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QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXXV. 1 APRIL, 1931 PART 4.

Event and Comment.

The Queensland Dairying Industry.

SPEAKING at the opening of a new butter factory at Chinchilla recently, the Minister for Agriculture and Stock, Mr. Harry F. Walker, who is also a successful dairy farmer, had much of interest to say on the progress generally of the dairying industry in Queensland. In this State particularly, he said, the industry is of the utmost importance in that it is one of the main factors in keeping our trade balance on the right side. Last year Queensland produced 87,000,000 lb. of butter, valued at £6,000,000. That output was 11,000,000 lb. more than the previous best for the State. As a central fact in what may be regarded as an excellent progress report, the year's return was very impressive and indicated what the industry means in our national economy. Of the quantity produced last year, nearly 60,000,000 lb., or 67 per cent., were despatched overseas—a valuable contribution to Queensland's export trade. The Chinchilla district contributed substantially to that record, and the new and larger factory is ample evidence of the progress of dairying on the Northern Downs and its gradual profitable extension westwards. Mr. Walker forecast a great increase in dairying production as more land was made available for closer settlement around Chinchilla and along the Western Line. The improved conditions under which wider areas of Crown land would be opened for settlement, should prove attractive to the younger men of the district, whose experience, energy, and enterprise would thus be retained for the development of rural industries within their home province. In the course of a recent visit to New Zealand he had had many opportunities of observing the conditions of dairying in our neighbouring dominion, and Queensland had little to learn from the progressive farmers there in respect of dairy practice and the quality of the marketable products. One of the main reasons for the success of the industry in this State, averred Mr. Walker, is its widespread co-operative control by the farmers themselves whose heart is in their work, both as cream suppliers and factory directors. Their readiness to adopt every tested modern discovery or development in dairy science and technology

was reflected in the fine quality of their produce—a quality that had not only won high awards in show-room competition, but also on the markets of the Empire. While they continued to produce butter of the highest grade, they should have nothing to fear from foreign competition on the British markets.

Mr. Walker advised the farmers to extend their co-operative movement and also to co-operate with the Department of Agriculture and Stock, particularly in respect of scientific investigation and the practical application of its results in field, dairy, and factory. The departmental herd-testing scheme warranted their whole-hearted support, and the results of its operation were made known regularly in the "Journal" and other publications of his Department which were supplied without cost to the man on the land. The economic possibilities of herd testing and herd culling were shown in some comparative tables of tests carried out by his Department which he had had prepared. Those figures showed that twenty-five good producers, under official tests, yielded 11,943 lb. of butter fat, valued at £875, in 273 days; twenty-five average milkers yielded 6,756 lb., valued at £506, in the same period; and twenty-five poor producers yielded 4,231 lb., valued at £312. Those figures taught their own lesson which every earnest dairy farmer would not fail to assimilate.

A New Dairy Enterprise at Dayboro.

WITHIN three hours' railway run of Brisbane is one of the richest dairying regions of Southern Queensland. Sheltered by the Blackall Range, and watered by the Pine River and its tributaries this district of converted jungle and cleared forest country, carrying the sweetest of pastures, is one of great promise already ripening rapidly into generous fulfilment. As the metropolis grows, Dayboro' must become one of the main sources of supply for the city's breakfast table. Already the daily output of its pastures alone is in great demand, and a central milk distributing depot is ever widening its range of service. The directors of the Dayboro' butter factory, with commendable enterprise, have now added to their plant milk drying machinery capable of converting skimmed milk into powder at the rate of 130 gallons an hour. The resultant product is being placed on the market in 1-lb. cans as "Pine Meadows Skim Milk in Powdered Form." As a new Queensland product, the first of its kind, made under hygienic conditions with modern machinery, right in the centre of rich dairying country, it should receive a welcome from all who believe in encouraging new Queensland industries in a practical way.

Kurrajong—A Useful Shade and Fodder Tree.

KURRAJONG seedlings, in very limited supply, are available for distribution through the Department of Agriculture (in conjunction with the Queensland Forest Service) to farmers and graziers desiring to plant and foster this very useful shade and fodder tree. The Kurrajong (*Sterculia diversifolia*) is familiar to many Queenslanders who appreciate its economic value as well as its usefulness as an ornamental tree and as a shelter for stock on hot summer days. The seedlings may be obtained on application to the Under Secretary, Department of Agriculture and Stock, Brisbane. Each request will be dealt with in the order of its receipt, until the small supply at our disposal is exhausted. The distribution will be made in June and July, thus ample time is given to prepare the land for planting in due season.

Grasshopper Control.

GRASSHOPPERS, the familiar yellow-winged variety, are already a cause of considerable anxiety in Northern cane districts, and a timely reminder of practical methods of control has been received from Mr. Edmund Jarvis, of the Meringa Entomological Laboratory, near Cairns. This insect, which is one of the recognised plague locusts, occurs in many other countries. Its last appearance in North Queensland in plague dimensions was in 1912, when a formidable invasion was reported. Control of the small hoppers when about a quarter of an inch in length was obtained at that time by spraying the swarms with soap or kerosene emulsions, or burning them by firing the grass, or with torches made of sacking tied to poles and dipped in some inflammable substance. A simple spray for treating these tiny hoppers may be made by boiling 1½ lb. of hard soap in half a gallon of water, and adding when boiling 2 gallons of kerosene. This is stirred well for about fifteen minutes until it emulsifies and begins to set like a jelly.

When using the spray add six parts of water to one part of the stock emulsion. Apply with a spray pump, using a nozzle throwing a fine spray; or if no pump be available use a watering can fitted with a fine rose. The best time to attack these hoppers is late in the day, when they are least active. Soap emulsion can also be used, made by boiling 1 lb. of "Witch" or other caustic bar soap in about 5 gallons of water.

Treatment for the nymphs or pupal form of this grasshopper when about 1½ inches long before they become winged, and for the adult or winged form, however, is quite different, these later stages of development being generally combated with poison sprays or baits. In cases of very severe outbreaks the nymphs are driven towards trenches about 3 feet deep by 3 feet in width by the aid of canvas screens about 2 feet 6 inches high, the upper 6 inches being formed of American glazed leather to prevent any locusts climbing over. These screens are placed so as to form two sides of a large angular-shaped portion of ground converging towards the trench into which the swarm is to be driven.

A good poison-bait for destroying the winged locusts is made by mixing together the following simple materials:—Sawdust 100 lb., sodium arsenite 1 U.S. quart, salt 5 lb., water 10 U.S. gallons. This should be used to check an advancing swarm by sprinkling fragments about the size of a peanut amongst the herbage, &c., over which the insects will have to pass. When valuable plants are being devoured they should be sprayed with lead arsenate, 2lb. in 50 gallons of water; or with Paris green 1 lb., lime 6 lb., treacle 6 lb., diluted with 160 to 180 gallons of water.

The eggs of this insect are usually deposited in hard ground, such as roadways, open fields, &c., being placed about 1½ inches below ground level, while the top of the egg mass lies half an inch below the soil and is usually covered over with a frothy secretion. When occurring in an eggery in bare or exposed places, as many as 200 separate masses have been found per square foot. An effort should therefore be made to locate the position of these eggeries by watching the winged swarms closely at the time when oviposition is likely to take place. Any patches discovered can be destroyed by harrowing the ground, which will prove most effectual and prevent much future injury.

