A Cross in this space is a reminder that your Subscription to the Journal expires with this number.

ANNUAL RATES OF SUBSCRIPTION.
Farmers, Graziers, Horticulturists, and Schools of Art FREE on prepayment of 1/- to cover postage. Members of Agricultural Societies, 5/-, including postage. General Public, 10/- including postage.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXIX. 1 JUNE, 1928. PART 6

Event and Comment.

What is a Living Area?

AT the annual interstate Ministerial Conference on agricultural subjects at Perth, the Minister for Agriculture and Stock, Mr. W. Forgan Smith, in moving that the Conference should give consideration to the establishment of a Bureau of Agricultural Economics, said that the importance of this matter could not be stressed too strongly. There was no co-ordination between the States in regard to their activities, and no co-operation or exchange of thought in regard to the building up of industries. In connection with land settlement, one often heard the phrase, "living area." What was a living area for the farmer? This would depend on the land, the locality, and the man, but first it was necessary to find the living flock or living herd. Once this was established, land settlement could be simplified. Market control and organisation necessary to prevent violent fluctuations in price were, said Mr. Smith, absolutely essential. The bureau would investigate marketing costs, new markets, and produce available for that market, besides building up lines of marketing, and suggesting the lines of production that should be followed by farmers.

Proposed Bureau of Agricultural Economics.

AT the Perth Conference, Mr. Forgan Smith, after a discussion on a proposal to create a Federal Bureau of Agricultural Economics, submitted the following definite resolution:—

> "(1) That the Commonwealth Government be asked to constitute an agricultural economic division of the Council for Scientific and Industrial Research, and that a skilled agricultural economist be retained as a permanent executive officer; each State Government, with the Commonwealth Government, to nominate a representative to sit on the agricultural economics committee of the Council of Scientific and Industrial Research.

"(2) (*a*) That it be recommended from this conference that each State Department of Agriculture should establish an economics division which would maintain the closest possible contact with the Commonwealth organisation previously mentioned; (*b*) that State Parliaments should provide such legislation or amending legislation as may be necessary to establish or facilitate the work of the division contemplated.

"(3) That the Commonwealth Government should be asked to provide for free franking through the mails of all agricultural papers and documents in trust from or to State and Commonwealth agricultural economics divisions."

In the course of the ensuing debate a doubt existed as to whether effective machinery could be set up for putting the ideas embodied in the motion into practice. There is always a difficulty, it was contended, in States formulating a policy in conjunction with the Commonwealth authorities. The desirability of establishing such a bureau, however, was generally approved, and further discussion was deferred until a later stage in the Conference proceedings.

Beef Shorthorns on Gindie State Farm.

FOR some years the Department has been engaged in the establishment of a beef shorthorn stud at the Gindie State Farm, in the Central district, with the object of breeding bulls of good, early maturing quality to effect an improvement in the Central district herds, and the results to date have been distinctly encouraging. With a knowledge that a higher standard of quality is necessary in the foundation animals of a stud, some excellent Shorthorns of both sexes have from time to time been placed at Gindie. Fresh infusions of blood, however, must obviously be made, so the Minister, Mr. W. Forgan Smith, informed the Press recently. Queensland's cattle industry is a most valuable one, and too much attention cannot, in the opinion of Mr. Forgan Smith, be paid to the question of using prepotent sires in an endeavour to breed early maturing, good quality stock. About the same time he inspected a yearling bull and three young heifers at Yeerongpilly Stock Experiment Station, which, after tick fever inoculation, are to be sent on to the Gindie Stud. These animals, after being subjected to the tuberculin test, were purchased quite recently, and they represent some of the best and the most fashionable families of Shorthorn blood extant. The heifers, "Milton's Actress 3rd," "Lovely 7th of Milton," and "Milton's Prunella," came direct from Mr. Anthony Hordern's Milton Park Stud, Bowral, New South Wales, and the bull, "Coonong Masterstroke," was bred by Mr. D. Roy McCaughey, of Narrandera. The consensus of opinion amongst well-known Shorthorn breeders is that the animals in Mr. Hordern's stud are equal in quality to anything available in the world to-day, and no expense has been spared in importing the males and females to build up this famous stud. The present little group for Gindie are very well-bred animals, and in each case their blood is redundant with that of Mr. Hordern's well-known imported sires, "Masterkey" and "Doone Monarch," also with that of imported cows. At Gindie two young bulls of fashionable blood have latterly been in use, one sired by "Masterkey" (imp.) and the other by "Donnington Count" (imp.) with the progeny of some other very good quality animals. If the seasons continue favourable for breeding operations, the Gindie Shorthorns should soon rank with the best in Queensland, for it is intended to carry on with animals only of the best possible type and quality.

Disposal of Cotton Plants after Harvest.

IN his recent report on cotton experimental work the Cotton Specialist, Mr. W. G. Wells, points out that the removal of cotton plants after the picking operations are completed, prior to the preparation of the land for another cotton crop, has constituted something of a problem under the conditions in Queensland. In many of the districts only light frosts, which kill the leaves and tops of the plants and hasten the opening of the crop, may be experienced. Under such conditions the stalks and branches are green and sappy, and would not be in a suitable condition for being cut down with the "stalk cutting" types of machines which are usually used in the cotton fields of the United States of America. With these machines a series of revolving blades chop the stalks into short lengths which can be ploughed under in the usual ploughing operations.

In Queensland, growers have attacked the problem in several ways, but nearly all their methods have had serious defects. The system which has generally been used the most has been to plough out the stalks with the plough set so as to skim just under the ground. The stalks are then raked up either by means of the horse-drawn hay-rake or, if in small plots, forked up by hand into piles to dry sufficiently for burning. In some of the districts where the plants make only a moderate growth, ploughing is done without any previous treatment. In some instances, plots have

been observed where the plants were chopped out by hand with sharp, heavy hoes, especially where the plants had grown to heights of 5 to 6 feet, with stalks of 1 to 1½ inches in diameter at the butt.

None of these methods is satisfactory, however. Where the plants are ploughed out, the ploughed soil not only covers some of the plants, but also covers up a considerable number of the fallen bolls of the top crop. In many of the districts in Queensland the pink boll worm (*Platyedra gossypiella*) exists, and in the coastal areas the peach grub (*Conogethes punctiferalis*) as well. Both of these insects may be found in the top unopened bolls at the end of the season, and any system of destroying the plants which does not assist in properly eradicating these pests is faulty. Where the plants are ploughed under in the usual ploughing operations, not only is there no attempt to destroy the insects, but also the seed-bed is badly prepared. The general experiences of the growers throughout the Cotton Belt indicate that a firm compact seed-bed offers the most insurance for the young seedlings to withstand the dry conditions which usually exist during the early period of their development. Under the normal winter conditions, little rain falls in most of the districts. Where large quantities of cotton stalks are ploughed under, it can be seen that, without winter rains, the seed-bed must be of an open nature with so much refuse mixed in it. Therefore, seed-beds prepared in such a manner will require very heavy planting rains, or frequent rains during the early growth of the seedlings, to enable them to withstand periods of dry weather of any length. The system of removing the plants by hand chopping is, probably, the most efficient method of any as regards the destruction of the top crop of bolls which may contain insect pests. The general experience is that an acre a day is good chopping for one man, so that it can be seen that this is an expensive operation.

The system used on the Research Station has been to plough out the plants and then rake up by means of a large horse-drawn rake which has long wooden teeth running along the ground in a nearly horizontal position. This rake gathers the plants, but, unfortunately, leaves a lot of the bolls. In the season of 1925-26 an adaptation of the old slide maize cutter was used to cut the stalks, and proved to be a decided improvement on the method of ploughing out the whole plant. The cut plants were raked up by the horse-drawn rake again, and with much less refuse left behind.

During the season of 1926-27, several modifications have been effected on the slide cutter which have developed it into an efficient machine, which should be used by all growers with an acreage larger than that which can be cut by hand. Some further improvements, which may lessen the draft, are contemplated for working out in the coming season, but it is believed that the describing of the machine in this report is justifiable. The photographs, which are included, are of the machine used at the Station this past season.

It was found that with two horses hooked in tandem, eight acres could be cut in an 8-hour day, in cotton planted in rows 650 feet long and spaced 4½ feet apart, with the plants spaced 20-24 inches apart. The plants averaged around 5 feet tall, and from 1 to 1½ inches in diameter at the section where cut. Where the cotton was taller and of greater diameter, it was necessary to use three horses in tandem, but this cotton was ranker than usually is encountered.

A departure from the use of the large horse rake in piling up the bushes also was made. An experiment in using a three-section lever spike-toothed harrow, drawn by a Fordson tractor, proved to be faster and more efficient; accordingly, the whole of the crop was cleaned up in this manner. It was found that the harrow raked up the plants in such a way that the field was partially swept, thus preventing most of the fallen bolls from being left behind. The harrow automatically dumped itself by riding over the accumulated pile of plants when too many were gathered under it to allow the back teeth to remain on the ground. This left the plants in rows and bunches over the field, where they could be forked up easily and burned when dry. An ordinary horse hay-rake was used to clean up after the burning operation, which left the field in a much cleaner condition than had been possible with any other operation except hand chopping. Eleven acres a day could be covered in this manner, and about another day was required to clean up with the horse rake after the first burning off of the piles of dry plants. The manager, in reporting on the use of the harrows, suggests that horses may be used instead of the tractor. He also suggests that harrows with long spikes may be preferable, and that the back of the harrow should not be too heavily weighed down or it will not ride over the piles of plants.

It is thought that every grower should equip himself with a slide cutter. It is a comparatively cheap machine and will enable the cotton crops to be removed quickly after the harvesting is completed. This allows the seed-bed to be prepared in time to take advantage of the first planting rains, which, in most seasons, enables the production of a profitable crop of cotton.

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS, Entomologist.

A Vegetable Parasite of Cane-grubs.

During this month a certain percentage of cane grubs will be killed by an entomogenous parasite known commonly as the Green Muscardine Fungus (*Metarrhizium anisopliæ*).

When attacked by it, the body of the grub, instead of decomposing, retains its original shape, and after gradually hardening to a cheese-like consistency (owing to the internal organs and juices being absorbed and replaced by the mycelium or rooting portion of this parasite) turn at first white, and a day or so later an olive-green colour; the latter condition being the fruiting stage and consisting

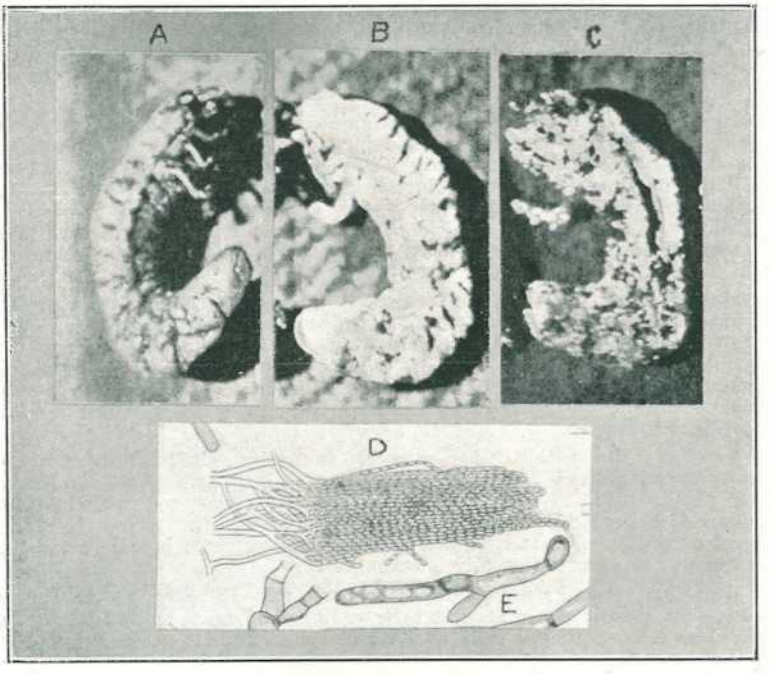


PLATE 95.—GRUBS OF THE GREYBACK CANE-BEETLE KILLED BY GREEN MUSCARDINE FUNGUS.

A. Stage 1.—Body filled with roots of the fungus; hardened internally.
B. Stage 2.—Body covered with white fungus growth of hyphæ.
C. Stage 3.—Body encrusted with green masses of spores.
D. A prismatic mass of spores, × 160.
E. Spores germinating, × about 700.

of a thin irregular crust formed of chains of microscopically minute spores (see illustration). In the event of samples of these greenish mummified grubs being noticed in ploughed furrows, growers are asked to communicate at once with the Entomologist at Meringa Experiment Station, either by letter, addressed—Meringa, Private Bag, Cairns; or by 'phone No. 95 Gordonvale.

Owing to favourable rains having fallen recently, the fungus in question should be more in evidence this season than has been the case during the last few years.

Deal Promptly with the Weevil-borer.

Watch the growth of cane on river flats, where beetle-borers are likely to occur, and if finding evidence of this pest having commenced to attack the basal portions of canes, advise the Entomologist without delay. Tachinid parasites of this weevil-borer will be released by the Sugar Bureau free of cost on such affected areas, on condition that the grower will agree to leave about a quarter of an acre of borer-infested cane sticks for these useful parasites to breed in. This cane should be allowed to stand for about three months, and during that period must not be burnt. Do not neglect to enlist the services of the above-mentioned Tachinid fly, which is one of the most effective natural enemies of this formidable cane-beetle.

Common-sense Methods for Combating Wireworms.

1. See that the land be well worked and thoroughly drained.

2. Plough deeply, and at the same time collect as many wireworms as possible by hand before planting the crop.

3. Use organic instead of chemical manures.

4. Increase the humus content of the soil by the use of green manures.

5. Apply a liberal dressing of lime.

6. Intensive cultivation of wireworm-affected land is highly recommended. Stir the land as often as possible.

7. Keep the land free from weeds, as the beetle form of this insect prefers land thickly covered with vegetation in which to oviposit.

8. The use of finely ground kainit, applied at the rate of about 4½ cwt. per acre and ploughed into the soil, has been recommended for controlling wireworms infesting beet fields.

CANE PEST COMBAT AND CONTROL.

The Entomologist (Mr. E. Jarvis) in charge of the Meringa Station, near Cairns, has submitted the following report for the period April to May, 1928, to the Director of Sugar Experiment Stations:—

Sulphur as a Grub Repellant.

During January last, a series of laboratory experiments with flowers of sulphur was carried out here, in order to test its insecticidal value against our root-eating scarabæid grubs. Fifteen cages, each containing 38 cubic inches of moist soil, were used in the first experiment, a single third-stage grub of *Lepidiota frenchi* being placed in each, and covered with four inches of earth. Before putting in the grubs, doses varying from ½ oz. to 2½ oz. were thoroughly mixed with the soil. In ten of these cages a bean leaf was buried about a quarter of an inch above the grub, to ensure that while eating the leaf, sulphur-coated particles of soil would also be ingested at the same time. The cages were examined at intervals of four to five days between the dates 20th January and 20th February, and all the grubs—excepting one in a 1-oz. dose cage, and one in a 2-oz. dose cage—being found alive and quite healthy, these two grubs, however, having apparently succumbed for want of sufficient moisture in the soil.

