees should be given a good irrigation, as this will carry on the fruit till maturity, provided it is followed up by systematic cultivation so as to retain a sufficient supply of moisture in the soil.

CUTWORMS.

The Commonwealth Cotton Entomologist (Mr. E. Ballard, F.E.S.), associated with the Cotton Branch, Department of Agriculture and Stock, Queensland, advises that several complaints have been received from different cotton areas of damage done to cotton seedlings by grubs commonly known as cutworms. Leaves are eaten, and sometimes the seedlings are cut down at about the level of the ground.

These cutworms are the caterpillar stage of a moth (*Agrotis* sp.). They only feed at night, and hide during the day under the surface of the soil or under clods of earth. The grubs are about 1¾ inches long when full grown and of a dirty grey-green colour.

The usual remedy for controlling them is to scatter a poisoned bait around the plants. This bait is made as follows:—Bran, 25 lb.; calcium arsenate, lead arsenate, powder, or Paris green, 1 lb.

Mix the bran and Paris green together, then moisten with water and molasses. The bait when mixed should not be too wet, but should just crumble in the fingers. It should be spread at night, or just before dark, at the rate of about 5 lb. to the acre.

The cutworms will feed on the bait, which will not kill them at once, but after a dose of the poison they will not feed again.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. K. CHAPMAN.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1926.	JANUARY.		FEBRUARY.		MOONRISE. JAN.	MOONRISE. FEB.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	5·1	6·48	5·25	6·45	8·30	8·54
2	5·2	6·49	5·26	6·45	9·6	9·27
3	5·3	6·49	5·27	6·44	9·44	9·59
4	5·3	6·49	5·28	6·43	10·16	10·33
5	5·4	6·49	5·29	6·42	10·55	11·9
6	5·5	6·50	5·30	6·42	11·25	11·49
7	5·5	6·50	5 30	6·41	12·0	nil
						a.m.
8	5·6	6·50	5·31	6·40	nil	12 32
					a.m.	
9	5·6	6·50	5·32	6·39	12·36	1·24
10	5·7	6·50	5·33	6·38	1·14	2·21
11	5·8	6·50	5·33	6·38	1·57	3·24
12	5·9	6·50	5·34	6 37	2·45	4·32
13	5·10	6·50	5·35	6·37	3·41	5·41
14	5·11	6 50	5 36	6·36	4·43	6 49
15	5·12	6·50	5·36	6·35	5·47	7·56
16	5·12	6·50	5·37	6·34	6·58	9·0
17	5·13	6 50	5·38	6·34	8·7	10·2
18	5·14	6·49	5·38	6·33	9·13	11·3
19	5·15	6·49	5·39	6·32	10·15	12·0
						p.m.
20	5·16	6·49	5·40	6·31	11·14	12·52
					p.m.	
21	5·16	6·49	5·40	6·31	12·14	1·53
22	5·17	6·49	5·41	6·30	1·12	2·46
23	5·18	6·48	5·41	6·29	2·8	3·37
24	5·19	6·48	5·42	6·28	3·3	4·22
25	5·20	6·48	5·42	6·27	3·58	5·4
26	5·20	6·47	5·43	6·26	4·49	5·44
27	5·21	6·47	5·44	6·25	5·38	6·21
28	5·22	6·46	5·55	6·24	6·25	7·5
29	5·23	6·46	...	...	7·6	...
30	5·24	6·45	...	...	7·45	...
31	5·25	6·45	...	...	8·20	...

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

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.]

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

7 Jan.	☾	Last Quarter	5 22 p.m.
14 ,,	●	New Moon	4 35 p.m.
21 ,,	☽	First Quarter	8 31 a.m.
29 ,,	○	Full Moon	7 35 a.m.

Apogee, 2nd January, at 8 36 p.m.
Perigee, 15th January, at 9 36 a.m.
Apogee, 30th January, at 2 24 a.m.

About two hours before sunset on the 14th instant, the sun will undergo a total eclipse, when viewed from parts of the world a good deal to the north and west of Australia. From a portion of Queensland north of Townsville, and of Perth, in Western Australia, a glimpse of a partial eclipse of the sun will be obtained, but for the rest of Australia no difference in the ordinary appearance of the sun will be observable.

The nearest approach of the earth to the sun will occur on the 2nd instant, at 2 p.m. On the following day Venus will attain its greatest brilliancy. Saturn will be in conjunction with the moon on the 10th, at 12·47 p.m., when it will be 2 degrees 47 seconds south of that luminary. Jupiter will be lost to view this month on account of its being in conjunction with the sun on the 25th. The Southern Cross will be below the horizon in Queensland until about 10 p.m., in the early part of the month, but becoming visible earlier as the days proceed. It will be lying on one side about 30 degrees eastward of the southern meridian, at first about midnight but later in the month nearer 11 p.m.

6 Feb.	☾	Last Quarter	9 25 p.m.
13 ,,	●	New Moon	3 20 a.m.,
19 ,,	☽	First Quarter	10 36 p.m.
28 ,,	○	Full Moon	2 51 a.m.

Perigee, 12th February, at 10 24 p.m.
Apogee, 25th February, at 3 12 a.m.

As Venus will be in inferior conjunction with the sun—that is, nearly in a straight line with it—on the 7th, when its dark side only will be presented toward the earth, it will be lost to sight for the greater part of this month. On the 16th Mercury will be in superior conjunction with the sun—that is, on the far side of its orbit and apparently so close to the sun as to be invisible. An interesting occultation of the star delta Geminorum, a star of magnitude 3·5, will occur on the 23rd. With a pair of binoculars or small telescope the star should be seen on the east side of the moon, which will approach the star and suddenly occult it shortly after 7 p.m., before the bright edge of the moon has quite reached it. About an hour later, in Southern Queensland, the star will reappear on the western side of the moon, but it will be more difficult to notice its reappearance on account of the brighter edge of the moon on that side. In the north the occultation of the star will be of shorter duration.