The object, of course, should be not to stir too deeply, but to scarify and pulverise the soil to a depth of about 2 inches.

Capturing the Common Grasshopper.

VARIOUS well-known appliances have been designed for capturing the young of the common grasshopper (*Locusta danica* Lin.) in the larval and nymphal stages. These appliances consist of shallow pans made of iron or wood, which are drawn either by hand or horse power over fairly level or cultivated land infested with swarms of the tiny or wingless forms of this locust. Perhaps one of the simplest and most effective is the "Robbins Coal Tar Pan," which somewhat resembles a road-scraper. It is made of a stout piece of sheet iron about 6 feet long by 11 inches wide, the front edge of which is turned up about an inch, and the back edge 9 inches. Two other simple pans may be made of ordinary sheet iron 8 feet long, 12 inches wide at the bottom, and turned up a foot high at the back, and an inch at the front. A runner at each end, extending some distance behind, and a cord attached to each front corner, complete the pan, at a cost of about 1s. From 7 to 10 bushels of young locusts may be caught with one such pan in an afternoon. It is pulled easily by two boys, and by running several together in a row, one boy to each outer rope and one to each contiguous pair, the best work is performed with the least labour. Longer pans drawn by horses should be stiffened by transverse partitions, to avoid spilling the liquid, and also with more runners. The bottoms of these pans are coated with coal tar. Lime and kerosene mixed are sometimes used as a substitute. Enough tar is spread over the bottom to cover it well, and when this becomes matted sufficiently with the young locusts as to no longer destroy newcomers, another coat is added, and so on until it becomes necessary to remove the whole mass, when it is shovelled from the pan and burned.

Another simple form of pan, known as the "Price Oil Pan," is made by taking a board from 12 to 15 feet in length as a foundation or bed-piece. Make a tin trough 4 inches deep, 6 inches wide, and as long as required. Divide the trough into partitions by means of strips of tin, so that each partition is a foot long, thus avoiding the spilling of oil. Back of this place a strip of tin 16 inches wide and as long as the trough. The back must be firmly secured by braces running down to the front edge of the board. Underneath place three wooden runners 3 feet long and shod with iron for the trough to ride on. Fill the pan half full of water, and then add a small quantity of kerosene sufficient to cover the water. A horse may be hitched to the machine by fastening a rope to the outside runners.

THE QUEENSLAND SUGAR INDUSTRY.

(Continued from December Issue.)

By H. T. EASTERBY, Director, Bureau of Sugar Experiment Stations.

Part XIII.

(c) Mills and Milling Work—continued.

MENTION was made in Part XI. of this history of the names of a number of the earlier sugar-mills, particularly in the Brisbane, Beenleigh, Nerang, Logan, and Albert districts.

In addition to this list it is now proposed to give, as far as possible, the names (and particulars where available) of other mills. Commencing in the South we find there were at least two mills at Marburg. Mr. T. R. Smith, who passed away a few weeks ago, erected a mill at Marburg in 1883, and the first crushing took place in 1884. It was stated that in the same year he added a refinery, and in 1885 a complete electric light system was installed. In 1886 a distillery was erected and steel tramlines were laid throughout the estate to convey cane to the mill. This mill, at the time, must have been a very up-to-date one and was known as Marburg Mill. In giving evidence before the first Federal Royal Commission in 1912, Mr. Smith said his refinery was a small one using animal charcoal. He further said that he had made nothing out of running a sugar-mill. This mill was later taken over by Mr. W. A. Gibson, son of the late William Gibson, of Bingera, but eventually, owing to the day of the small mill being over and the farmers having other crops and not being particularly anxious to grow cane, the Marburg Mill was closed somewhere about the date of the entrance of the Cane Prices legislation.

There was another very small mill at Marburg known as Lark Hill, which also ceased operations a few years ago.

Most of the early mills between Brisbane and Bundaberg have been listed, but at one time there was a very large number of sugar-mills and juice-mills in the Bundaberg district, and in order that the names of these may not be lost, a list of same is furnished:—

LIST OF MILLS CLOSED DOWN IN THE BUNDABERG DISTRICT, AND MANY OF WHOSE ORIGINAL OWNERS LOST THEIR CAPITAL.

Name of Mill.	Owners.
Branyan	C. H. Goodwin.
Kalbar	T. H. May.
Cuba	McDowall Bros.
Sharon	Hy. Palmer and Sons.
Oakwood	Denny and Buchanan.
Millbank	Perry and Co.
Avoca (juice)	John Forest.
Mabbro	F. W. Gladwell.
Waterview	Samuel Johnston.
Albionville	Scott and Walters—later Geo. Noakes.
Kalkie	Olesen and Grotherr.
The Vulcans (juice) ..	Co-operative Company.
Woodbine (juice) ..	Buss and Jones.
Duncraggan (juice) ..	Cran Bros. and Co.
The Grange (juice) ..	Miss Tanner.
Spring Hill	Noakes Bros.
*Mon Repos	A. P. Barton.

* Mon Repos subsequently became Qunaba Mill.

List of Mills Closed Down in the Bundaberg District, and Many of Whose Original Owners Lost their Capital—*continued.*

Name of Mill.	Owners.
Woodlands (juice) ..	C. Faulkner.
Summerville	W. Adams.
Windsor	J. Gaylard.
Sherwood	John Lee.
Rubyanna	Sheldon and Kruger.
The Hummock ..	Farquhar and others.
Sea View	L. Staneig and W. Dart.
Annesley	Co-operative Company.
Glenmorris	Jno. O'Leary.
Hybla	Matthew Walker.
Kepnock	T. Young.
Hopewell	G. Greathead.
Ashgrove	John Clark.
Tegege	R. Jones.
Belle View	M. Wessel.
Yandaran	Fred Poppel.
Windermere	Nott Bros.
Ashfield	C. W. Buss.
Sunnyside	E. Turner and H. Cattermull.
Woondooma	J. Rowe.

These are all the old mills I have been able to discover, but a little later, or perhaps about the same time in some instances, there were the following:—

Name of Mill.	Owners.
Millaquin	Millaquin Sugar Company.
Qunaba	Millaquin Sugar Company.
Fairymead	A. H. and E. Young.
Hermitage	A. H. and E. Young.
Bingera	Gibson and Howes.
Pemberton Grange ..	Buss and Davidson.
Millbank	Thomas Penny.
Bonna	Bonna Sugar Company.
Poplars	Walker Bros.
Invicta	Buss Bros.
Gin Gin	Co-operative.

To the north of Bundaberg there were also the Miara Mill, owned by A. M. Broom, and Waterloo owned by White Clapperton and Broom.

Between Bundaberg and the Isis there was a mill known as Goodwood, owned by West and Blissett, afterwards purchased by the Fairymead Sugar Company.

Of all these many mills of the 'Eighties and 'Nineties, only the following now operate, viz.:—Millaquin, Qunaba, Bingera, Fairymead, and Gin Gin, but these now turn out much more sugar than was ever manufactured by all the old mills in conjunction.

The following description of Bingera Mill, Bundaberg, was written by Mr. George Stupart, of Maryborough, in 1892:—

"Bingera plantation is about eleven miles from Bundaberg by rail on the Mount Perry line. The factory, which works night and day for about six months, employs nearly 200 white people, including drivers, ploughmen, and others. Out in the fields and handling the cane at the feeders, there are 250 kanakas employed.