On 30th January six additional cages were prepared, similar to the above in size, but three having doses of 6 oz., and the others of 9 oz. of flowers of sulphur mixed with 38 cubic inches of soil. When looked at nine days later, these six grubs were alive and healthy.

An examination on 20th February (twenty-one days from commencement of experiment) showed that all the grubs were still active and normal, except for a slightly blackened appearance of the anal segment in some specimens; caused, possibly, by some chemical action having taken place, due, perhaps to such ingested soil containing a large percentage of sulphur.

A final inspection of these cages was made on 2nd May (about three months from treatment of cages), when a grub in one of the 9-oz. cages was found to be still alive but suffering from want of moisture; while all the grubs in the 2½-oz. cages were alive, and one grub in a cage with a 3-oz. dose, these latter grubs having been living in soil treated at the rate of about 9½ tons of sulphur per acre, for nearly four months.

Summary.—Results obtained indicate that fully grown grubs of *Lepidiota frenchi* Blkb. are able to remain alive in soil containing flowers of sulphur applied at the rate of about 36 tons per acre. It need hardly be stated that such an excessive quantity would be out of the question in field practice, and was merely tried at our laboratory as a crucial test.

Manurial Value of Sulphur.

When used in canefields at the rate of 200 to 2,000 lb. per acre, sulphur has been found to increase germination of the sets; such treated cane, when about a foot high, "having a remarkable green appearance, with only one or two non-germinated stools in a hundred." When treating ratoons the trash is burnt after harvesting, and the sulphur immediately applied and harrowed into the soil, the effects of such application being shown in the quick growth and green appearance of the cane shoots.

It may be of interest to mention in this connection that experiments conducted in the year 1913 by M. E. Boullanger in the West Indies, tend to show that the application of small quantities of flowers of sulphur to the soil results in a very considerable increase in the crops. This was very noticeable in such vegetables as celery, beet, beans, spinach, potatoes, &c.

He found, for example, that a crop of celery, treated with sulphur only, gave more than ten times the yield obtained from a similar check plot which had no manure at all, and nearly twice the yield of a plot which had received a complete manure but no sulphur. It is interesting to note that by means of a series of experiments with sterilised and non-sterilised soils, Mr. Boullanger discovered this beneficial effect of the sulphur to be due to its action on certain soil bacteria.

Paradichlorobenzene Again Successful.

Canegrowers and horticulturists will doubtless be interested to learn that larvæ of the "White Stem Borer" (*Authores leuconotus* Pasc.) have recently been brought under effective control by means of the fumigant which has proved so deadly to our cane-grubs. An up-to-date method of dealing with the larvæ of the above pest—which work for about two years in the stem and roots of the coffee plant—was discovered during 1927 by the Government Entomologist of the Department of Agriculture, Nyasaland, who reports as follows:—"A good way of dealing with the larvæ is to remove the plug of grass extruded from the cavity where each is situated, and insert a few crystals of paradichlorobenzene, subsequently covering the hole with mud or clay. Grubs so treated were dying within six days and had completely disintegrated in three weeks, while the bushes seemed to be uninjured. This method is simpler than the use of carbon bisulphide. . . ." Lead arsenate, sodium fluoride, and zinc sulphate were all used, both with and without a resin and washing soda adhesive, and also in conjunction with paradichlorobenzene, which, however, when melted for incorporation in the poison, evaporated too quickly to be of any value."

The above results substantiate the importance of advice given by us in reports issued from time to time during the last few years with regard to the inadvisability of *dissolving* the crystalline nodules of paradichlorobenzene in other liquid fumigants, thereby destroying its effectiveness and rendering this chemical—as was found also when the nodules were *melted*, as described above, and added to other poisonous solutions—of no practical use for combatting soil-frequenting larvæ, &c.

Experiment Plots against Cane-grubs.

Recent results obtained by the establishment of various experiment plots laid down during January last on volcanic land in the Hambledon Mill area indicate that all the plots treated by us with various mixtures of carbon bisulphide and other liquid fumigants look better than the check areas alongside. Cane treated with naphthalene impregnated with sinapis oil appears likely to yield negative results, but it is a little early to make definite statements one way or the other, as the grubs of *albohirtum* have not yet finished feeding.

Significance of the Present Grub Infestation.

In view of the many cases of grub damage reported from the Cairns, Babinda, and Innisfail districts, the following brief notes may be of interest to canegrowers.

In the year 1917, when this pest appeared in alarming numbers, the rainfall for November and December of 1916, together with that of January to April, 1917, was 69.37 inches; as against 81.51 inches for the same period of last year (1927).

During the period of June to October, immediately preceding the outbreak of 1917, a fall of 6.17 inches was registered here; whereas, for the same period of last year which preceded our present grub-infestation, the precipitation happened to be 8.09 inches. Had it not been for the meteorological check to the numerical increase of this pest experienced during the seasons 1925-1927, the recent rainfalls mentioned above—which exceed those leading up to the 1917 outbreak by 14.06 inches—would have brought about a far more serious grub-infestation than that experienced at present in the Cairns district.

RECORDS OF AUSTRALIAN THYSANOPTERA (THRIPS.)

By A. A. GIRAULT, B.Sc., Entomological Branch.

Part III.

The following records are a continuation of those published in May and October, 1927, in the pages of this Journal. The arrangement is as previously adopted, and unless otherwise stated the collector is myself, and the plants, as usual, have very kindly been identified by Mr. C. T. White, the Government Botanist.

1. *Thrips tabaci* Lindeman.—Taken from the following flowers:—*Marrubium vulgare,* Forest Hill, 2nd October, 1927, A. R. Brimblecombe; *Lepidium ruderale,* Norman Park, 31st October, 1927, and Forest Hill, 2nd October, 1927, Brimblecombe; *Dianella coerulea,* Norman Park, 2nd October, 1927; white clover, same place, 12th September, 1927; cultivated flowers, Mayne Junction, 17th September, 1927, Brimblecombe; on pistil of Arum Lily, Geebung, 15th September, 1927; *Trachymene incisa,* Norman Park, 22nd November, 1927; wild carrot, Mayne Junction, 8th October, 1927, A. R. Brimblecombe; *Apium leptophyllum,* Samsonvale, 18th September, 1927; commonest and most abundant in field peas on a farm, same place and date; Iris Lily, Mayne Junction, 6th October, 1927, Brimblecombe; *Helichrysum diosmifolium,* Norman Park, 13th September, 1927; *Argemone mexicana,* Brisbane City, 14th October, 1927; *Rumex brownii,* same place, 29th October, 1927; *Solanum sodomæum,* Norman Park, 17th September, 1927; Calendula, Nundah, 21st September, 1927, I. W. Helmsing; injurying growing tips of cotton, Biloela, October, 1927, G. A. Currie; *Thevetia neriifolia,* 22nd October, 1927, Norman Park; common on Agapanthus lily flowers, Mayne Junction, 13th November, 1927, Brimblecombe; *Trifolium agrarium,* Norman Park, 19th September, 1927; "Silvering" onions, Toowoomba, September, 1927 (Department of Agriculture and Stock); on bean foliage, Glen Osmond, South Australia, 19th March, 1928 (Geoff. Samuel, Waite Agricultural Research Institute).

2. *Thrips imaginis* Bagnall.—*Thrips* in Gurney, "Agricultural Gazette," New South Wales, 1915, pp. 303-305, pl. (opp. p. 307). Attacking in great numbers blossoms of fruit trees in New South Wales; the species is doubtless this one.

3. *Pseudanaphothrips achætus* Bagnall.—Flowers of *Velleia spathulata,* Samsonvale, 18th September, 1927; white clover again, Norman Park, 12th September, 1927; *Anagallis arvensis,* forest, Samsonvale, 18th September, 1927; next commonest to No. 1 and abundant in field peas on a farm, same time and place; *Pimelea linifolia,* forest, same place and time; *Jussiæa repens* and *Eichornia speciosa,* aquatic plants, Alderley, 29th December, 1927; *Stachys arvensis,* Norman Park, 10th September, 1927; *Lepidium ruderale,* Forest Hill, 2nd October, 1927, Brimblecombe; *Trachymene incisa,* Norman Park, 22nd November, 1927; *Vilia sativa segitalis,* same place, 17th September, 1927; *Marrubium vulgare,* Forest Hill, 2nd October, 1927, Brimblecombe; *Pratia erecta,* Mungar Junction, 8th March, 1928; *Melhania incana,* Gayndah, 5th March, 1928; *Lantana sellowiana* again, Gayndah, 28th February, 1928; *Spermacoce* species, Byrnestown, 7th March, 1928; *Wahlenbergia gracilis* again, Gayndah, 28th February, 1928; *Verbena officinalis,* Byrnestown, 6th March, 1928; watermelon, Gayndah, 1st March, 1928.

4. *Physothrips kellyanus* Bagnall.—*Bryonia lacinosa* in a lemon orchard, Gayndah, 1st March, 1928 (the lemon blossoms were also infested with the species); *Thevetia neriifolia,* Norman Park, 22nd October, 1927; lantana again, Taringa, 11th February, 1928, and at Innisfail, 16th June, 1926 (F. W. Becker); *Musa banksii,* Berner's Creek, Innisfail, 23rd November, 1926, J. L. Froggatt; lemon again, Byrnestown, 6th and 7th March, 1928; loquat, Gayndah, 28th February, 1928; granadilla, Taringa, 11th February, 1928; Arum lily, Mayne Junction, 1st October, 1927, Brimblecombe; pawpaw, Mayne Junction, 10th December, 1927, and 15th January, 1928, Brimblecombe, and at Taringa, 11th February, 1928; Iris lily, Botanic Gardens, Brisbane, E. Filer, 3rd November, 1927; Christmas lily, Mayne Junction, 26th December, 1927, Brimblecombe; *Hymenosporum flavum,* Brisbane, 7th October, 1927; honeysuckle, Mayne Junction, 4th December, 1927, Brimblecombe; dahlia, same place, 15th January, 1928, Brimblecombe; custard apple, same place and collector, 17th September and 4th December, 1927; *Acacia maideni,* Toowong, 29th December, 1927; *Viburnum odorotissimum,* Brisbane, 7th October, 1927.

5. *Physothrips mjöbergi* Karny.—Pawpaw, Mayne Junction, 15th January, 1928, Brimblecombe; granadilla, Taringa, 11th February, 1928; lantana again, Innisfail, 16th July, 1926, F. W. Becker; loquat, Gayndah, 29th February and 2nd March, 1928; *Convolvulus erubescens,* Byrnestown, 7th March, 1928; loquat, Byrnestown, 7th March, 1928.

6. *Physothrips brevicornis* Bagnall.—*Crotolaria sericea,* Alderley, 20th September, 1927; sweeping in forest, Morningside, 9th September, 1927; from composite flowers, Samsonvale, 18th September, 1927.

7. *Thrips lacteicorpus* Girault.—Native to *Eucalyptus* and *Acacia. Acacia maideni,* Toowong, 29th December, 1927; *Apium leptophyllum,* Samsonvale, 18th September, 1927; Iris lily, Mayne Junction, 6th October, 1927, Brimblecombe; *Allium* probably *fragrans,* Norman Park, 30th October, 1927; *Ligustrum sinense,* Mayne Junction, 29th September, 1927, Brimblecombe; pawpaw, Taringa, 11th February, 1928; lantana, Innisfail, 16th June, 1926, F. W. Becker; *Buckinghamia celsissima,* Brisbane, 2nd February, 1927; *Viburnum odorotissimum,* Brisbane, 7th October, 1927; dahlia, Mayne Junction, 15th January, 1928, Brimblecombe; *Flindersia collina,* Forest Hill, 2nd October, 1927, Brimblecombe.

9. *Idolothrips marginatus* Haliday.—A female, forest sweepings, Morningside, 9th September, 1927; in grass tussocks and so forth, Bogong High Plains, Victoria, 5-6,000 feet, January, 1928, F. E. Wilson.

15. *Scirtothrips signipennis* Bagnall.—For distribution and other hosts than banana, also origin, see J. L. Froggatt, this Journal, January, 1928, pp. 16-17.

16. *Cryptothrips dimidiatus* Hood.—Apterous forms common in grass and forest sweepings, Morningside, 9th, 13th September, 1927.

18. *Physothrips cinctipennis* Bagnall.—*Melhania incana,* Gayndah, 5th March, 1928; *Glycine tabacina,* Mitchelton, 27th December, 1927; *Phaseolus semierectus,* Alderley, 29th December, 1927; *Crotolaria linifolia,* Gayndah, 6th March, 1928; *Rhynchosia minima,* Byrnestown, 7th March, 1928; *Crotolaria trifoliastrum,* Gayndah, 1st March, 1928; *Cassia mimosoides,* Gayndah, 6th March, 1928; and at Tiaro, 8th March, 1928; *Glycine tabacina,* Byrnestown, 6th March, 1928; *Œnothera longifolia,* Gayndah, 1st March, 1928; *Medicago sativa,* Gayndah, 2nd

March, 1928; *Tribulus tenestris*, same place, 1st March, 1928; *Crotolaria mitchellii*, same place, 28th February, 1928; peanut again, Byrnestown, 6th March, 1928.

23. *Neophysopus flavicinctus* Karny.—A female, sweeping in forest, Alderley, 29th September, 1927; on grass, Gayndah, March, 1928.

24. *Stylothrips brevipalpus* Karny.—*Poranthera microphylla*, Samsonvale, 18th September, 1927; cultivated flowers, Nundah, 13th January, 1928, I. W. Helmsing; *Ageratum conyzoides*, Taringa, 3rd February, 1928, common with occasional *Thrips tabaci*; *Callistemon viminalis*, Forest Hill, 2nd October, 1927, Brimblecombe; *Emilia sonchifolia*, Alderley, 20th September, 1927; *Aster subulatus*, Taringa, 30th March, 1928.

32. This is *Australothrips bicolor* Bagnall and this name takes precedence over *Pterothrips quadratus* Hood, which it equals. A pair, sweeping forest and grass, Samsonvale, 18th September, 1927; a rather common species.

35. *Thrips shakespearei* Girault.—Three males, cunjevoy, *Alocasia macrorrhiza*, Innisfail, 4th December, 1925, J. L. Froggatt.

37. *Frankliniella æschyli* Girault.—*Melhania incana*, Gayndah, 5th March, 1928.

38. *Heliothrips bifasciipennis* Girault.—Four females reared from larvæ found by M. E. Temperley on the foliage of *Solanum nigrum* in the Department of Agriculture's grounds, Brisbane, December, 1927. They were denuding the epidermis in spots and also soiling it with excrementitious matter. They were placed over earth and emerged in a week's time.

40. *Odontothrips australis* Bagnall.—*Oxalis corniculata*, Samsonvale, forest, 18th September, 1927; also males with the typical "anal prong" from flowers of *Daviesia squarrosa villifera*, forest, Morningside, 9th September, 1927. This species resembles somewhat *Physothrips seticollis* Bagnall.

41. *Anaphothrips keatsi* Girault.—On bean leaves, Glen Osmond, South Australia, 19th March, 1928 (Geoff. Samuel, Waite Agricultural Research Institute).

44. *Haplothrips partifuscipennis* Girault.—Flowers of *Spermacoce* species, Byrnestown, 7th March, 1928.

47. *Haplothrips froggatti* Hood.—*Dianella coerulea*, Norman Park, 6th October, 1927.

51. *Haplothrips gowdeyi* Franklin.—*Allium* probably *fragrans*, Norman Park, 20th October, 1927; *Acacia maideni*, Toowong, 29th December, 1927; *Emila sonchifolia*, Alderley, 20th September, 1927; lantana again, Innisfail, 16th June, 1926, F. W. Becker; banana, Palm Island, 27th May, 1926, J. L. Froggatt; in curling leaves, *Musa banksii*, Innisfail, 14th July, 1926, J. L. Froggatt; *Eleusine ægyptiaca*, Gayndah, 1st March, 1928.

52. *Thrips io* Girault.—Loquat, Gayndah, 29th February, 1928.

54. *Haplothrips nigroculex* Girault.—On pistils of Arum lily, Geebung, 15th September, 1927; *Viburnum odorotissimum*, Brisbane, 7th October, 1927; forest, Samsonvale, 18th September, 1927; sweeping grass and low vegetation, Morningside, 9th September, 1927; sweeping *Leptospermum*, Geebung, 15th September, 1927; on burrs of *Xanthium*

strumarium (identified by W. A. T. Summerville), Taringa, 27th March, 1928; Alderley, forest, 20th September, 1927, common.

57. *Hydatothrips argenticinctus* Girault.—On lemon foliage, Mayne Junction, 17th December, 1927, Brimblecombe; in forest sweepings, Morningside, 9th September, 1927.

The forewing is black only at base and at middle and apex widely. The male is like the female but segment 7 of the abdomen and the meson of 2 and 3 are also silvery.

59. *Anaphothrips regalis* Girault.—Common in flowers of *Solanum nigrum,* forest, Murarrie, 27th September, 1927.

60. *Anaphothrips cecili* Girault.—*A. striatus* (Osborn) in W. W. Froggatt, "Agricultural Gazette," New South Wales, 1915, pp. 303-305. Injuring fruit blossoms in great numbers.

61. *Physothrips quadriseta* Girault.—Described from the cunjevoy, *Alocasia macrorrhiza;* lantana, Innisfail, 16th June, 1926, F. W. Becker.

62. *Thrips partirufus* Girault.—On bananas, Fiji, 24th November, 1925 (H. W. Simmonds); *Musa banksii,* Innisfail, 15th May, 1926, J. L. Froggatt; also *Alocasia macrorrhiza,* Innisfail, 4th December, 1925, J. L. Froggatt; bananas, Palm Island, 27th May, 1926, J. L. Froggatt; banana flower buds, Innisfail, 15th February, 1926. J. L. Froggatt, and under flower bracts, banana, 18th May, 1926, J. L. Froggatt; lantana, Innisfail, 16th June, 1926, F. W. Becker.

63. *Physothrips bilongilineatus* (Girault).—On banana, Innisfail, 21st September, 1925, J. L. Froggatt.

64. *Frankliniella trybomi* Karny.—*Convolvulus erubescens,* Byrnestown, 7th March, 1928. Wings are practically clear; head, thorax black, former not narrowing behind.

65. *Scolothrips sexmaculatus* Pergande.—A single female amongst material comprising Nos. 1 and 41, bean leaves, Glen Osmond, South Australia, 19th March, 1928 (Geoff. Samuel, Waite Agricultural Research Institute).

This specimen bore upon the first five segments of the abdomen on each side a pair of marginal dots near base, the inner dot of each dorsal.

The species occurs in North America, Hawaii, India, Europe, but this is the first Australian record.

AFTER TREATMENT OF THE WHEAT CROP.

The harrowing of the growing crop when it is about 6 inches high is coming more into favour. Harrows certainly drag a few plants out, but when the stand is not already too thin no damage results, as the increased vigour of the crop and the better stooling induced more than make up for any disadvantage. In years when heavy winter rains have fallen, and on heavy land which is inclined to set hard, harrowing in early spring is very beneficial. Harrowing breaks this surface crust and also destroys many weeds. It is also of great advantage even in normal years on all classes of soil in the drier parts of the State, as it helps to conserve moisture by producing a surface mulch. On heavy land harrowing should be completed early in spring, otherwise the land is inclined to become so hard that the harrows will hardly mark the surface.

Rolling is sometimes practised when the crop is 6 to 8 inches high if it is intended to be cut for hay or silage. This is only done to level the surface. Rolling is beneficial on many of the light open soils, as it assists in consolidating the soil. Farmers on this class of land would improve their yields by rolling the growing crop. On very heavy soils rolling is not so beneficial.

OBITUARY.

MAJOR A. J. BOYD, F.R.G.S.

Many friends and old associates throughout Queensland and in other parts of the Commonwealth will learn with regret of the death of Major A. J. Boyd, F.R.G.S., which occurred in Sydney on 19th May.

The late Major Boyd was editor of the "Queensland Agricultural Journal" from its first issue in July, 1897, until May, 1921, and in the course of that time he became a friend of practically every farmer in the State. By general consensus of opinion in agricultural and literary circles, the "Journal" under his directorship attained a very high standard as an official publication, and was a distinct credit to the Department and the State.

Honesty is a word of many meanings. Major Boyd was honest in the widest sense—honest with himself, setting no standard which he himself would not maintain, seeking no honours but his own self-esteem, his knowledge of work well attempted and well done, and the confidence and affection of his friends. He was one of those in whom the pioneering history of Queensland is rich, one who was content to leave others to reap the harvest of his efforts. In all his enterprises he was a man of well-tested merit who possessed great gifts, and through them gave big and unstinted services to Queensland. He had a strong character as well as great capacity, and in his character was a rare combination of inflexible purpose and genial humanity. As a man, everyone who knew him was the better for knowing him, and those who enjoyed his friendship were very happy in the association.

He was intense in his patriotism, which found practical expression in many fields of effort. Though too old for active service in the great war, he was one

PLATE 96.—THE LATE MAJOR A. J. BOYD, F.R.G.S., FORMERLY EDITOR OF THE "QUEENSLAND AGRICULTURAL JOURNAL."

A man of well-tested merit who possessed great gifts, and through them gave great and unstinted services to Queensland.

of the first to volunteer for the A.I.F. His wide knowledge of languages, however, gave him an opportunity of doing excellent work as an Intelligence Officer; while he used his limited leisure in those days of stress in coaching young volunteers for non-commissioned and commissioned ranks in the newly-formed citizen army that was to win so much honour for Australia on the battlefields of three continents.

On one of those golden mornings which are the charm of Queensland's early winter, Major Boyd was laid to rest at Toowong on the crest of a knoll backed by Mount Coot-tha's wooded splendour. The scene at the graveside was very impressive. The service was beautiful in its simplicity. In sight was his much-loved river down which in his pioneering days he had rafted logs felled by his own hand and on the banks of which he had seen a city grow—a city in the building of which he had taken no small part, both materially and as a guiding influence in the formation of the character of many of its citizens. From the nearby eucalyptus forest came a gentle sap-scented breeze; from high up in the ranges came the staccato tapping of an axe—fitting symbolry in sense and sound. Gathered round were many old friends, old associates and old pupils, while within reach on either hand were many more old friends, fellow pioneers who had gone before but not without leaving their imperishable mark on Queensland history.

Since his retirement from the State Service in 1921, Major Boyd was engaged in literary pursuits, much of his work being published in the metropolitan Press. During the previous 40 years he had been in different branches of the Public Service, and was generally admired for his upright bearing and extensive learning. He was a son of the late Colonel Charles Boyd (of the 95th Regiment), of Kilmarnock, Scotland, and was born in France on 27th November, 1842. His mother was a member of the Vachell family, and Horace Vachell, the author, is his cousin. Educated in France, Switzerland, Germany, and Italy for a commission in the British Army, he, however, was placed in a mercantile house in Manchester. Deciding to go to sea, he went practically all over the world, including Australia. When in England he heard Dr. Lang lecture on cotton-growing in Queensland, and this induced him to come to Brisbane in January, 1860, to purchase land at Oxley Creek (now Corinda), but after a few years he obtained the appointment of head master of the new State school at Oxley. Later on he took up a large area of land at Pimpama, growing sugar, and erected a sugar-mill. Success attended this enterprise until cane disease, frosts, and pest attack impoverished for a time nearly all the sugar-growers on the Pimpama, Logan, and Albert Rivers. His plantation name, Ormeau, still survives as a railway station. Next he became head master at the Townsville State School and Inspector of Schools in North Queensland. The only means of journeying in those days was by horseback, and the fierceness of native blacks made bush travelling very risky. Journalism next attracted him, and the purchase of the Townsville "Cleveland Bay Express" proved a good investment. Later he sold out and opened a private school at Milton, Brisbane. In 1882 he and his wife went to England. On returning he was appointed head master of the Toowoomba Grammar School. His journalistic engagements have been with the London "Graphic," "Brisbane Courier," and "Queenslander," and in 1897 he was appointed editor of the "Queensland Agricultural Journal," a position he held up to the time of his retirement. The late Major Boyd obtained his rank in the Queensland Garrison Artillery. He was twice married, and the death of the second Mrs. Boyd took place at the close of 1927. An adopted daughter survives, the widow of Lieutenant Ralph Clifton, an officer in the Royal Artillery, killed on the Western Front during the Great War. Major Boyd was a past master of the St. Patrick's Lodge, Irish Constitution, of Brisbane Freemasons.

A striking tribute to the late Major Boyd was accorded at the obsequies, which took place at the Toowong Cemetery on 22nd May, when, in addition to a large number of intimate friends and Public Service associates, there were present many of his old school pupils and members and ex-members of the Queensland Garrison Artillery, and four of the maids of Major and Mrs. Boyd, who were in their service thirty years ago. The casket was draped with the Union Jack, and was surrounded by numerous floral tributes testifying to the sorrow of a wide circle of friends. The service at the graveside was performed by the Rev. F. W. E. Wilkinson, of St. Paul's, Taringa, the chief mourners being Mrs. Ralph Clifton, adopted daughter (wife of the late Lieut. R. B. Clifton), who was accompanied by Mrs. Spencer-Browne, and Mr. S. H. H. White (son-in-law). Among those present at the graveside were Messrs. R. Wilson, S. S. Hooper, A. H. Cory, H. S. Iliff, A. E. Gibson, H. G. Crofts, H. W. Mobsby, A. H. Jones, J. C. Brunnich, H. C. Quodling, R. P. Short, F. F. Coleman, E. G. E. Scriven, H. Tryon, C. McGrath, and J. P. Orr (representing the Department of Agriculture and Stock), Mr. R. Hogan (State Stores), Dr. J. P. Thomson (Royal Geographical Society), Captain W. Campbell Thomson, Captain G. A. H. Curtis, Col. R. A. Stanley, Captain Chester Reynolds (editor, "Queensland Government Mining Journal"), Lieut. J. F. F. Reid (editor, "Queensland Agricultural Journal"), Col. C. H. Drummond and Major H. Maddock (representing the president and committee of the United Service Club), Lieut. R. L. Higgins,

O.C. Garrison Artillery, Major-General Spencer Browne (representing literary department, Brisbane Newspaper Company, Ltd.), Mr. H. C. Woodhouse (publisher, Brisbane Newspaper Company, Ltd.), Captain H. S. Bere, Dr. von Schultze, Captain J. E. Hinton, and Messrs. O. Radcliffe, H. S. Macpherson, J. Baxendale, Daniel Jones, J. Walker, T. A. Jones, J. Soutter, S. Simnamon, J. P. Kennedy, W. K. Berry, W. H. Parker, A. Paterson, and A. Jones. Messrs. Radcliffe, Berry, and Simnamon were original pupils with Major Boyd at the opening of the Oxley school in 1867.

Included among numerous floral tributes were wreaths from the Minister and officers, Department of Agriculture and Stock, President and members of the United Service Club, Directors of the Brisbane Newspaper Company, and "Old Comrades, 'Courier' and 'Queenslander' literary staffs."

Tributes.

Many were the tributes to the memory of Major Boyd. His work, worth, and public service were the subjects of extended and appreciative Press references, of which the subjoined were expressive of the general feeling of regret for the ending of a long and useful life:—

Vale Major Boyd, wrote Dr. J. P. Thomson, C.B.E. "He sleepeth the sleep—the eternal sleep—we all must sleep. And no one knows whence we come and where we go. The purpose of life is truly a puzzle, the longest span being but short, and the strength of man being disproportionate to his years. Cicero considered that every man has lived long enough who has gone through all the duties of life with unblemished character. This, I think, is a noble sentiment. It is just about forty years ago since the late Major A. J. Boyd associated himself with the activities of the Royal Geographical Society in Queensland, and which continued up to within a couple of years of his death. He filled various positions with zeal and enthusiasm, and for a time acted as secretary during my occupancy of the presidential chair. A most efficient and accomplished officer, he carried out the duties of his post successfully, and was esteemed by his colleagues as a ready worker and staunch supporter. Of a most genial disposition, Boyd was always accessible to the large number of members and their friends who usually filled the society's hall at the monthly meetings, and frequently took a leading part in the discussions following the lectures and addresses given at those gatherings. In recognition of his valuable services to the society, the council awarded him the diploma of fellowship some years ago. At a meeting of the council of the Royal Geographical Society yesterday, his Grace Archbishop Duhig, F.R.G.S., in the chair, allusion was made to the death of Major Boyd, and it was decided to record on the minutes the council's deep regret at the loss sustained thereby, and sympathy with his surviving relatives.

THE LATE A. J. BOYD.

SOLDIER, SAILOR, SCHOOLMASTER, AND JOURNALIST.

By "Nut Quad."*

Fifty-four years ago the present writer first became acquainted with the late Major Boyd. In 1874, Mr. Boyd was, by the late Mr. Gresley Lukin, then managing director of the Brisbane Newspaper Company, appointed to the position of agricultural editor of the "Queenslander," a position previously held by the late Angus Mackay, who was the first editor of the paper. In the year mentioned, the late Hon. Arthur Macalister, who was then Colonial Secretary, wanted to send someone to America to represent the Queensland Government at the great Centennial Exhibition, held in Philadelphia, to celebrate the first century of the great Republic. His choice fell on Mr. Mackay, who, a few years before, had been on the staff of the New York "Tribune" when the eminent Horace Greeley had been editor-in-chief. Mr. Mackay had the Queensland Court at the Exhibition ready for the reception of the public two or three days before the official opening day, and sent by telegram to the "Tribune" a full description of the Queensland exhibits. Queensland was, therefore, the only country in the world to have its exhibits described in the American Press on the opening day.