"The Day of the Horse.

"I saw from 70 to 100 horses at work ploughing, and at other plantation work numerous teams of six horses each drawing twelve wagons or trollies of cane from different parts of the plantation to the factory. Every one busy, everything in order, and everything showing

unmistakable signs of good management and prosperity. This one plantation gives employment and sustains a population, including families, of not less than 600, as it also takes and pays for the whole produce of numerous farms in the vicinity. This year's crushing will be the yield of about 1,000 acres of cane, and the result is expected to reach the splendid total of 3,500 tons of sugar, or as expressed in money, say, £45,000, every penny of which, and in all probability more, will be circulated.

"At night the works and all the out-buildings are lit up with the electric light, so arranged as to avoid shadows so that the workmen are able to work with perfect safety amongst the machinery, all of which is of the highest order.

"Industrious family.

"The Gibson family arrived in the colony in 1864, and settled on the land about the Hemmant, on the Brisbane River. They manfully fought against the extreme difficulties that beset farmers then—more than now. But from the day that they began to make sugar in the primitive fashion of the time they have steadily and surely advanced, exerting a stimulating influence on all around them. In those days all members of the household able to help did so, and manipulated the sugar with such aids as they could find, such as by drying the sugar on cotton sheets and graduating the syrup through banana stalks, &c.

"A fact worthy of note, and of special interest to farmers, is this: That having such an area of land, and such a troop of horses to feed, the Gibsons don't grow maize, or any other horse feed except cane tops, and yet all the horses are corn fed. Most planters do the same thing, so that the more land we get under cane the better chance for those whose farms are distant from water or rail carriage to grow maize."

Turning now to the Isis district (Childers), there were at one time six mills operating. The first of these was at Horton and owned by Mr. Horton. Doolbi Mill (owned by the Cran family) came next, and of this mill the following description has been given by Mr. H. J. Marks, of the Bundaberg Daily News and Mail, in his interesting "History and Incidents of the Burnett":—

"Doolbi and its Mill.

"The Doolbi Mill was situated in a forest pocket near the railway stopping place—there was neither a station nor a platform siding. People arriving there alighted directly on the open line. The mill was opened in December, 1890, when a month's work was undergone. The farmers around who had not sufficient pluck previously to believe in the assurance made then accepted the positive fact, and the result was that, at the end of 1892, Mr. William Cran, the manager for Messrs. R. Cran and Co., had forty-five constituents, and to the north, east, and west the outlook was one succession of bright green waving canefields. Within a radius of 2 miles of the mill the farmers were putting all their scrub land under cane, and the extra area cultivated and ready for crushing for the next season necessitated operations being conducted both day and night at the mill. For the 1892 season Mr. Cran had paid away no less than £11,500 to the farmers (planters they were then called), and consequently a feeling of general security prevailed. Houses, which hitherto were only barely sufficient to hold the family of the farmer, had been added to in good and permanent style. Buggies

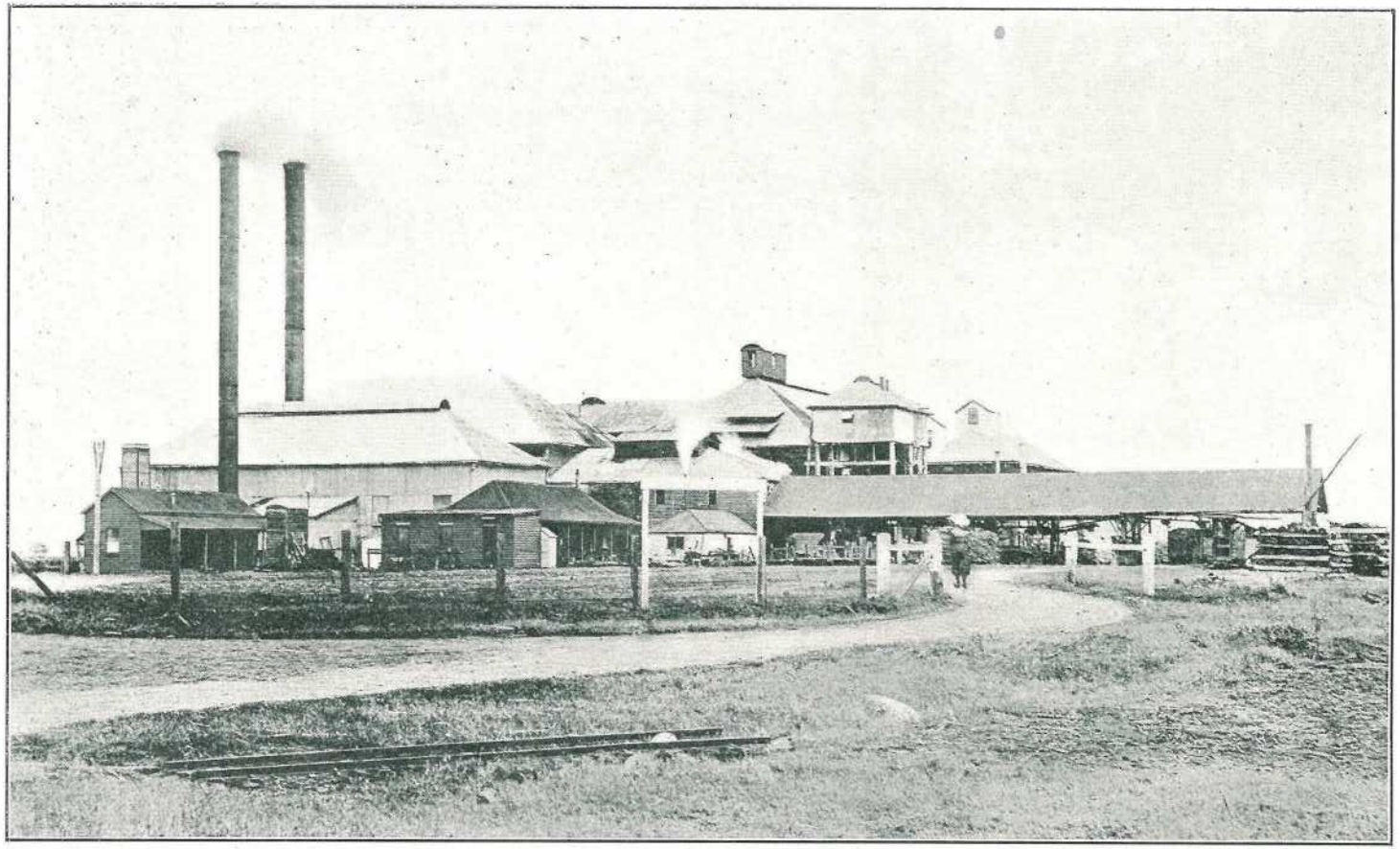


PLATE 64.—BINGERA MILL IN THE LATE 'NINETIES.

and pianos and other luxuries had been purchased, and contentment reigned supreme. The word 'mortgage,' too, was becoming obsolete. All these changes, these tokens of prosperity, these evidences of future wealth, were brought about through the erection of the Doolbi Mill.

"A Pioneer Juice Mill.