For some years previous to this, numbers of well-educated young Englishmen from the great public schools in the Homeland had been arriving in Queensland to seek their fortunes in this new and promising land. To the sons of well-to-do English gentlemen, and to the yeoman and peasant stock of England, Ireland, and Scotland, we are indebted for many of our most valuable pioneer families. A typical specimen of this stamp of colonist—versatile, energetic, and undismayed by failure—was Major A. J. Boyd. According to an article which was published in the "Queenslander" in 1897, Major Boyd was a Frenchman born, but a Briton by parentage and heredity. He was born in the historic City of Tours in the year 1842. After passing through a course of primary and secondary education at the

* In "The Brisbane Courier."

Fulham and Brampton Grammar School, he was, for the higher educational honours, sent to Switzerland, France, and Germany, successively, with the intention of entering the British Army; for many generations his male ancestors had worn Her Majesty's uniform. His father (Lieutenant-Colonel Boyd), owing to pecuniary losses, was unable to maintain two sons in the army, and it was decided that the younger son should go to sea. He, therefore, joined the American mercantile marine, but, foreseeing, after a few years in that service, that it offered no very bright future as a sailor, he determined to seek some other career. Being in London when the late Henry Jordan, our first Immigration Agent, was delivering lectures on Queensland as a desirable field for immigration, he decided to come to this State. He arrived in Brisbane in the ship Saldanha, in 1861, and pitched his tent on the then wooded slopes of Wickham terrace, on ground which is now a portion of the Roma Street Railway Reserve. A few days later he purchased land on Oxley Creek, adjoining what was afterwards known as Consort Cliff. There he started farming, and, in spite of floods, with a fair measure of success. Cotton growing was then the pet agricultural industry, and he started the first ginning establishment in the Oxley district. After some time he relinquished cotton growing, and entered the service of the Queensland Board of Education as the first head master of the Oxley State School. This was his first experience as a schoolmaster, to be frequently repeated in after life.

Sugar growing next claimed his attention. He took up a plantation at Ormeau, erected a mill at Pimpama, and took his share in the ruin which frosts and rust in the Bourbon cane brought upon the entire body of Southern planters. Rejoining the Department of Public Instruction, he was appointed head master of the school at Townsville, and was shortly afterwards promoted to an inspectorship. An opportunity of acquiring the Cleveland Bay "Express" was too fascinating to be resisted by a man of Mr. Boyd's literary tastes, and for the sum of £500 he became sole proprietor and editor. The paper, which he developed into a bi-weekly, proved a great success, and realised a handsome figure when disposed of by Mr. Boyd, who, shortly afterwards, left for Brisbane to take up the position of agricultural editor of the "Queenslander," under the late Mr. Gresley Lukin.

But the scholastic life still beckoned to him, and we next find him located at Milton as a private schoolmaster, a step which proved to be the initiative of successful educational records. Mr. Boyd's proved teaching capacity, and his rare faculty for the handling of boys, secured for his school a name throughout Queensland, so that, after seven years, it became necessary to go further afield to secure larger accommodation. This was found at Nundah, where ten acres were purchased, and school buildings erected at a cost of about £3,000. After a brief visit to England, Mr. Boyd opened his new school, where success continued so to smile on him that the dormitories were soon found to be too small for the reception of all the pupils seeking admission. All went well with him for six or seven years, when, under the pressure of bad times, Northern and Western men found it was no longer possible to bear the expense of boarding their sons in the South. This proved temporarily disastrous for the school, which had to be closed in 1889.

Mr. Boyd subsequently accepted the head mastership of the Toowoomba Grammar School, where, during his two years' incumbency a high standard of efficiency was attained, and the roll strength of the school was largely augmented. In 1891, Mr. Boyd decided to reopen his old school at Nundah, and his decision was rewarded with fair prospects, until the disastrous floods of 1893 drowned his hopes, in common with those of many Southern Queenslanders. This blow determined him to give up proprietary schoolkeeping for ever, after devoting twenty-five of his best years to the work.

A large number of men now prominent in the professions, in commerce, and in the Public Service are proud to acknowledge the debt of gratitude they owe to the late Major Boyd for all of value they possess in the way of educational equipment.

In his journalistic days, apart from routine work, he wrote many Christmas stories for the "Queenslander," and was a frequent contributor both to the pictorial and ordinary columns of the London "Graphic. His "Old Colonials," in which he described many old Queenslanders, such as the sawyer, splitter and fencer, the boundary rider, the bullock driver, &c., has passed through several editions. He wrote the book called "Queensland" at the instance of the Government, and on one occasion he wooed the muses with such effect in "Geology in Verse" for boys and girls that the entire colonial Press applauded. He also was for some years editor of the Queensland Government "Agricultural Journal," and indeed drew an honorarium from the department until the time of his death.

That excellent corps, the Darling Downs Mounted Infantry, is largely the fruit of the late Major's recruiting zeal. For twelve years he was in command of the Brisbane Garrison Battery, having creditably qualified for all grades from acting lieutenant to major, which rank he held on the retired list.

PROFESSOR E. M. SHELTON.

The news has been received by cable from America that Professor Shelton, Instructor in Agriculture to the Queensland Government from 1890 to 1897, has died at Seattle, at the ripe age of eighty-one years.

The late Edward Mason Shelton was one of the pioneers of the modern system of agricultural instruction, and typical of a body of men who came into prominence in America, Great Britain, and Australia between forty and fifty years ago. They were men actuated by high ideals, great energy, and a devotion to the cause of improvement in farming methods.

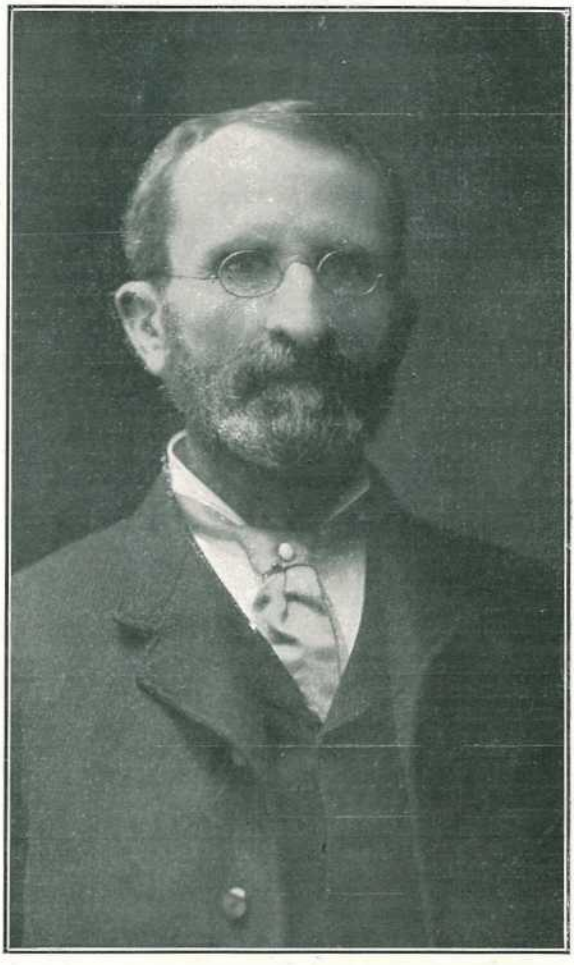


PLATE 97.—THE LATE PROFESSOR E. M. SHELTON.

Born in England, the late Mr. Shelton went to the United States of America at an early age, and on attaining manhood made agricultural education his life's purpose. Among other offices he held was the position of Agricultural Instructor to the Government of Japan. On returning to America he was appointed first Principal of the Kansas Agricultural College at Manhattan. Professor Shelton started this institution with about fifty students, but when he left it in 1889 to come to Queensland, the number had grown to five hundred. He accepted the position of Instructor in Agriculture in the Queensland Government service on the 15th January, 1890, in the then recently formed Department of Agriculture. He, the late Mr. Peter McLean, and Mr. E. G. E. Scriven, formerly Under Secretary, were the three men mainly instrumental in laying the foundations of the Department.

From the time of his arrival he was bent upon the establishment of an Agricultural College, and in 1897 he had the satisfaction of seeing the results of his advocacy realised. The site of the College was selected by him in collaboration with Mr. Peter McLean. He was the first Principal, but resigned in the following year and entered into partnership with Mr. Robert Brown, in the firm of Shelton and Brown, machinery agents. He subsequently returned to the United States, where for years he maintained an orchard which he worked commercially as well as a hobby.

Professor Shelton had a numerous family, and had the satisfaction in his later years of seeing them all honourably placed in life.

While in Queensland he was assisted admirably in his work by Mrs. Shelton, who became well-known as a lecturer in domestic science subjects to rural audiences. She was the first to popularise bottling fruit as a local home industry.

In his work in the Department, Professor Shelton was specially interested in wheat, maize, and pigs, as was natural in one coming direct from the Middle West of the United States. In wheat, he was one of an Australian Committee whose labours were largely responsible for reducing the ill-effects of what was once the great bugbear of the Australian grain grower—namely, "rust." He was particularly active in introducing new varieties of both wheat and maize. He was also instrumental in getting the Department to bring out a regular Bulletin, the forerunner of this Journal, for which much of the matter came from his vigorous pen. He also inaugurated a system of annual agricultural conferences, with a regularly changing venue to the advantage of different parts of the State, and the establishment of Government experiment plots on private farms. He did a great deal of work in reporting generally upon land throughout the State for the Government, and was one of the first to draw attention to the possibilities of the commercial production of fruits, other than bananas, in Queensland, a possibility which for many years was derided. It was he probably more than anyone else who gave the necessary publicity to the, then almost unknown, agricultural wealth of the Blackall Range, one of the most productive and picturesque regions in the whole of the Commonwealth.

Whilst here, there was no more genuinely enthusiastic Australian than Professor Shelton, and he maintained correspondence with the State up to the time of his death. He was in regular receipt of the "Queensland Agricultural Journal" and the "Queenslander," so that he could keep in touch with the events that followed his sojourn here. Moreover, he never forgot those with whom he had been associated in the Department, and in his letters always made reference to one or another. To his old associates, both of the farm and the Department, it seems a striking coincidence that two old colleagues to whom Queensland is indebted for much that has emerged from formula to fact in the long and fruitful years of our agricultural advance—Professor E. M. Shelton and Major A. J. Boyd—should pass hence almost at the same time.

Many of the late Professor Shelton's agricultural ambitions in Queensland have been realised. He had one vision, as yet unfulfilled, and that was of a great wheat belt stretching from Hughenden to Roma. In his usual thorough manner he conducted a series of tests with wheat varieties at Hughenden, Barcaldine, and Roma, and the results were sufficiently satisfactory to indicate that time may yet prove that his opinion upon this particular matter was no idle dream.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING APRIL 1928 AND 1927, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	April.	No. of Years' Records.	April, 1928.	April, 1927.		April.	No. of Years' Records.	April, 1928.	April, 1927.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	4·31	26	1·26	5 97	Nambour	5·39	31	21·78	4·43
Cairns	12·09	45	2·48	12·19	Nanango	1·76	45	6·24	2 59
Cardwell	9·49	55	2·31	4·23	Rockhampton ...	2·24	40	21·68	2·03
Cooktown	9·04	51	1·63	10·50	Woodford ...	4·09	40	19·16	4·63
Herberton	4·14	40	0·63	2·81					
Ingham	8·45	35	2·93	5·55					
Innisfail	21·22	46	5·90	13·56	*Darling Downs.*				
Mossman	9·96	14	2·48	7·23					
Townsville	3·67	56	0·16	0·43	Dalby	1·20	57	5·02	2·20
					Emu Vale ...	1·15	31	4·16	0·79
					Jimbour	1·19	39	4·80	1·87
Central Coast.					Miles	1·28	42	4·59	1·37
					Stanthorpe ...	1·62	54	3·12	1·32
Ayr	2·72	40	0·19	0·10	Toowoomba ...	2·36	55	9·58	3·29
Bowen	2·83	56	1·19	0·17	Warwick	1·58	62	4·70	1·21
Charters Towers ...	1·68	45	0 20	0·62					
Mackay	6·56	56	6·83	2·07					
Proserpine	6·23	24	5·43	1·11					
St. Lawrence ...	2·75	56	11·93	0·68	*Maranoa.*				
South Coast.					Roma	1·21	53	3·93	0·85
Biggenden	1·80	28	5·68	2·90					
Bundaberg	2·82	44	13·54	3·83	*State Farms, &c.*				
Brisbane	3·69	77	14·89	2·07					
Caboolture	3·91	40	17·61	3·64	Bungeworgorai ...	0·78	12	3·91	0·51
Childers	2·51	32	9·76	3·57	Gatton College ...	1·53	27	6·94	1·64
Crohamhurst ...	5·78	35	27·04	5·27	Gindie	1·14	27	6·05	0·
Esk	2·58	40	16·69	3·01	Hermitage ...	1·18	20	4·00	1·13
Gayndah	1·29	56	2·42	3·32	Kairi	4·93	12	1·20	4·01
Gympie	3·12	57	14·17	4·16	Sugar Experiment Station, Mackay	5·16	29	5·07	2·11
Kilkivan	2·00	48	7·13	2·36					
Maryborough ...	3·43	55	13·34	4·21	Warren	1·31	12	...	1·80

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April this year, and for the same period of 1927, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Meteorologist.

If you like the "Journal," kindly bring it under the notice of your neighbours who are not already subscribers. To farmers it is free and the annual charge of one shilling is merely to cover postage for the twelve months.

QUEENSLAND RAIN-FOREST TREES.

By W. D. FRANCIS, Assistant Government Botanist.

The Red Ash (*Alphitonia Petriei*) is a fairly distinctive tree. It has a deeply-fissured bark and the underside of the leaves is white or very pale. The bark of the young branchlets has a peculiar, sarsaparilla-like scent. The leaves and young shoots are eaten by stock and are considered to be good forage. The timber is red in colour, and should be useful for cabinet-making and general indoor fittings. The species is found in Queensland from the Blackall Range in the South to Cairns in the North. It also occurs in Northern Australia from Thursday Island to Port Darwin. The accompanying illustrations show the appearance of the lower part of the stem and of the leaves, flowers, and fruit.

Photo.: W. D. Francis.]

PLATE 98.—THE RED ASH (*Alphitonia Petriei*) IN THE RAIN FOREST AT IMBIL.

Photo.: Dept. of Agriculture and Stock.]

PLATE 99.—RED ASH (*Alphitonia Petriei*).

A. Flower-bearing Shoot. B. Dry Fruit.

DAIRYING IN QUEENSLAND

The Minister for Agriculture and Stock (the Hon. W. Forgan Smith) announced last year the appointment of a Departmental Committee to make a survey of economic facts relating to some important phases of agriculture in Queensland.

The Committee has met from time to time and has collected and collated much useful data. It is the intention of the Minister to convey some conclusions based upon this data to producers through a series of Bulletins. Mr. Forgan Smith has chosen as the subject-matter for the first bulletin, "Dairying in Queensland," from which the subjoined notes are taken.—ED.