"The Doolbi Mill was a double crusher, having rollers 60 by 30, and was driven by two engines of 60 horse-power each. The driving wheels were some 25 feet in diameter. There were two carriers, worked automatically, for carrying cane through the rollers, the one being fed on the outside of the mill by kanakas, and the second took the megass through the second set of rollers and thence to the furnaces in which it was used as fuel. The crushing was what was known as the dry process, neither the steam jet nor the hot water spray being applied to the megass before being put through the second mill. This was to save the expense of the extra freight. The juice was pumped into a lime mixer, where a small quantity of lime was added in order to keep the juice in proper condition during its transit by rail to Yengarie, Maryborough. There were two tanks capable of holding 20,000 gallons each, these being supplied with agitators to keep the lime continually at work in the juice. During the 1892 season 24,000 gallons of juice had been produced daily. These juice tanks were placed on the east side of the building, and the railway ran along that side. There were ten tanks for carrying the juice by rail to Yengarie, each holding 2,400 gallons. These were the property of Messrs. Cran Brothers, and cost no less than £105 each. The wheels and bodies of the trucks were provided by the Railway Commissioner.

"These small tanks being drawn alongside, the juice was let out of the receiving tanks into the tanks on the trucks, which were filled in a very small space of time. The emptying of these tanks at the Yengarie refinery was done in the same expeditious manner, for as soon as the train arrived the taps of all the tanks were opened at once and allowed to flow into a huge pipe by funnels, and conveyed thence by gravitation into a storage tank on a lower level.

"At Doolbi, in the 1892 season, 23,000 tons of cane were crushed, the density being between 9 and 9½ degrees Bme. The mill ceased operations from the end of December to beginning of June, when it would start on another seven months' run. Eight white men and three lads had been engaged in the mill, and ninety-one kanakas were employed by the firm. It had been the rule of Messrs. Cran so far to utilise their black labour for the benefit of the planters, large areas of scrub having been felled and burnt off, and the land planted with cane, in an incredibly short space of time. The payment for scrub work was not immediate, but remained to be deducted from the first or subsequent crushings. Not only was the cane planted, but when ready for the knife the Messrs. Cran would cut, cart, and crush it also, if requested so to do."

The next mill was a small one owned by Larsen and Daughter in the South Isis district, of which no particulars are available.

Knockroe Mill was opened about 1893 by Messrs. Buss, Williams, and Penny. The machinery, &c., for this mill was removed from the Bloomfield River, near Cooktown, and the last shipment arrived at Bundaberg per the schooner "Louisa Lamont" on 12th January, 1893. This vessel brought two traction engines, steam plough, and complete

gear, harrows, scarifiers, portable tramway, &c. The removal of the entire plant (800 tons) had required the services of the "Mayflower" 2 voyages, "Fearless" 1, "Lavonia" 1, "Moonta" 1, "Marion" 1, and "Louisa Lamont" 1. The loading and despatching of the plant from Bloomfield River was conducted under the personal supervision of Mr. Penny, of Millbank.

Knockroe Mill was afterwards purchased by Mr. A. C. Walker, of Bingera Cattle Station.

The Colonial Sugar Refining Company next erected a mill at Childers; this commenced crushing in 1895.

The last mill to be erected was the Isis Central Mill, which began operations about 1897.

These last two mills are the only ones left in the Isis district.

[TO BE CONTINUED.]

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS.

Be Prepared to Combat Grasshoppers.

At the present time grasshoppers are occurring more or less plentifully in the vicinity of cane fields, and during the month of March may cause trouble. In the event of these insects being noticed travelling towards a plantation in army formation (migratory) close to the headland, leaving the ground quite bare behind them, an attempt should be made to arrest their progress by means of arsenical sprays or poison baits. An effective bait can be made up from the following formula:—Sawdust, 100 lb.; sodium arsenite, 1 U.S. quart; salt, 5 lb.; water, 10 U.S. gallons. This must be applied at the rate of 10 lb. to 20 lb. wet bait per acre by sprinkling same in fragments about the size of a small walnut among the advancing locusts. The first appearance of migratory swarms of grasshoppers close to cane areas should be communicated to the Entomologist at Meringa without delay.

Fumigating Grubs of Greyback Cockchafers.

Examine the roots of cane growing on land known to be usually grub-infested, and if finding from six to ten grubs under a single stool fumigate the ground with carbon bisulphide. This must not be applied while the soil is at all wet, but three or four consecutive dry days should be allowed to elapse before treating lighter classes of soils. Two injections of about ½ oz. on each side of a stool of cane and about 3 in. from the stalks should prove effective. Set the injector in manner to deliver the dose just above the level at which the grubs are feeding at the time. Close the holes after withdrawing the spear by pressure with the foot. A drum of bisulphide holds 60 lb., being slightly less than 5 imperial gallons, and equal to 37.60 pints; price, 36s.

Italian canegrowers are asked to apply at Meringa Experiment Station for a leaflet written in their own language describing how to fumigate cane grubs, which has been issued lately by the Assistant Entomologist.

Flowers Which Attract Digger Wasps.

In the "Queensland Agricultural Journal" for January last (vol. xxxv., p. 10), it was pointed out that farmers should do their best to encourage the useful scoliid parasites of our cane grubs to take up their quarters on land adjoining any canefields which are known to be very subject to invasion of this pest. This can only be done by preserving or growing purposely on such areas certain honey-bearing flowers

which are attractive food-plants of these digger wasps. Applications have been received for seeds of favourite wasp-plants, but they are still available for free distribution to any growers who may care to have them.

Weevil Borer Becoming Active.

Watch the growth of your cane on lowlying flats, &c., which is where beetle borers are likely to occur, and if discovering evidence of this cane insect having commenced attack on the basal portion of sticks, communicate at once with the Entomologist at Meringa Experiment Station.

SOME COLEOPTERA OF MINOR IMPORTANCE INJURING SUGAR-CANE IN NORTH QUEENSLAND.

By EDMUND JARVIS, Entomologist, Meringa.

IN the present paper no descriptions are given of the numerous species belonging to various orders of the class Insecta that one usually meets with in canefields, some of which are guilty at times of inflicting insignificant damage to the stem or leaves, &c. Such species form part of what may, I think, be called the insect fauna of cane lands, which naturally embraces a vast assemblage of interesting species, found behind loosened leaf-sheaths, amongst unfolding heart-leaves, or on the roots; many of them, indeed, being more or less beneficial to normal growth of the cane.

The insects described below, however, can certainly claim the title of cane-pest, although their activities happen to be unimportant when compared with the destruction wrought by our greyback cockchafer, locusts, or army worms.

Anomala Australasiae Blkb.

About fourteen species or more of *Anomala* have been recorded from other countries as being more or less destructive to the roots or leaves of such economic plants as vines, cotton, coffee, &c. *Anomala orientalis* Waterh. for example, when introduced into Hawaii from Japan about seventeen years ago, soon turned its attention to sugar-cane, necessitating before long the introduction of one of its natural enemies, a digger-wasp parasite (*Scolia manilæ Ashm.*) to keep it within bounds.

Fortunately, the activities of *Anomala australasiæ* Blkb. happen to be effectively controlled by those of its various natural enemies; so that although the grubs of this pest occur frequently amongst the roots of cane in Queensland, no decided increase of the beetle has yet been noticed.

Description of the Egg.

The egg and early larval stages of *australasiæ* were worked out by the present writer during 1918-19, the data in connection with same being of scientific interest. A beetle captured 28th November and placed in a breeding cage laid eighteen eggs after an interval of nine days.