Introduction.

The dairying industry is one of the most important of the primary enterprises of the State, and the position of dairying in Queensland has been considered from every angle. The producing, manufacturing, and marketing interests have assisted in this review of the industry. Investigations have also been made under actual field conditions on holdings regarded as typical Queensland dairy farms. The ultra-practical as well as the technical and theoretical aspect of affairs has been taken fully into account.

Dairying Industry in Perspective.

The following facts serve to indicate the position of the dairying industry in Queensland:—

(*a*) Production of milk in Queensland for all purposes, ranges, according to the season, from 100,000,000 to 150,000,000 gallons per annum.

(*b*) In a reasonably good season, butter production reaches more than 60,000,000 lb. and cheese production reaches 13,000,000 lb.; the gross annual value of this production is approximately £6,000,000.

The quantity of milk produced in 1926 and how it was utilised was—

	Gallons.
Total milk production	132,144,165
How distributed—	
(1) Butter factories	103,314,026
(2) Cheese factories	9,244,373
(3) Condensed milk factories	1,662,755
(4) Butter made on farms	5,726,647
(5) Cheese made on farms	17,763

(*c*) Queensland produces approximately one-fourth of the total Commonwealth output of butter and almost one-half of its cheese production.

(*d*) In Queensland there are 52 butter factories and 73 cheese factories and 22,500 dairying establishments. It is estimated that 21,172 males and 14,849 females, or a total of 36,021 persons, are engaged in the dairying industry. It is further estimated that there are about 90,000 persons, or more than 10 per cent. of the population of the State, largely dependent upon the industry.

(*e*) The number of dairy cattle in Queensland is estimated at 500,000, and the amount of capital invested in the dairying industry is approximately £35,000,000.

These figures illustrate very forcibly the importance of dairying to Queensland, the extent to which our people are influenced for good or for ill by the prosperity or the adversity of the dairying industry, and the necessity of developing it along sound lines.

Factors in Successful Production.

An analysis of returns furnished by dairymen shows that there are marked variations in milk production in relation to size of holding, number of cows milked, number of hours worked, and amount of capital invested. The conclusion which may be drawn from a review of individual returns is that satisfactory production in dairying depends on—

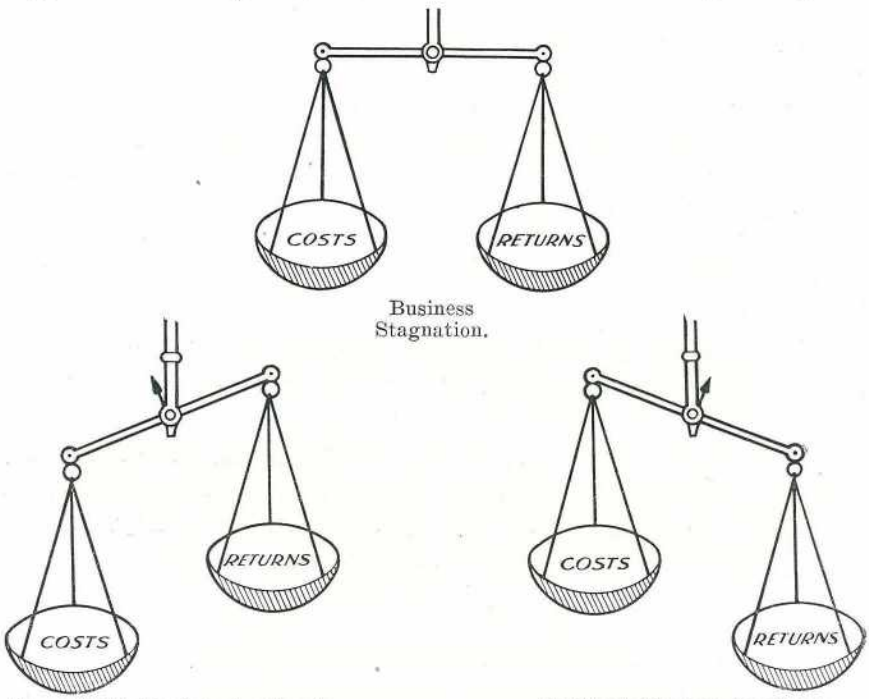
(i.) Suitable land of adequate acreage;
(ii.) Suitable cattle in sufficient number;
(iii.) Feeding and care of milch cows conducive to high milk yield.

If any one of these factors is unsatisfactory production is likely to suffer.

If, for example, the milch cows are not of good producing strain, much labour expended in milking and attending to them, and much of the feed which they consume, will, to a great extent, be wasted; on the other hand, if even good cattle are not suitably fed and cared for production will be unsatisfactory, the capital represented by their value will not be used to advantage, and the dairying business will not be progressive.

It is illogical to suppose that the average person without experience or capital can take up land and run a dairying business successfully in competition with more experienced and practical men. One might just as reasonably expect an unskilled workman to turn out as much as a skilled operator using a modern machine.

Review your position and find out where you stand!



Business Stagnation.

Unprofitable Business leading to Financial Disaster.

Profitable Business leading to Financial Prosperity.

In many districts in Queensland dairying may be carried on in congenial circumstances; conditions generally are conducive to the production of a product of superfine flavour and of high food value.

In view of these facts it might naturally be expected that the average yield of milk per cow in Queensland should be higher than the average yield in any of the other States; but what do we find? Let the following figures supply the answer:—

——	1921. Butter.		1922. Butter.		1923. Butter.		1924. Butter.	
	Gall.	Fat.	Gall.	Fat.	Gall.	Fat.	Gall.	Fat.
Victoria	366	146·4	329	131·6	340	136	393	157·2
New South Wales	363	145·2	281	112·4	285	114	391	156·4
South Australia ..	333	133·2	316	126·4	350	140	336	134·4
Queensland ..	301	120·4	240	96	194	77·6	310	124
Western Australia	223	89·2	213	85·2	217	86·8	218	87·2

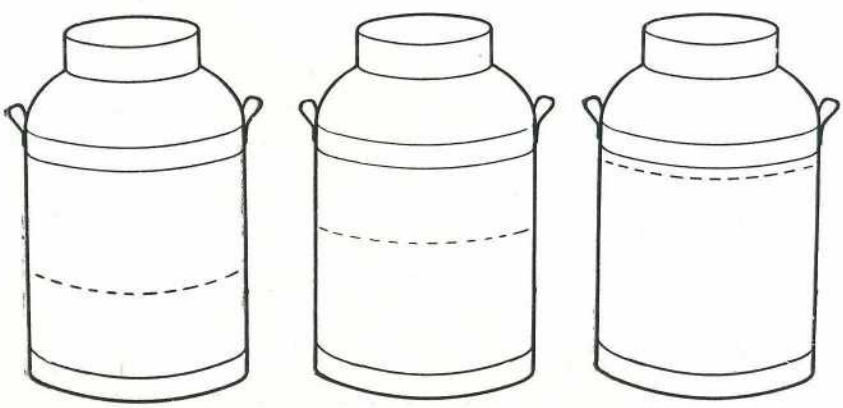
Is it in the interests of the dairy farmers of Queensland that this State should have the second lowest average? Should not the objective be to secure for Queensland—the Queen Dairying State—pride of place? Would not the realisation of this objective result in substantial gain to the dairy farmers?

It is realised that our average production of butter fat per cow is based upon the production of all herds, that some herds are milked only during periods when natural pastures are plentiful, and that by reason of these facts the average production may be somewhat lower than in the case of full-time dairy herds. The herd-testing records of the Department, however, indicate a very wide variation in the production of butter fat per cow in the herds tested, and it may be assumed that these herds are not below average in production.

Official figures prove indisputably that a very large number of Queensland dairy farmers are carrying on their operations with cows that are definitely unprofitable.

The figures for the year 1925-26 show that the cow with the lowest yield of butter fat for a full milking period (290 days) gave 133 lb. of butter fat (equivalent to 156 lb. of commercial butter), while the cow with the highest yield of butter fat gave 366 lb. (431 lb. of commercial butter) over the same period. Assuming 1s. 2d. per lb. to be the average price received for commercial butter, we find the lowest-yielding cow returning its owner £9 2s. per annum and the highest £25 2s. 10d., a difference of £16 0s. 10d. in favour of the better animal.

A graphic representation of returns per cow is shown hereunder; the effect of keeping high-producing cows upon the individual dairyman's finances and upon the industry generally should be obvious.



Lowest Cow in Tested Herds 156 lb. C.B.

Average of Tested Herds 239 lb. C.B.

Herd Book Standard 400 lb. C.B.

The particulars which have been given in the foregoing paragraphs are very suggestive. A few of the deductions which may be drawn are:—

(*a*) The capacity of each cow to produce is the fundamental and dominant factor in making dairying profitable.

(*b*) Production per cow is the deciding factor in assessing the number of cows which a dairyman must keep in order to earn sufficient income to maintain himself and his family in reasonable comfort.

(*c*) The price received for butter will not pay for the labour in milking unprofitable cows.

(*d*) The price of dairy products has an important influence upon the cost of living in the community, and the community should not be expected to pay a price which will permit of inefficiency.

POINTERS TO PROSPERITY.

1. Improvement in the breeding of dairy stock.

2. Herd improvement by testing and culling.

3. Systematic and adequate conservation of fodder.

(*e*) A large number of Queensland dairy farmers are carrying on their operations with cows that are unprofitable.

(*f*) The use of approved dairy sires is essential to successful dairy farming. A dairy herd should be built up by the use of sires from proved producing strains. A sire will either increase or decrease the milk production of his progeny.

(*g*) The number of good dairy cows should be increased; the number of unprofitable cows should be reduced. It would be idle to expect dairy farmers to replace immediately all the unprofitable cows in their herds; but they could introduce a gradual elimination process by breeding from selected dams mated with approved sires.

(*h*) To breed from unprofitable cows increases the number of inferior milch cows; the dairy farmer who persists in milking unprofitable cows and breeding from them will not secure a return commensurate with his labour and with the capital which he has invested.

(*i*) Every breed of improved live stock has been developed by well-defined laws of selection and breeding. Under the influence of skilful selection, breeding, and feeding, the dairy cow has developed remarkably, both in type and functions, and differs greatly in general characteristics from the foundation stock from which the modern type has been evolved.

It cannot be emphasised too strongly that the farmer who retains cows yielding a low average production of butter fat per annum, is engaged in farming on a basis which must be unpayable, and which, from the individual as well as from the wide national standpoint, is economically unsound. Of such a farmer, one or more of the following things might be said:—

(*a*) He is not sufficiently interested in the business to keep accurate records and ascertain his real financial position;

(*b*) He is not making effectual efforts to increase the production of his herd and to make the best use of his time and money;

(*c*) He is utilising under-paid family labour which sooner or later will result in discontent;

(*d*) He and his family are not experiencing the standard of comfort and living which would be afforded by keeping a herd of good cows.

Production per cow is the fundamental factor in making dairying profitable. It is also the deciding factor in assessing the number and productivity of cows which a dairyman in Queensland must keep in order to earn sufficient income to maintain himself and family in reasonable comfort. The many problems of dairying in Queensland surround the basic factor of production per cow.

Based upon the foregoing data and deductions, the urgent attention of the industry is directed to the imperative necessity for taking the following definite steps:—

(i.) By better breeding and testing to raise the producing capacity of the average herd to such a point that the herds will pay for labour and feeding involved and return a reasonable margin on capital invested;

(ii.) By pasture improvement, rotation of crops, and fodder conservation, to provide food rations for milch cows such as have been proved by experiment to be conducive to high production;

(iii.) By sanitary and hygienic methods and due attention to transport to ensure high quality products in order to command top prices.

Queensland's Variety of Climate and Soil.

Generally, dairying is carried on throughout the whole of the coastal districts of Queensland, from Atherton Tableland in the North to Goondiwindi in the South, a stretch of territory of 1,000 miles between extremes. In some districts farmers concentrate on dairying either for butter or for cheese production. In others this activity is combined with the several forms of diversified farming. In other parts of the country dairying is also combined with fruitgrowing and sugar-cane growing. Probably two out of every three of the farmers of

Queensland are interested in the dairying industry. Owing to the variation in the fertility of the soil and of the rainfall throughout the State, the carrying capacity of the land used for dairying purposes differs very greatly, ranging from 1½ acres to 8 acres to the cow. The exact area required is dependent upon the suitability of soil and rainfall for natural pastures and fodder crops. Such factors must be taken into account when determining the living area in any particular district, and no hard and fast rule can be set down that would apply to all the varying conditions under which dairying is conducted.

Fodder Conservation Essential.

In Queensland dairy stock need not be housed at any period of the year. On the other hand this State has its problems connected with recurring dry spells, necessitating provision being made for the storage of fodder in good seasons when production is abundant. Many farmers commence operations with the handicap of shortage of capital, besides having to face, very often, the difficulties of pioneering. Many farmers often find it impracticable to make adequate provision for fodder conservation. Those who condemn the improvidence of Australian dairy farmers, fail to fully recognise or appreciate these

Cultural methods, fodder conservation, herd improvement, the meeting of the world competition, the influence of the price of dairy products upon the cost of living in the community, and the importance of the prosperity of the dairy farmer himself, are definitely bound up with the productive capacity of the individual unit in the dairy herd.

circumstances. It is, however, considered to be imperative in profitable dairy farming practice in Queensland that adequate provision should be made for fodder conservation. In some countries the conditions of land tenure provide, as an essential, for conservation of stock feed on the holding. Notwithstanding the wealth of crops and pastures in Queensland in good years, provision for the lean periods is, we have learned by experience, of the highest importance. After making due allowance for the early difficulties mentioned, the practice of fodder conservation is not yet so general as it ought to be, and it demands the serious attention of every dairyman who aims to control a prosperous enterprise.

A series of Bulletins will follow dealing with:—

Dairying—

- Herd improvement.
- Animal husbandry, pastures and fodder crops.
- Dairy hygiene, transport, manufacturing, and marketing of dairy products.

Pig raising.

Poultry keeping.

General agriculture.

AUSTRALIAN PIG INDUSTRY COUNCIL.

At the first meeting of the newly-formed Australian Pig Industry Council held at the Commonwealth Bank Offices, Sydney, recently, delegates representing both co-operative and proprietary bacon factories, producers, and State and Commonwealth Departments were in attendance. The delegates present were:—

Commonwealth.—The Hon. T. Paterson, Minister for Markets; E. J. Mulvany, Secretary, Department of Markets; J. M. Davidson, Veterinary Officer, New South Wales; P. J. Carroll, Supervisor of Dairy Exports; G. A. Bedwell, representing the Federal Council of the Australian Stud Pig Breeders' Society.

New South Wales.—Producers' Representative: G. W. Gordon, Raleigh, New South Wales; Co-operative Bacon Factories: J. J. Hayter, Byron Bay, New South Wales; Proprietary Bacon Factories: W. J. Gale, Barnes Bacon Company, Homebush, New South Wales; Representing Department of Agriculture: A. F. Gray, Senior Pig Instructor, Department of Agriculture, Sydney.