These varied slightly in size, so were probably deposited on different days, and hatched on 17th December (nineteen days after capture of the beetle). Other beetles caged on 5th December produced eggs on the 11th, which hatched ten days later.

The egg of this beetle is nearly spherical, smooth, milky-white, and measures about 2.25 mm. longest axis; ten eggs placed in a line with ends touching equalled 22.50 mm.

They are deposited separately in the soil, no cavity being provided to allow for expansion of the chorion.

Description of First Larval Instar.

General colour bluish-grey; head pale fulvous, width of same 2.70 mm.; legs whitish-yellow; arrangement of body hairs very similar to instars 2 and 3; anal path on posterior ventral surface distinct, and defined by short setæ. Length, doubled up position, 9 mm.; length when fully extended, 16 mm.

Description of Second Larval Instar.

Pale bluish-yellow, somewhat shining. Head, legs, and spiracles fulvous; mandibles and labrum castaneous; the former darker towards tips; width of head 4 mm. Peritremes very open, and with exception of first thoracic segment equi-sized. Vestiture reddish-brown, hairs rather long, sparingly distributed on thoracic and first abdominal segments. Posterior area of venter of anal segment with numerous short recurved scattered hairs, and sometimes with little or no indication of an anal path. Length in doubled up position, 15.50 mm.

Note.—When lying on its side in this position the grub assumes a somewhat circular form. Length fully extended 28 mm.; widest transverse measurement, 7.50 mm.

The fully-grown grub (third instar) can be at once distinguished from those of other root-eating scarabæidæ attacking sugar-cane in Queensland by the presence on central portion of venter of anal segment of two longitudinal slightly curved lines of tiny reddish bristles (about nine on each side) surrounded by an irregular patch of longer red hairs. The head, which is yellowish-brown in colour, measures 5 mm. in width.

Description of Pupa.

Colour castaneous to reddish-brown. Pronotum with two distinct tubercules, placed centro-dorsally close to posterior edge. Median groove deeper on meso and metanotum than on anterior portion of pronotum. Dorsal area of seventh to anal segments not raised like the preceding, and ornamented with carinate and more or less longitudinal lines, arranged to form an intricate curved and twisted pattern. Cremaster inconspicuous and without spines. Length about 17 mm., by 9 mm. across first abdominal segment.

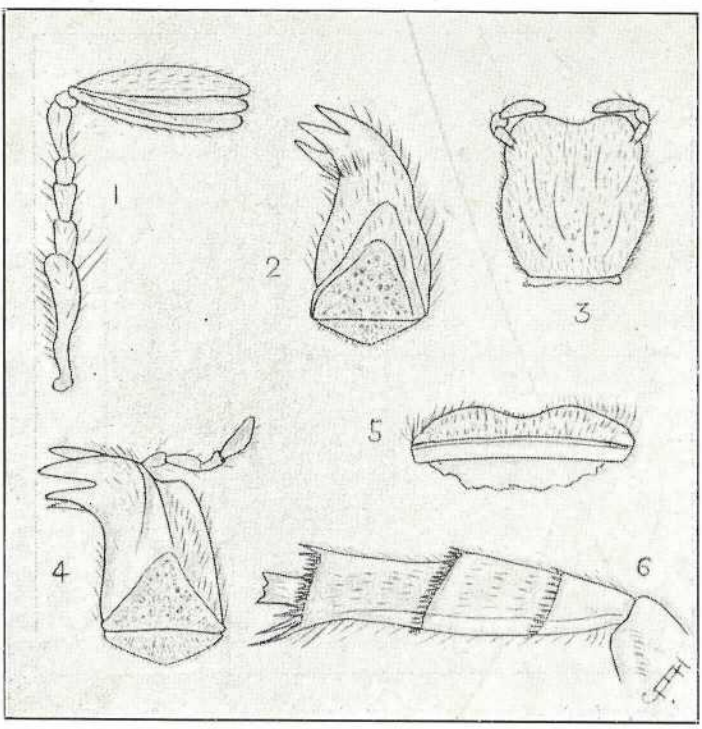


Plate 65.—Details of Parts of Trophi, &c., of *Anomala Australasiae* Blkb.

1. Antenna of female beetle, × 20.
2. Mandible of male of same, × 20.
3. Labium of same, × 20.
4. Maxilla of same, × 20.
5. Labrum of same, × 20.
6. Posterior tibia of female of same, × 12.

Description of Beetle.

Uniform deep blackish-green with changing lustrous lighter tints of pink or bronze. Elytra roughened, finely punctulate, the punctures placed in irregular rows. Scutellum large, equilateral; pronotum smooth, minutely punctate. Head rough, coarsely punctured above, eyes black, large, slightly protuding, and globose, antennal club 3-lamellate in both sexes (Fig. 1). Legs, antennæ, trophi, and venter of abdomen dark-reddish. Coxa of anterior leg cylindrical, as long as femur; tibia with two large teeth and usually indications of a lower third one; tarsus about length of tibia, first joint longer than second and third taken together, last joint (including unguliculi) more than total length of other four. Coxa of posterior leg broader and longer than femur, the outer surface with a few long red hairs and edges turned up forming a slight rim; outer surface of tibia with three transverse rows of short spines and a stout fringe of same on distal end, inner surface flattened, sprinkled with stout red hairs (Fig. 6). Pygidium much the same form in both sexes. Length of body 14 to 16 mm., width about 8 mm.

This beetle has been figured in colour by the writer in the "Queensland Agricultural Journal," vol. xix., p. 336.

***Cacachroa decorticata* Macleay.**

During December and January one occasionally notices numbers of this interesting beetle flying erratically on sunny days over grassland, roadways, &c., generally keeping within a few inches of the surface. At such times they can be very easily captured with a butterfly net, and it is possible to soon secure a large number of specimens showing considerable variation in size and colouration.

The grubs of this beetle have been collected from amongst cane roots in sufficient numbers to entitle the species to rank as a minor cane pest, being also

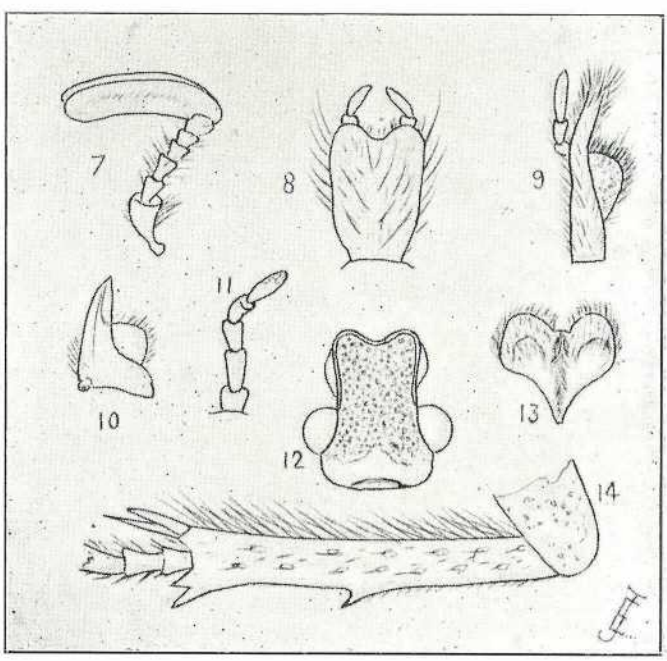


PLATE 66.—TROPHI, &C., OF *Cacachroa decorticata* MACL.

7. Antenna of male beetle, × 12.
8. Labium of same, × 12.
9. Maxilla of same, × 12.
10. Mandible of same, × 12.
11. Antenna of grub of same, × 12.
12. Head of same, × 6.
13. Labrum of same, × 12.
14. Posterior tibia of same, × 6.

common at times under blady grass (*Imperata arundinacea*) both around Gordonvale and farther north. The life-cycle of this insect (from egg to imago condition) is completed in one year, the larva when fully grown tunnelling downwards to a depth of about a foot before constructing a hard oval-shaped cocoon formed of compacted soil in which to transform to the pupal state.

Description of the Grub.

Somewhat onischiform, of swollen appearance from sixth to anal segment, which in the fully-grown larva has a width of about 10 mm., and tapering towards head. When captured the grub doubles up, at such time assuming a nearly circular outline when lying on its side. Head dark reddish-brown, very small, the width in mature larva being about 3.75 mm. Antennæ dark brown, distal ends banded with whitish, terminal joint furnished with about nine sensilia or olfactory organs, appearing as pale yellow spots of circular or oval outline placed mostly near the tip (Fig. 11). Legs very short, spine at end of tarsus arising from a thickened base and surrounded by long hairs. The short reddish spine-like hairs on venter of anal segment form a patch on its posterior portion, those at the centre being closer together, surrounding and pointing towards a bare oval central area. Body length when extended about 25 mm., when incurved about 19 mm.

Description of Beetle.

Uniform shining black, elytra and pronotum very coarsely punctulate or irregularly pitted, the punctures on central area of alytra being sometimes confluent, with raised centres and roughly arranged in lines; sides of elytra covered with numerous transverse strongly marked carinations or wrinkles. A large creamy or straw-yellow irregular blotch occurs on central area of each eytron, while others of similar colour and very variable size are arranged as follows, viz.:—One or two on each outer edge of pronotum, two on pygidium, from two to four on the sides of abdominal segments against edges of elytra, and one or two on each side of metathorax. These blotches have a smooth felted appearance, and in some specimens are entirely absent. Vertex of head extended anteriorly, with dorsal edges carinate (Fig. 12); club of antenna large, 3-lamellate, a portion of the outer surface of inner plate hirsute (Fig. 7); trophi as shown in sketch. Anterior tibæ with three teeth; posterior tibia with one central tooth, and distal edge provided with three teeth and two long spurs. Length of beetle about 14 mm., width 7 mm.

Description of Pupa.

Colour yellowish-brown, wings reaching to posterior edge of second abdominal segment, hind tarsi reaching to anal segment. Spiracles obtuse ovate, inconspicuous, edge of stigma exserted. A decided hump of circular convexity occurring close to each outer posterior angle of the pronotum; hind margin of cremaster strongly carinate dorsally. Scutellum large sub-acute, with tip slightly cleft. Length of pupa 16 to 18 mm.

The eggs of this beetle, which are said to hatch about a fortnight after oviposition, can be found in the soil from December to January.

***Dasygnathus Australis-Dejeani* Macl.**

This dynastid beetle is one of the first to appear on the wing in canefields during October and November. Its presence in firm soil is usually betrayed by a small round hole, against which one often sees a small pile of loose earth—which forms the entrance to a short subterranean tunnel, a beetle being generally found at the bottom. Data obtained by the present writer when breeding this species in 1918 from eggs laid by a specimen captured in October, has shown it to have a life-cycle of only one year. This beetle flies readily to artificial lights, often coming into houses, attracted by lamplight, &c.

Its range of flight is also very extensive, embracing the sugar districts of New South Wales to Mossman.

The Egg Stage.

The eggs are deposited each one in a cavity by itself, which is made large enough to allow room for the egg to expand during development. It was noticed at the time (1918) that in each case these cavities were made in small nodules of compact earth. This stage of its metamorphosis occupies a period of about nineteen days.

The ovum, which measures 2.70 by 2.90 mm., is white, elongate-ovate, with ends less obtuse than those in the egg of *Lepidiota frenchi* Blkb.

Habits of Grub.

Larvæ of this insect are known to attack growing cane setts, eating into them and also devouring or tunnelling the basal portion of cane shoots below ground.

A collection of these grubs from plough furrows made around Gordonvale about twenty years ago yielded a bigger percentage from canefields than from under forest grasses.

They are found more commonly in clay loam lands than in the lighter redsoils.

Description of the Grub (Third Instar).

Colour yellowish-grey. Head castaneous, punctulate, mandibles roughened, black, a deep channel on outer frontal surface extending from base of antenna to end of labrum; basal joint of antenna somewhat globose, second and fourth joints about equal length, third joint longest, distal ends of second and fourth whitish, sensilia on terminal joint conspicuous. Legs rather short, thin, light yellow, with numerous brown hairs. End of venter of anal segment fringed with rather long golden-brown hairs, and with a patch of short spine-like dark hairs on the posterior half. Sub-dorsal cervical shield shining brownish-yellow, concave, mostly with one seta, its lower edge about opposite thoracic spiracle. Peritremes of abdominal spiracles brownish-yellow, bulla convex. Dorsal surface of abdominal segments 1 to 7, with numerous short dark, spine-like hairs; sides of body below spiracles furnished with many rather long light-yellow hairs. Length of grub when doubled up 28 mm., when fully extended 44 mm.; width of head 6.25 mm.

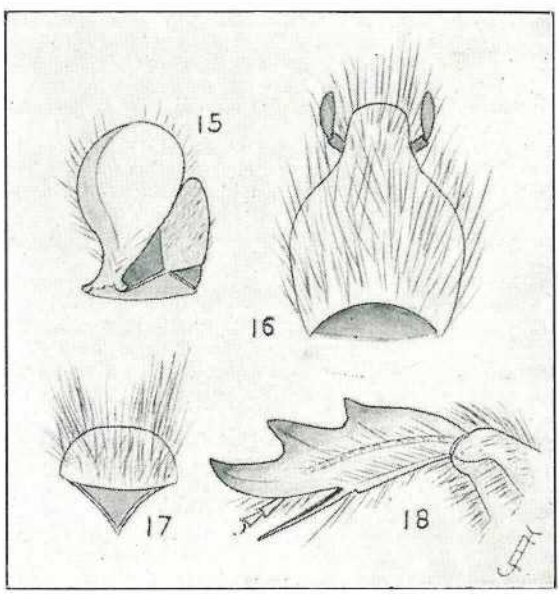


PLATE 67.—DETAILS OF PARTS OF TROPHI, &C., OF *Dasygnathus Australis-Dejeani*, MACL.

15. Mandible of male beetle, × 20.
16. Labium of same, × 20.
17. Labrum of same, × 20.
18. Anterior tibia of same, × 8.

Description of the Beetle.

Dark reddish to nearly black. About seven irregular lines of punctures on each elytron, which are less conspicuous towards ends of elytra, and strongly marked on basa portion of same. Pronotum smooth, punctures very small, anterior and lateral edges slightly turned up; dorsal surface in female without concavities, but in male with frontal portion concave, the upper edge of concavity being produced cephalad centro-dorsally into two very short obtusely pointed horns. Vertex of head punctuate,

supporting in male a rather long bluntly pointed horn, curved slightly towards thorax, and being absent in the female beetle; edge of vertex sharply ridged. Labrum, labium, mandibles, maxillæ, and first antennal joint armed with many stiff reddish hairs; club of antenna short, 3-lamellate in both sexes. Legs spined and very hairy; anterior tibiæ flattened for digging, outer edge provided with three large teeth (Fig. 18). Length of beetle 20 mm. by 11 mm.