Victoria.—Producers' Representative: F. E. Kurrle, Korumburra; Co-operative Bacon Factories: T. J. McGalliard, Gippsland, Co-operative Bacon Curing Company, Limited; Proprietary Bacon Factories: F. A. White, J. C. Hutton Proprietary Limited.

Queensland.—Producers' Representative: R. G. Watson, Australian Stud Pig Breeders' Society; Co-operative Bacon Factories: J. A. Heading, Chairman of Directors of the Queensland Co-operative Bacon Association, Limited; Proprietary Bacon Factories: A. B. Anderson of J. C. Hutton Proprietary Limited; Department of Agriculture: E. J. Shelton, Instructor in Pig Raising.

South Australia.—Producers' Representatives: F. G. Ayres, President, South Australia Dairymen's Protection Association.

Tasmania.—Producers' Representative: L. Williams, Tasmanian Branch, Australian Stud Pig Breeders' Society.

Resolutions.

After considerable discussion and after carefully weighing up the pros and cons of the numerous items included on the agenda, the following resolutions were agreed to:—

1. That the constitution of the Council for the Australian Pig Industry and the State Pig Industry Committees drawn up at the Conference held in Sydney on 7th and 8th June, 1927, be accepted, subject to the inclusion in each of the State Committees of one representative of the State Agricultural Colleges in their respective States.

2. This Council approves of the organisation of the pig industry to bring about a stable price, and recommends that the pig-producing States be urged to enact legislation to enable this to be done. (Note.—Legislation is already in existence in Queensland and New South Wales.)

3. Pending the introduction of such legislation the proprietary and co-operative factories in each State be urged to form committees for the regulation of prices, having regard to the interests of the producer and the consumer.

4. That the State Departments of Agriculture be asked to conduct experiments in the breeding and feeding of pigs at the Agricultural Colleges and/or selected farms, and to co-operate with the Royal Agricultural Societies in the different States in the exhibition of the best types of pigs.

5. That it be a recommendation to the pig breeders in the undermentioned States that the most suitable factory weights for best quality bacon pigs be as follow:—

Victoria	110 lb. to 135 lb. dressed weight
New South Wales	105 lb. to 130 lb. dressed weight
Queensland	95 lb. to 120 lb. dressed weight

6. That it be a recommendation to bacon factories that they pay a bonus for pigs of a desired quality within specified weights.

7. That each of the State Committees be requested to consider the question of conducting propaganda to increase the home consumption of pork products.

8. That each of the State Committees be asked to make a recommendation to their respective Departments of Agriculture that all pigs sent to slaughter be fire-branded.

9. That in connection with investigations now being conducted into the question of diseases in pigs by the Council for Scientific and Industrial Research, that body be requested to give particular attention to tuberculosis and to mortality in young pigs.

10. That the question of the interstate carriage of pork and bacon by refrigerated steamers be referred for consideration to the State Committees.

11. That the question of rail transport conditions generally, including bruising of pigs and cleanliness of trucks be referred for consideration to the State Committees.

12. That the question of securing uniformity of control throughout the States and the interchangeability of inspection certificates be referred for consideration to the State Committees.

13. That the Tariff Board be requested to inquire into the question of imposing an increased duty upon imported pig products.

14. That the question of establishing pig clubs in States other than Queensland, where they are at present in operation, be referred to the State Committees for consideration, and that Mr. Shelton forward to those Committees details of the scheme in operation in Queensland.

15. That Mr. Gale's scheme for the stabilisation of the industry be referred to the State Committees for consideration and for report to the next meeting of the Council.

16. That the Council approves of the appointment of proxies in the State Committees in the same way as in the Federal Council.

17. That with regard to the publication of the proceedings of meetings, the secretary prepare a report for the Press after each meeting.

18. That it be a recommendation to the State Committees that members of State Committees and of the Federal Council should hold office for two years, and that the State Committees be authorised to elect a new member to any vacancy in the Committee in their respective States from whatever cause arising.

19. That the next meeting of the Council be held in Melbourne on the Tuesday prior to the opening of the Royal Agricultural Society's Show (September, 1928).

20. That representatives of the various Governments on the State Committees and the Federal Council should act in an advisory capacity only.

21. That the question of the appointment of a Commission to inquire into the pig industry throughout Australia be referred to the State Committees for consideration, and in the event of a recommendation in favour of the appointment of such a Commission, the lines upon which the investigation should be made.

State Committees.

State Committees have already been formed in Queensland, New South Wales, Victoria, and South Australia. Up to the present no Committees have been formed in Western Australia or Tasmania, but it is possible as a result of the above meeting a Committee may be formed in Tasmania. It is hoped later on Western Australia will also join up, for the Director of Agriculture, the Superintendent of Dairying, and other officers and farmers are greatly interested in the development of the industry in that State, while manufacturers have already established modern factories at convenient centres for the treatment of all available stock, and are equally as interested there as elsewhere throughout Australia.

The Queensland Pig Industry Committee is composed of the following representatives:—

Producers: Mr. R. G. Watson representing the Queensland Branch of the Australian Stud Pig Breeders' Society; Mr. John Hardcastle, Director of the Queensland Co-operative Bacon Association, Limited.

Co-operative Factories: Mr. J. A. Heading, Chairman of Directors, Queensland Co-operative Bacon Association, Limited, Murarrie; Mr. H. M. Hart, Chairman of Directors of the Darling Downs Co-operative Bacon Company, Limited.

Proprietary Bacon Factories: Mr. E. E. Forth, General Manager, J. C. Huttons Proprietary, Limited, Brisbane; Mr. T. L. Jones, General Manager, Foggitt, Jones, Limited, Brisbane.

Commonwealth Departments: Mr. O'Boyle, Government Veterinary Officer.

State Departments: Mr. E. J. Shelton, H.D.A., Instructor in Pig Raising, Department of Agriculture and Stock, Brisbane.

SIMPLE SHEEP FENCE.

At the present prices of wire, anything that will economise in material is acceptable to landowners. The fence illustrated, which was noticed by a frequent contributor in Western Australia, will be found an effective fence for merinoes and easily repaired. Only one wire is used, the posts being 100 feet apart, and the secret of success is to keep this wire tightly strained, with wire droppers from it to the netting selvedge. The netting is let into the ground, but is not fastened in any way to the posts. Fig. 1 shows the general arrangement of the fence. Fig. 2 shows the device for making

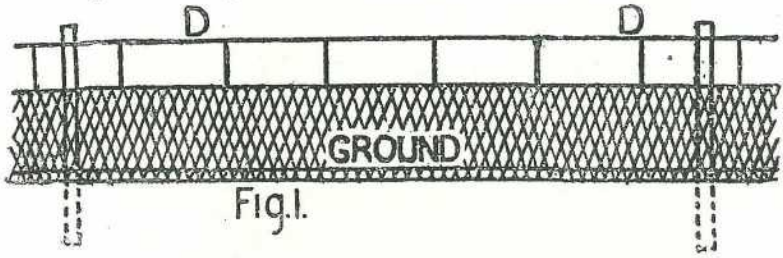


Fig.1.

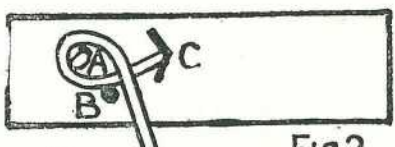


Fig.2.

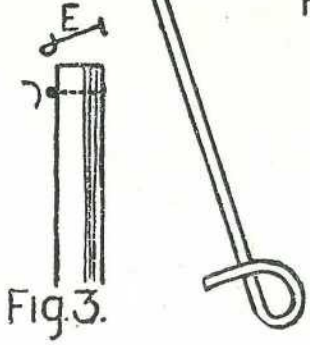


Fig.3.

the wire droppers, consisting of a piece of batten with a screw, A, a spike, B, and a stop, C, all projecting about half an inch out of the batten. The ends of the droppers must be turned in opposite directions, and on opposite sides. Fig. 3 shows how the top wire of the fence is fastened to the posts by a piece of wire, E, running through the post at right angles, with a twist about the size of a halfpenny at the back to hold it, and an ordinary hitch round the top fence wire to hold that wire in position at D.—"Australasian."

CLASSING SMALL CLIPS.

The following notes are taken from a radio address by Mr. J. Carew, Acting Instructor in Sheep and Wool:—

Having established a flock of sheep, the next thing to consider is the best and most profitable method of preparing the wool for market.

The standard which has been attained in Queensland has caused a feeling of security and confidence to prevail amongst our wool-buying representatives, and this standard should be safeguarded amongst the small holders as well as it is with the large holders. The large stations usually have flocks sufficienty large to justify the employment of a qualified wool-classer. It is really the get-up of these clips that has secured for us the high standard which the trade now enjoys. It is where the flocks are too small to justify the employment of a qualified wool-classer that I wish to direct my remarks. Every sheep farmer knows that from a sheep there will be shorn a low grade of wool as well as the good, clean fleece wool. To keep these grades separate is very important, but first consideration should be given to the

matter of general cleanliness. Have a good, clean shearing board, the size suitable to the requirements, and keep it clean. When the sheep is shorn the fleece should be picked up and thrown out, cut side down, on a wool roller's table for skirting.

The reason for skirting the fleece is that the edges represent the lower types, having a greater amount of yolk and run out to short fibres. When this skirting is removed the fleece is composed of wool practically the same length all over, thus allowing the buyers to secure what they require without having these inferior wools included.

If the fleeces are lightly affected with seed or burr, a deep skirting is most suitable, as the fleece wool will then be seed-free.

If seed or burr extend over most of the fleece it is better to give a light skirting, removing the heavy seed-matted edges, as to make the fleece seed-free would mean removing too much wool in the skirtings.

All skirtings should be picked over carefully, removing all stained portions and fatty trimmings, which should be packed separately and called "stained pieces."

The amount of pieces secured from the clip should decide whether they be sorted into two classes or left to go into one bulk line.

If two sorts are made, the bulky, bright, light-conditioned pieces would be called "brokens," and the small, duller, and heavier-conditioned sort would be called "pieces."

Bellies.—As this portion is shorn separately, it is best to keep them separate from fleece wool or pieces. All stained wool should be removed and the bellies packed by themselves. As they are not used for the same purpose they are likely to prejudice a buyer against either lines of fleece or piece wool. No matter how small the flock this precaution should be taken.

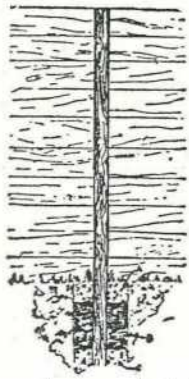
Locks will consist of all second cuts and small locky bits that fall through between the lathes of the wool tables. Where a small flock is being treated the floor sweepings can be mixed with them, thus making one line of locks. When the fleece is skirted it should be rolled. If this is done properly the wool is likely to open up better and be more attractive to the buyer. To do this properly, first throw in one side, about one-third the fleece width, then turn in the same side again, tuck in the edges of the fleece, throw in the neck, and roll from britch to shoulder. The fleece can be secured by drawing out from the shoulder enough wool to turn and tuck into the fleece. This is not necessary if fleeces are properly handled. Fleece wool should not be secured with twine when preparing it for market.

[TO BE CONTINUED.]

SAVING CONCRETE IN POST HOLES.

The ordinary method of setting a post in concrete is to set it into the hole and fill in around with concrete. This is wasteful, and does not reach the highest efficiency.

A square hole should be dug so that the concrete will have square corners. After placing the post in position the concrete should be poured in until the hole



is about one-fifth filled. The concrete is marked A in the drawing. The hole is partially filled with wet earth, here marked B, leaving room for more concrete. The upper concrete block should be about 50 per cent. larger than the lower block to offset any difference in the hardness of the ground. There is practically no strain exerted against the ground between the two concrete blocks.

THE STORAGE OF EGGS.

Compiled by P. RUMBALL, Poultry Instructor.

On the commercial scale eggs are preserved almost universally by means of cold air storage. For the small producer or consumer such a procedure is generally impracticable, and resort has been made to simpler methods, such as packing the eggs in sand, bran, ashes, salt, lime, &c. These methods have, however, now been abandoned in favour of storage in solutions in which the eggs are immersed and held until consumed or sold, states the Department of Scientific and Industrial Research, London, in a report on the "Storage of Eggs," a copy of which has been received by the Department of Markets and Migration. This report, which deals most exhaustively with all phases of the subject, may be obtained directly from H.M. Stationery Office, Adastral House, Kingsway, W.C. 2, or from Messrs. Gordon and Gotch, Limited, Little Collins street, Melbourne. The price is 1s. 3d.

Continuing, the report states that the choice of a suitable solution is determined by certain considerations. The shell of the egg and its adjoining membranes are permeable to water and certain dissolved substances, and care must be taken that the preserving solution does not contain any ingredient likely to pass into the egg, thereby affecting its flavour or contaminating it in some way. Various substances have been tried and discarded for different reasons, so that at the present the two solutions most commonly used are a solution of sodium silicate, better known as water glass, and lime water, to which salt is usually added.

Fundamentally the preservation is still one requiring a certain degree of cold, and although for satisfactory results constancy of temperature is not required, it is essential that the eggs should be stored in a cool place where, if possible, the temperature should always lie in the range of 33 deg. to 45 deg. Fahr.

From their investigations the Board of Agriculture and Fisheries recommend the following specific solutions:—

(*a*) Water Glass.—A strong solution containing approximately equal parts by weight of sodium silicate and water is sold commercially. It is very viscous and has a specific gravity of 1.7. A 5 per cent. solution of this is a convenient concentration to use.

(*b*) Lime Water.—Four parts of finely slaked lime are mixed with twenty parts of cold water, and the whole well stirred for several days to ensure saturation. One part of salt is then added and the clear solution decanted and poured over the eggs which should be placed in suitable wooden, cement, or galvanised iron containers.

If the containers are open to the atmosphere the carbon dioxide in the air reacts with the solutions, giving a white precipitate. In the case of lime water it is simply a precipitate of calcium carbonate, whereas with the water glass silica itself is precipitated, due to the neutralisation of the alkali. It is therefore advisable, in order to maintain the solutions at the required strength, to cover the containers and so limit the ingress of carbon dioxide. An alternative method is to cover the liquid surface with a layer of oil, such as liquid paraffin or olive oil.

In both cases the eggs to be preserved should be clean and new-laid, and should not at any time have been subjected to a temperature much higher than 60 deg. It is therefore advisable to candle the eggs and discard cracked ones or any departing from this standard of freshness. Most investigators claim that water glass is the more satisfactory solution. Using the solutions described above, and, in addition, storing the eggs at a temperature of 32 deg. to 35 deg. Fahr., eggs have been preserved in the course of experiments by the Department for twelve months in both solutions with good results. The taste of the eggs stored in water glass was excellent, the air chamber was the same size as before storage, and the white had all the consisteney of a new-laid egg. The eggs fried and poached, but nearly always cracked on boiling unless the shell was first pierced at the broad end. The only other point was that the shells had a slight crusty deposit which was not removed on washing with water.

The eggs stored in lime water were not so good, although the flavour was excellent. In all cases the air chamber had completely disappeared and the white was more fluid and tended to spread when the contents of the egg were emptied into a dish. The shell in every case was markedly thinner and appeared rough and amorphous. In general, the shell cracked on boiling, even though it was first pierced. Presumably, the action of the lime water was to make it very brittle.

The role played by the water glass in preserving the eggs is very simple. Being a colloid it does not pass through the egg membrane, and, indeed, Hendrick has shown that the silica content of eggs is not increased after two years' immersion in water glass. Further, Berger has shown that within three to seven days the water glass is deposited in the pores of the shell, completely sealing it. This, of

course, is the reason why the shell has to be pierced prior to boiling. Once the egg is sealed it suffers no change resulting from external causes such as mould or bacterial invasion.

Commercial water glass is very alkaline, and some controversy has taken place as to whether a neutral sodium silicate would give better results. A certain amount of alkali is necessary to dissolve the silica, but it is claimed that the excess alkali affects the flavour of the egg. This fear, however, appears to be groundless in view of the fact that with water glass the egg is so quickly sealed. It is possible, however, that the alkali concentration influences the extent of the action of the water glass on the shell surface.

With lime water it would appear that the egg is never completely sealed, and therefore permits the passage of water through the shell, which fills the air chamber. This is rather striking, in that the solution in the present experiments (containing 5 per cent. sodium chloride) had a much lower freezing point, and, therefore, greater osmotic pressure than the white of the egg. The solubility of lime in water is small (approximately 1 in 700), and the freezing point of the lime solution will, therefore, be very approximately that of a 5 per cent. salt solution, i.e., 3 deg. C. One would therefore have expected water to pass from the egg to the lime solution, thereby giving rise to an increased air chamber. That it does not can only be explained by supposing that the lime attacks the egg membranes, destroying their permeability, just as it attacks and wears away the shell.

The efficiency of water glass and lime water as a means of preserving eggs is without question. Used in connection with a rough system of cold storage (i.e., paying no particular regard to constancy of temperature, but merely temperature limits) either method gives excellent results, with the preference, so far as the present experiments show, in favour of water glass. The cost of the water glass is small, and apart from the extra labour involved—e.g., the washing of the eggs on removal from the solution—the only disadvantages are that the surface of the shell is marred, and there is every possibility of the shell cracking on boiling. It would seem, however, that further research might remove these objections. Moreover, there appears to be no reason why, if clean eggs alone are used, the same preserving liquid should not be employed for several storage seasons. Lime water possibly has the advantage in this respect, as it is definitely antiseptic and is less likely to suffer from mould and bacterial contamination than water glass under the same conditions.

QUEENSLAND SHOW DATES.

The following show dates have been listed by the Queensland Chamber of Agricultural Societies for the present year:—

JUNE.	
Lowood	8-9
Bundaberg	14-16
Miriam Vale	13-14
Hughenden	12-13
Wellington Point	16
Gladstone	20-21
Mount Larcom	22-23
Gatton	27-28
Woombye	27-28
Rockhampton	27-30
JULY.	
Mackay	3-5
Kilcoy	5-6
Proserpine	7
Esk	13-14
Townsville	10-12
Woodford	12-13
Nundah	14
Home Hill	14
Caboolture	19-20
Rosewood	20-21
Charters Towers	18-19
Ingham	20-21
Ithaca	21
Ayr	27-28
Wowan	26
JULY—*continued*.	
Laidley	25-26
Nambour	25-26
Mount Gravatt	28
Pine Rivers	27-28
AUGUST.	
Bowen	1-2
Redcliffe	3-4
Royal National	6-11
Crow's Nest	22-23
Maroochydore	25
Coorparoo	25
SEPTEMBER.	
Imbil	5-6
Zillmere	8
Gympie	12-13
Stephens	15
Pomona	19-20
Rocklea	22
Malanda	26-27
Beenleigh	28-29
Melbourne Royal	20-29
OCTOBER.	
Kenilworth	4
Enoggera	6

Answers to Correspondents.

FRUITGROWING.

The following replies have been selected from the outward correspondence of the Director of Fruit Culture, Mr. Geo. Williams:

Monstera Deliciosa.

INQUIRER (N.Q.)—

The *Monstera deliciosa*—a native of Mexico—is an epiphytic climber and of slow growth, with large scolloped and perforated leaves carried on stems 1 ft. to 2 ft. in length, which are very ornamental. Propagated by seeds or short cuttings—the latter coming into bearing in two or three years; seedlings occupy much longer.

Fruit are produced in the axis of the uppermost leaves and occupy upwards of twelve months from the first appearance of the flower sheath (the plant belongs to the Arum family) to ripening. It attains about 10 inches in length by 2½ inches in diameter, and will ripen after being cut from the plant. The flavour is variously described from agreeable to exquisite. When perfectly ripe, the scales, as the outer covering is usually referred to, loosen, and commence to fall, and the edible portion becomes partially detached from the core. The lower half of the fruit is the first to mature, the upper half should be left to the following day. If eaten prematurely an irritation is caused in the throat by the small hairs which are present beneath the scales. Where treated as a climber, the plant may be grown against an old stump or slab wall. It may also be allowed to grow along the ground.

BOTANY.

The following answers have been selected from the outgoing mail of the Government Botanist, Mr. C. T. White, F.L.S.:—

"Periwinkle" (*Vinca rosea*).

T.M.K. (Beecher)—

The plant sent is *Vinca rosea*—the Periwinkle—commonly found as a stray from garden culture in Queensland, particularly on the coast in North Queensland, where it has become very abundant. It has attracted much attention in recent years as a cure for diabetes. Hundreds of people are now using it and, on the whole, reporting very good results. The plant is not known to be poisonous though it belongs to a dangerous family—the *Apocynoceæ*. Eaten by stock in very large quantities it may have a deleterious effect, but the plant has a rather nauseous taste and on the whole is more or less left untouched by animals.

TICK-FEVER INOCULATION.

PRECAUTIONS TO BE OBSERVED.

1. Animals should be placed in a tick-free stall or shady yard and allowed to remain there until they have recovered from the inoculation fever (approximately four weeks).

2. Animals undergoing inoculation should be given easy access to water and green feed, and should be disturbed as little as possible.

3. The protection afforded by inoculation *is not absolute*, and a second and even fatal attack of the disease may be brought about in any of the following ways:—

Driving too fast and too long distances;
Exposure to extreme temperature;
Unfavourable conditions of environment;
Undue excitement;
Starvation;
Gross tick infestation;
Lowered vitality by an attack of some other disease;
Over service (in a bull).

4. Animals should not be travelled for at least six weeks after inoculation.

5. Any blood remaining in the bottle after inoculation should be destroyed.

Note.—Animals reared in tick-infested country rarely respond to inoculation.

General Notes.

Staff Changes and Appointments.

The resignation of Mr. A. H. T. Bedford as Agricultural Bank Inspector has been accepted as from 12th April, 1928, as tendered.

The following have been appointed Inspectors of Slaughter-houses:—Mr. L. P. Doyle, Inspector of Stock and Brands, Cloncurry; Constable T. J. Brennan, Adavale, and Mr. B. Dunbavand whose appointment will be on probation for a period of six months as from the date of his entry upon duty.

Mr. D. J. Callaghan, Inspector of Dairies, Mundubbera, has, in addition to his present position, been appointed Officer under and for the purposes of the Animals and Birds Acts.

Mr. G. B. Gallway, Senior Clerk, Queensland Agricultural High School and College, Gatton, has been appointed Inspector of Accounts under the Dairy Produce Act.

Messrs. H. Lambert and R. J. Rollston have been appointed Assistant Inspecting Cane Testers for the 1928 sugar season. They will be stationed at Cairns and Mackay, respectively, and will commence duty as from 1st June and 14th June, 1928, respectively. The following have been appointed Cane Testers and Assistant Cane Testers, as the case may be, at the mills and as from the dates set opposite each:—

Cane Testers: Miss S. Riley, Invicta (1st June, 1928); Mr. F. C. J. Jorss, Inkerman (1st June, 1928); Mr. W. J. Richardson, Mulgrave (23rd May, 1928); Miss J. O'Flynn, Mourilyan (1st June, 1928); Mr. L. Chadwick, North Eton (8th June, 1928); Miss F. Parkinson, Proserpine (1st June, 1928); Mr. W. J. Mason, Kalamia (6th June, 1928).

Assistant Cane Testers: Miss D. Bowder, Inkerman (1st June, 1928); Miss J. Orr, Proserpine (1st June, 1928).

Cane Levy.

Additional Regulations have been approved under the Primary Producers' Organisation and Marketing Act, empowering, subject to the following proviso, the Innisfail District Cane Growers' Executive to make a particular levy on growers of sugar-cane on the lands supplying cane to the Goondi, Mourilyan, Tully River, Central, and South Johnstone Central Mills at the rate of 1¼d. per ton on all cane delivered during the period commencing 1st May, 1927, and ending on the 28th February, 1928, provided that, if at least 100 growers in the localities above-mentioned, on or before the 11th June, 1928, make a request for a poll on the question of the proposed levy, such poll shall be held, and if the majority of votes is against the making of the levy, the levy will not be made. The amount of the levy, if made, will be deducted by the managers of the respective mills from the final cane payments due by such mills to growers in the said localities, and shall be paid by the managers to the secretary of the Innisfail District Cane Growers' Executive, which shall expend same in the interests of the district comprised within the jurisdiction of that Executive. The secretary of the Executive shall furnish the Minister, not later than the 1st May, 1929, an audited statement setting out in detail the receipts from the levy, if made, and the disbursements therefrom. A penalty not exceeding £5 is provided for any breach of the Regulations.

A Cream Cooler—Its Value.

If properly used under clean conditions, nothing will give better results than a milk or cream cooler. Several very efficient types with a water bag attachment are on the market at comparatively low prices. Besides lowering the temperature of the milk or cream, and thus checking bacterial development, coolers aerate the milk or cream, release gases, food flavours, &c., and in the case of cream, improve its body and consistency. If coolers were generally used, there is no doubt that a marked improvement in quality of milk and cream delivered to both cheese and butter factories would take place.

Care should be taken to thoroughly *wash and boil* a cooler after use, or otherwise it will become a source of infection. It is advisable always to mix creams already held in the dairy immediately the fresh cream is cool, and not to keep the lots separate until delivery to the factory. The mixed creams should be stirred with a metal stirrer several times a day to keep the mass uniform.

Citrus Levy Regulations

On the 10th February, 1928, the Citrus Levy Regulations were extended to deal with citrus fruit marketed during the period from 29th February, 1928, to 28th February, 1929. These Regulations have now been amended to the following effect:—The levy will be at the rate of 2d. per bushel case and 1d. per half-bushel case instead of 1d. and ½d., respectively, as previously. Of the sums raised by the levy, an amount equal to 1d. per half-bushel case and ½d. per half-bushel case shall be expended only in the interests of the Citrus Fruit Section of the Fruit-growing Industry in Queensland, and the balance only upon advertising in the interests of the growers concerned.

Valedictory.

The officers of the Division of Entomology and Plant Pathology of the Department of Agriculture and Stock met recently to bid farewell to Mr. J. Harold Smith, who has been transferred to Cairns, where he is to take charge of the general entomological work of the Northern portion of the State. Mr. R. Veitch, Chief Entomologist, on behalf of the staff of the Division, wished Mr. Smith future prosperity, and presented him with a leather suitcase as an outward expression of regard. Mr. Smith, in responding, thanked those present for the gift, and while expressing pleasure in the thoughts of the possibilities that now lay open to him because of his new appointment, he regretted severing personal contact with the officers of the Division.

Poddies or Pigs.

There are doubtless many dairy farmers who might with advantage put to themselves the question raised by Mr. E. T. Boller in an address before a recent gathering of farmers on the South Coast of New South Wales. Said the speaker:—

"In exploring possible avenues along which the bacon industry might be profitably developed, one cannot help noticing the enormous quantity of skim milk that is somewhat aimlessly fed to calves each year. If we were to follow these calves to their ultimate exit from the district, we would probably find that they were bought for stocking districts where the farmers consider it more profitable to raise pigs and to buy their calves from the districts where the farmers have never taken the trouble to sit down and think things out a little more thoroughly.

"No sound reason exists for our district farmers to raise more than 15 per cent. of the herd in female calves each year in order to replace ordinary depreciation of dairy herds. It cannot be shown that it pays to raise male animals of any description except a small percentage of purebreds. Butchers' meat consists largely of cows. Even though bullocks were required for beef, if the food that is used to fatten them can be turned into either milk or pork, their fattening must be regarded as relatively unprofitable. If all male calves and all female calves not required for replenishing herds were destroyed and the skim milk fed to pigs, South Coast farmers could afford to buy the best Sydney meat all the year round."

Cleaning Tomato Seed.

The best method of separating tomato seed from the surrounding pulp, writes an officer of the New South Wales Department of Agriculture, is as follows:—

Cut the fruit in halves and scoop the contents into a bucket, and when the latter is about half full fill up with water. Stand the bucket aside and allow the contents to ferment, which will take from two to six days, according to the warmth of the weather. A froth forms on top of the water when fermentation is sufficiently advanced. Wash the contents of the bucket on a fine sieve or a layer of hessian and the pulp will come right away from the seed, which must be spread out in a thin layer to dry. Rapid drying is important to prevent moulding. When dry, rub the seed in the hands to separate the individual seeds. Seed harvested in this manner has averaged 94 per cent. germination.

A few points in the selection of the fruit are worth noting. Select only from the best yielding plants which conform strictly to the characteristics of the variety, both as regards type of vine and type of fruit. Cut several fruit open to be sure of the quality. Choose a plant that produces a large number of average size tomatoes rather than a plant with two or three large fruits and a number of small ones. Be sure the plant is free from disease, as several tomato diseases are transmitted by the seeds. As a further precaution, the seeds, before planting, should be dipped for ten minutes in a solution of mercuric chloride, 1 part in 1,000 parts of water. The seed should then be rinsed in clean water and dried.

Points in Poddy Rearing.

The essential features of calf rearing may be summarised as follows:—

1. Always handle calves quietly and patiently, and so develop in the animal a sense of confidence in the human foster parent, which will remain till the calf reaches maturity.

2. Feed at regular times each day.

3. Always give the calf a regular quantity of milk.

4. Feed only perfectly clean sweet milk.

5. Feed the milk at body temperature (about 100 deg. Fahr.).

6. Always cleanse feeding buckets as rigidly as you would all other dairy utensils. All the above points have a big bearing on the calf's digestive system, and will eliminate the common causes of calf scours.

7. Provide shade in summer and shelter from winter wind and rain, because it is cheaper to conserve animal heat and energy by these means than by the use of larger amounts of food.

8. Always make a point of picking up pieces of rag, paper, twine, &c., if found about the calf paddock. Young calves exhibit a mischievous delight in picking up foreign substances of this description and ultimately swallowing them. Indigestible material of this nature, when eaten by young calves, is almost certain to set up a serious form of gastro-enteritis.