Description of the Pupa.

Dark reddish-yellow. Sutures on centro-dorsal portion of abdominal segments 1 to 6 sulcate, enclosing dark red slightly curved carinæ of horny consistency. Spiracles of abdominal segments 1 to 3 open, circular, with edge exserted. End of cremaster bifid, rather densely clothed with short whitish hairs. Intermediate tarsi not reaching end of elytra; anterior tarsi reaching to sixth abdominal segment. Tips of palpi and antennæ dark red. Length of pupa 22 to 24 mm., width 10 mm.

THE CANE GRUB SITUATION FOR 1931.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (27th February, 1931), covering the period January to February, 1931, from the Entomologist at Meringa, Mr. E. Jarvis:—

Some anxiety was experienced this season in certain localities near Cairns and Gordonvale during October to December last, at the time when cane beetles made their first appearance after falls of 3 in. or 4 in. of rain. The Cairns district as a whole registered 8.59 in. for December, which happened to be four points in excess of our average rainfall for that month, so that conditions looked propitious here for development of the egg and early larval stages of our greyback cane beetle.

At Greenhills an unusually early emergence of these cockchafers took place in October, followed by additional flights in November and December. Beetles were observed on the wing at South Johnstone throughout the mill area about the middle of November, and since then a further fall of about 8 in. of rain was probably followed by another emergence of these cockchafers.

We may always expect more trouble than usual from this pest during seasons in which the first spring rain occurs, at a time when a large proportion of the beetles are not sufficiently matured to leave their pupal cells. Such condition may result either from belated pupation of these grubs owing to the occurrence of unfavourable climatic factors during their second and third larval instars, or from rainfalls in October or the beginning of November.

Ideal seasons, on the other hand, are those in which the first few inches of rain chance to fall at a time when practically the entire body of greybacks are not only fully matured, but desirous of seizing the first opportunity to escape from the subterranean confinement of their pupal cells. During such seasons these beetles generally emerge en masse, and, as no secondary flights are likely to follow, the grower is able, when commencing fumigation work, to destroy all the grubs present without needing to worry about any possible reinvasion of his cane land by grubs arising from later broods of beetles.

On some farms, where fumigation is now in progress (13th February), grubs of the first, second, and third instars of growth may be seen all feeding together, many of those in the third or final stage being nearly ready to pupate. In order to meet this sort of infestation it becomes necessary to defer control work until all first-stage grubs arising from later emergences have appeared in the block to be fumigated. Although such delay may not always be possible, it often happens that a week or two chances to occur in February when the ground is sufficiently open for treatment with fumigants.

How to Control Cane Grubs.

The success obtained during the last two or three years with carbon bisulphide, paradichlororobenzene, and other liquid insecticides has apparently induced additional growers to attempt to combat the ravages of this cane beetle. In some quarters a decided reaction has set in in favour of using carbon bisulphide, such feeling being due to successes resulting from its use last season, secured by certain farmers, who, having tried this fumigant both mixed with paradichlor and used alone,

obtained a cane grub mortality of 100 per cent. simply by using the carbon bisulphide only. The merits of this well-known grub destroyer have been repeatedly advocated in reports and bulletins issued from time to time at Meringa Experiment Station, the points emphasised again and again if wishing to secure success with this fumigant being—

(1) Certainty as to the soil to be treated being properly open or aerated;

(2) See that injections be placed just above the level at which the grubs are feeding;

(3) Do not fumigate when the surface soil is loose and dry;

(4) Avoid working the soil for about a fortnight both before and after treatment;

(5) Commence fumigation if possible at a time when the ground is moist but permeable to the toxic fumes, and the surface even and slightly compacted owing to recent rains.

VISITS TO OTHER SUGAR-GROWING DISTRICTS.

The following brief account of some of the work being carried out in various sugar centres has been handed to Mr. Jarvis for inclusion in his report by Mr. J. H. Buzacott, Assistant Entomologist:—

Mossman.

A trip was made to Mossman between 7th and 9th January in order to assist farmers who are commencing fumigation there. This work is proceeding on two farms in the district, and the grub infestation in both places was very heavy, the cane on one of the farms showing yellow patches even at that early date. Good results are anticipated from the work if instructions are faithfully adhered to.

Tachinid Flies.

On 23rd January a consignment of fifty Tachinid flies was taken to South Johnstone and liberated in two different parts of the district. Owing to the large amount of standover cane there the borer will probably be somewhat worse than last season.

A consignment of sixty flies was taken to Tully on the 13th February and liberated in a block of standover at Djarawong, where the borer infestation was fairly heavy. Parts of the Tully district are suffering from a plague of grasshoppers (*Locusta danica* Linn.), which have not yet attacked the cane, but are stripping the roadside of grass. Should a further generation of these grasshoppers materialise, considerable damage to crops is likely to result.

CANE PRICES BOARDS.

His Excellency the Governor, with the advice of the Executive Council, and in pursuance of the provisions of "*The Regulation of Sugar Cane Prices Acts*, 1915 to 1922," has appointed the following persons as representatives of the owner or owners of the mill, and as representatives of the canegrowers, to be members of the respective Local Boards hereinafter specified, and has been pleased to appoint the persons so designated as chairman thereof, respectively:—

Babinda Local Board—

Millowners' Representatives—F. A. Lamont and W. J. Ryan.
Canegrowers' Representatives—D. O. James and S. H. Warner.
Chairman—A. H. O'Kelly.

Bingera Local Board—

Millowners' Representatives—A. J. Gibson and B. A. Bourke.
Canegrowers' Representatives—L. G. Scotney and C. W. Thiele.
Chairman—C. D. O'Brien.

Cattle Creek Local Board—

Millowners' Representatives—P. H. McLean and C. Simonsen.
Canegrowers' Representatives—E. McIntyre and F. W. Valentine.
Chairman—T. E. Dwyer.

Childers Local Board—
Millowners' Representatives—J. H. D. Goldie and M. B. Heath.
Canegrowers' Representatives—J. Broadhurst and J. W. Clayton.
Chairman—H. B. Carney.

Fairymead Local Board—
Millowners' Representatives—E. S. Young and C. G. Wauchope.
Canegrowers' Representatives—F. J. Wheeler and P. E. Scotney.
Chairman—C. D. O'Brien.

Farleigh Local Board—
Millowners' Representatives—T. G. Mulherin and J. Smith.
Canegrowers' Representatives—P. Kirwan and M. Shannon.
Chairman—M. Gallagher.

Gin Gin Local Board—
Millowners' Representatives—G. Stevenson and H. G. Mittelheuser.
Canegrowers' Representatives—J. Laurison and G. Powell.
Chairman—C. D. O'Brien.

Goondi Local Board—
Millowners' Representatives—E. Irving and R. T. Challinor.
Canegrowers' Representatives—W. D. Davies and W. J. Burke.
Chairman—A. E. Aitken.