Points in Working Concrete.

The utility of concrete is appealing increasingly to farmers, but certain precautions are necessary if work constructed of this material is to be as durable as it should. The setting and hardening of concrete depends on several factors. Warm weather, rich mixtures, and dry consistency all make concrete set rapidly. Concrete subject to its own weight and where there is no tendency to bend will be sufficiently hard for the removal of the forms when it cannot be indented by the pressure of the thumb. In reinforced concrete, such as beams, &c., the concrete should remain in the forms from three to four weeks. In cool weather they should be allowed to remain just twice as long as in warm weather.

All concrete should be put into place before it begins to stiffen, any further handling resulting in weak concrete, and retempering is bad practice. If a dry mixture is being used it should be placed in layers not more than 6 in. deep and rammed to compact the mass and to exclude all air. Continue till a little water rises to the surface. With wet mixtures light ramming will do, using a spade to force the stone away from the face of the mould, otherwise a rough surface will be left when the moulds are removed.

In hot dry weather the concrete should be shaded from the sun and wind, as concrete which dries quickly cannot be strong. It should be covered with bagging, canvas, or sand for the first seven to ten days, and if these coverings are kept wet the conditions will be ideal for curing the concrete. It is important that dry mixtures should be kept sprinkled. Light weights may be placed on concrete when it is a few days old, providing the load is a comprehensive one. Much longer is required for bending stresses.

Fresh concrete will not bond well with concrete that has set. To avoid this trouble the work should be left rough where it is stopped. Even one hour's delay will leave a poor bond. On resuming work half an inch should be removed off the place to be joined. The old surface should be well wetted and a rich mixture of one part cement and one part sand made to join the bond. The bond should always be made in a gradual slope off.

Freezing of concrete before it is set is very detrimental to a strong concrete.

Orchard Notes for July.

THE COASTAL DISTRICTS.

The marketing of citrus fruits will continue to occupy the attention of growers. The same care in the handling, grading, and packing of the fruit that has been so strongly insisted upon in these monthly notes must be continued if satisfactory returns are to be expected. Despite the advice that has been given over and over again, some growers still fail to grasp the importance of placing their fruit on the market in the best possible condition, and persist in marketing it ungraded; good, blemished, and inferior fruit being met with in the same case. This, to say the least, is very bad business, and as some growers will not take the necessary trouble to grade and pack properly, there is only one thing to do, and that is to insist on the observance of standards of quality and see that the fruit offered for sale complies with the standards prescribed, and that cases are marked accordingly.

Where the crop has been gathered, the trees may be given such winter pruning as may be necessary, such as the removal of broken or diseased limbs or branches, and the pruning of any superfluous wood from the centre of the tree. Where gumming of any kind is seen it should be at once attended to. If at the collar of the tree and attacking the main roots, the earth should be removed from around the trunk and main roots—all diseased wood, bark, and roots should be cut away, and the whole of the exposed parts painted with Bordeaux paste.

When treated do not fill in the soil around the main roots, but allow them to be exposed to the air for some time, as this tends to check any further gumming. When the gum is on the trunk or main limbs of the tree cut away all diseased bark and wood till a healthy growth is met with and cover the wounds with Bordeaux paste.

If the main limbs are infested with scale insects or attacked by any kind of moss, lichen, or fungus growth, they should be sprayed with lime sulphur.

Towards the end of the month all young trees should be carefully examined for the presence of elephant beetles, which, in addition to eating the leaves and young bark, lay their eggs in the fork of the tree. When the young hatch out they eat their way through to the wood and then work between the wood and the bark, eventually ringbarking one or more of the main limbs, or even the trunk. A dressing of strong lime sulphur to the trunk and fork of the tree, if applied before the beetles lay their eggs, will act as a preventive. In the warmer localities a careful watch should also be kept for the first appearance of any sucking bugs, and to destroy any that may be found. If this is done systematically by all growers the damage done by this pest will be very much reduced.

Citrus trees may be planted throughout the month. Take care to see that the work is done in accordance with the instructions given in the June notes. All worn-out trees should be taken out, provided the root system is too far gone to be renovated, but when the root system is still good the top of the tree should be removed till sound, healthy wood is met with, and the portion left should be painted with a strong solution of lime sulphur. If this is done the tree will make a clean, healthy growth in spring.

The inclusion of a wide range of varieties in citrus orchards—and which has been the general practice—is to be deprecated. Even in new plantations there is a tendency to follow the same unprofitable lines. Far too much consideration is given to the vendor's description or the purchaser's appreciation of a particular variety or varieties. Individual tastes must be subordinated to market requirements, and the selection of varieties to the best available kind of early, medium, and late fruits. Amongst oranges Joppa should be placed first, Sabina for early fruit, and Valencia or Loon Giru Gong for late markets.

In mandarins local conditions influence several varieties, and since the introduction of the fungus known as "scab" the inclusion, particularly on volcanic soil, of the Glen Retreat and Emperor types is risky. In alluvial lands, Emperor and Sovereign (an improved Glen Retreat) are the most profitable, though Scarlet in many places is worth including, with King of Siam as a late fruit. This commanded the highest price realised for mandarins last season.

Land intended for bananas and pineapples may be got ready, and existing plantations should be kept in a well-cultivated condition so as to retain moisture in the soil.

Bananas intended for Southern markets may be allowed to become fully developed, but not coloured, as they carry well during the colder months of the year, unless they meet with a very cold spell when passing through the New England district of New South Wales.

The winter crop of smoothleaf pines will commence to ripen towards the end of the month, and when free from blackheart (the result of a cold winter) or from fruitlet core rot, they are good for canning, as they are of firm texture and stand handling. Where there is any danger of frost or even of cold winds, it pays to cover pines and also the bunches of bananas. Bush hay is used for the former and sacking for the latter.

Strawberries should be plentiful during the month, provided the weather is suitable to their development, but if there is an insufficient rainfall, then irrigation is required to produce a crop. Strawberries, like all other fruits, pay well for careful handling, grading, and packing, well-packed boxes always realising a much higher price than indifferently packed ones on the local market. Where strawberries show signs of leaf blight or mildew, spray with Bordeaux mixture for the former and with sulphide of soda for the latter.

When custard apples fail to ripen when gathered, try the effect of placing them in the banana-ripening rooms, and they will soon soften instead of turning black.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

July is a busy month for the growers of deciduous fruits, as the important work of winter pruning should, if possible, be completed before the end of the month, so as to give plenty of time for spraying and getting the orchard into proper trim before spring growth starts.

In pruning, follow the advice given in the June number; and if you are not thoroughly conversant with the work, get the advice of one or other of the Departmental officers stationed in the district.

Pruning is one of the most important orchard operations, as the following and succeeding seasons' crops depend very largely on the manner in which it is carried out. It regulates the growth as well as the number and size of the fruit, as if too much bearing wood is left, there is a chance of the tree setting many more fruits than it can properly mature, with a result that unless it is rigorously thinned out it is undersized and unsaleable. On the other hand, it is not advisable to unduly reduce the quantity of bearing wood, or a small crop of overgrown fruit may be the result.

Apples, pears, and European varieties of plums produce their fruits on spurs that are formed on wood of two-years' growth or more; apricots and Japanese plums on new growth and on spurs; but peaches and nectarines always on wood of the previous season's growth. Once peachwood has fruited it will not produce any more from the same season's wood, though it may develop spurs having a new growth or new laterals which will produce fruit.

The pruning of the peaches and nectarines, therefore, necessitates the leaving of sufficient new wood on the tree each season to carry a full crop, as well as the leaving of buds from which to grow new wood for the succeeding year's crop. In other words, one not only prunes for the immediately succeeding crop, but also for that of the following season.

All prunings should be gathered and burnt, as any disease that may be on the wood is thoroughly destroyed. When pruned, the trees are ready for their winter spraying with lime-sulphur.

All kinds of deciduous trees may be planted during the month provided the ground is in a proper state to plant them. If not, it is better to delay planting until August, and carry out the necessary work in the interval. The preparation of new land for planting may be continued, although it is somewhat late in the season, as new land is always the better for being given a chance to mellow and sweeten before being planted. Do not prune vines yet on the Granite Belt; they can, however, be pruned on the Downs and in the western districts.

Trees of all kinds, including citrus, can also be planted in suitable situations on the Downs and western districts, and the pruning of deciduous trees should be concluded there. If the winter has been very dry, and the soil is badly in need of moisture, all orchards in the western districts, after being pruned and ploughed, should receive a thorough irrigation (where water is available) about the end of the month, so as to provide moisture for the use of the trees when they start growth. Irrigation should be followed by a thorough cultivation of the land to conserve the water so applied. As frequently mentioned in these notes, irrigation and cultivation must go hand in hand if the best results are to be obtained, especially in our hot and dry districts.

Farm Notes for July.

FIELD.—Practically the whole of the work on the land for this month will be confined to the cultivation of winter crops, which should be now making good growth, and to the preparation of land for the large variety of crops which can be sown next month. Early-maturing varieties of wheat may be sown this month. The harvesting of late-sown maize will be nearing completion, and all old stalks should be ploughed in and allowed to rot. Clean up all headlands of weeds and rubbish, and for this purpose nothing equals a good fire. Mangels, swedes, and other root crops should be now well away, and should be ready for thinning out. Frosts, which can be expected almost for a certainty this month, will do much towards ridding the land of insect pests and checking weed growth. Cotton-picking should be now practically finished and the land under preparation for the next crop. The young lucerne should be becoming well established; the first cutting should be made before the plants flower—in fact, as soon as they are strong enough to stand the mowing machine—and the cutting of subsequent crops should be as frequent as the growth and development of the lucerne plants permit. Ordinarily cutting should be regulated to fit in with the early flowering period—*i.e.*, when about one-third of the plants in the crop are in flower.

The Home and the Garden.

KITCHEN GARDEN.

Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. In fine weather get the ground ploughed or dug, and let it lie in the rough until required. If harrowed and pulverised before that time, the soil is deprived of the sweetening influences of the sun, rain, air, and frost. When the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts, it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities, it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops.

FLOWER GARDEN.

Winter work ought to be in an advanced state. The roses will not want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolour, marigold, cosmos, cockscombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna lily, and other bulbs. Put away dahlia roots in some warm moist spot, where they will start gently and be ready for planting out in August and September.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	June, 1928.		July, 1928.		MOONRISE. June, 1928.	MOONRISE. July, 1928.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	6.38	6.38	6.46	5.6	3.36	3 29
2	6.38	5.1	6 46	5.6	4.13	4.15
3	6.39	5.1	6.46	5.6	4.47	5.6
4	6 39	5.1	6.46	5 6	5.30	6 1
5	6.39	5.1	6.46	5.7	6.20	6.56
6	6.40	5.1	6.46	5.7	7.10	8.0
7	6.40	5.1	6.46	5.8	8.6	9.1
8	6 41	5.1	6.45	5.8	9.4	10.1
9	6.41	5.1	6.45	5.9	10.4	11.1
10	6.41	5.1	6.45	5.10	11.5	...
						a.m.
11	6.42	5.1	6.44	5.11	...	12 3
					a.m.	
12	6.42	5.1	6.44	5.12	12.5	1.4
13	6.43	5.1	6.44	5.12	1.7	2 19
14	6.43	5.1	6 44	5.12	2.11	3.23
15	6.43	5.1	6 43	5.12	3.16	4.36
16	6.44	5.1	6.43	5.13	4.24	5.33
17	6.44	5.2	6.43	5.13	5.35	6.34
18	6.44	5.2	6.43	5.13	6.43	7.32
19	6.44	5.2	6.43	5.13	7 51	8.31
20	6.44	5.2	6.42	5 14	8.52	9.0
21	6.44	5.3	6.42	5.14	9.46	9.37
22	6.44	5.3	6.42	5.15	10.28	10.9
23	6 45	5.3	6.41	5.15	11.5	10.37
24	6.45	5.3	6.41	5.16	11.39	11.17
25	6.45	5.4	6.40	5.17	12.6	11.37
						p.m.
26	6.45	5.4	6.40	5.17	12.37	12.5
27	6.45	5.4	6.39	5.18	1.11	12.44
28	6.45	5.5	6.38	5.18	1.39	1.23
29	6.45	5.5	6.37	5.19	2.14	2.8
30	6.46	5.6	6.37	5.20	2 47	2.59
31	...	...	6.36	5.20	...	3.53

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.

Phases of the Moon, Occultations, &c.

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

7 June	○	Full Moon	10 13 p.m.
11 ,,	☽	Last Quarter	3 51 p.m.
18 ,,	●	New Moon	6 42 a.m.
25 ,,	☾	First Quarter	8 47 a.m.

Apogee, 1st June, at 6.6 p.m.
Perigee, 16th June, at 11.54 p.m.
Apogee, 29th June, at 9.42 a.m.

The conjunction of Saturn with the Moon at 6 a.m. on the 4th will form an interesting sight, Saturn being only 2 degrees north of the full Moon and both being situated more than 20 degrees south of west but well above the horizon in the early dawn. On the 6th Saturn will be in direct opposition to the Sun, as the Moon was at the time of its eclipse on the 3rd.

Phi Capricorni (magnitude 5·8) will be occulted soon after the Moon rises at Warwick on the 8th.

On the 14th a favourable opportunity will occur to see Jupiter about midday and near 2 o'clock, as it will then be 2 degrees north of the waning Moon in the western sky.

On the 19th the conjunction of Mercury with the new Moon will take place, so nearly in a line from the Earth to the Sun that both will be entirely lost in its rays.

The winter solstice will occur on the 22nd, when the Sun, having reached its greatest northern latitude, will be at an angle of about 51 degrees from the zenith of Brisbane, Toowoomba, and Warwick, or 42 degrees at Townsville, affording quite welcome warmth.

Kappa Virginis (magnitude 4·4) will be occulted on the 27th about 9 p.m.

On the 29th Mercury will be passing between the Earth and the Sun from east to west, but will avoid a transit being apparently 3 degrees above it.

Omega Orphinci (magnitude 4·5) will be occulted by the Moon on the 30th soon after 8 o'clock p.m.

3 July	○	Full Moon	Midnight.
10 ,,	☽	Last Quarter	10 0 p.m.
17 ,,	●	New Moon	2 0 p.m.
25 ,,	☾	First Quarter	12 38 a.m.

Perigee, 15th July at 1 6 a.m.
Apogee, 26th July at 10 6 p.m.

Venus will be in superior conjunction with the Sun on the 1st when it will be passing the Sun from the east to the west of it, apparently very closely on the northern side, escaping an occultation by the Sun by about half the Moon's diameter.

An occultation of a small star in Orphiucus will take place a little before half-past 6 p.m. on the 1st at Rockhampton. At places south of Bundaberg and Carnarvon the star will skirt the southern edge of the Moon. Three hours later the occultation of another star in Orphiucus will be visible from any part of Queensland. Another star in the same constellation will be occulted near midnight.

About a quarter past one in the morning of the 3rd Lambda Sagitarii will be occulted at Rockhampton, but somewhat later at other places in Queensland.