Hambledon Local Board—
Millowners' Representatives—J. G. L. Gillett and L. M. Smith.
Canegrowers' Representatives—W. Browne and W. W. Chapman.
Chairman—A. H. O'Kelly.

Inkerman Local Board—
Millowners' Representatives—W. Gibson and H. G. Bell.
Canegrowers' Representatives—E. E. Turnbull and F. J. Woods.
Chairman—T. R. Kennedy.

Invicta Local Board—
Millowners' Representatives—H. B. Burstall and J. L. Mullins.
Canegrowers' Representatives—P. Hayes and H. F. Hecht.
Chairman—T. R. Kennedy.

Isis Local Board—
Millowners' Representatives—A. Adie and J. Alison.
Canegrowers' Representatives—W. M. Duncan and A. W. Macpherson.
Chairman—H. B. Carney.

Kalamia Local Board—
Millowners' Representatives—R. H. Farrar and R. K. Calcutt.
Canegrowers' Representatives—W. H. Ferguson and H. A. Wellington.
Chairman—T. R. Kennedy.

Macknade Local Board—
Millowners' Representatives—A. J. West and H. Freeman.
Canegrowers' Representatives—G. Cantamessa and T. J. McMillan.
Chairman—J. A. Murray.

Maryborough Local Board—
Millowners' Representatives—T. E. Braddock and O. C. Kinne.
Canegrowers' Representatives—F. F. Bertram and H. Doss.
Chairman—J. M. Bracewell.

Millaquin Local Board—
Millowners' Representatives—G. S. Moore and E. P. Wyllie.
Canegrowers' Representatives—F. Courtice and T. Scotney.
Chairman—C. D. O'Brien.

Moreton Local Board—
Millowners' Representatives—W. McD. Whalley and G. Greathead.
Canegrowers' Representatives—W. Kittle and A. E. Williams.
Chairman—S. L. Stormonth.

Mossman Local Board—
Millowners' Representatives—C. J. Crees and E. J. O'Brien.
Canegrowers' Representatives—R. D. Rex and H. B. Schnitzerling.
Chairman—F. W. Schafer.

Mount Bauple Local Board—

Millowners' Representatives—T. Beattie and W. C. Cunningham.
Canegrowers' Representatives—W. J. Douglas and H. Jeppesen.
Chairman—J. M. Bracewell.

North Eton Local Board—

Millowners' Representatives—G. Johnson and S. H. Seougall.
Canegrowers' Representatives—W. H. Keen and G. N. Laws.
Chairman—T. E. Dwyer.

Pioneer Local Board—

Millowners' Representatives—C. S. Wynter and B. C. J. Martin.
Canegrowers' Representatives—B. S. Donovan and L. W. J. Hoey.
Chairman—T. R. Kennedy.

Proserpine Local Board—

Millowners' Representatives—M. R. Gibson and C. C. Dodd.
Canegrowers' Representatives—H. L. Hall and T. G. Mann.
Chairman—C. A. K. Morrison.

Qunaba Local Board—

Millowners' Representatives—G. S. Moore and W. A. Shield.
Canegrowers' Representatives—A. J. Christensen and C. F. Mittelheuser.
Chairman—C. D. O'Brien.

South Johnstone Local Board—

Millowners' Representatives—J. T. McNamee and F. Gillan.
Canegrowers' Representatives—F. Darveniza and S. Gullotta.
Chairman—A. E. Aitken.

Tully Local Board—

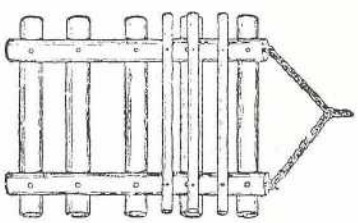
Millowners' Representatives—J. J. Cran and G. R. Blair.
Canegrowers' Representatives—H. N. Lund and J. A. Winter.
Chairman—A. E. Aitken.

Victoria Local Board—

Millowners' Representatives—E. F. Hayley and J. R. Kerr.
Canegrowers' Representatives—H. E. Hollins and G. G. Venables.
Chairman—J. A. Murray.

A CLOD CRUSHER.

A simple clod crusher can be constructed on any farm, and the cost is practically nothing. In use, it will be found as effective as a Cambridge roller, and on some soils it will leave a better seed bed.



The sketch describes it. Poles used are of not less than 5 inches diameter. The two cross poles 5 feet long, and the two lengthways one about 8 feet. Distance between cross poles about 18 inches. Bolts should be as stout as possible.

Above the long poles may be bolted lighter ones to carry rocks, which act as ballast. Rocks are added or removed according to the nature of the soil.

THE BACON FLY OR HAM SKIPPER.

By F. H. S. ROBERTS, M.Sc., Veterinary Entomologist and Parasitologist.

DURING the earlier part of 1930 it was reported to this Department that severe losses were being brought about in several of the bacon factories in this State through the depredations of the bacon fly or ham skipper.

Correspondence with the several factories situated in Queensland indicated that this insect was known at each and every factory, and that unless certain control measures were rigorously and continuously maintained severe losses were experienced.

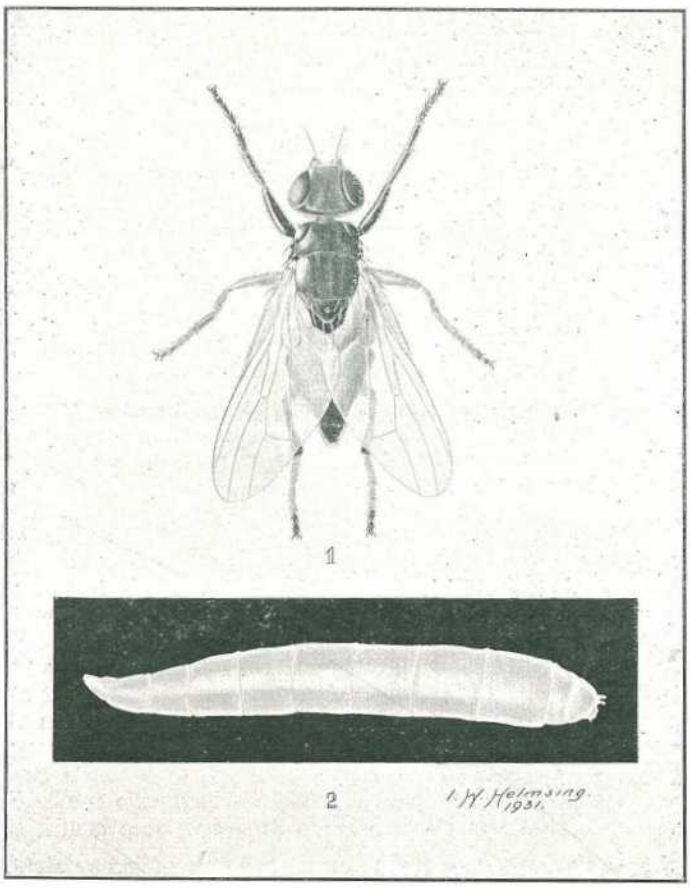


PLATE 68.—THE BACON FLY OR HAM SKIPPER (*Piophila casei* Linn).
Fig. 1. Adult, × 9. Fig. 2. Larva, × 9.

The Adult.

The adult (Plate 68, fig. 1) is known scientifically as *Piophila casei* Linn., and is a dark bronze fly measuring about $\frac{1}{6}$ inch in length—i.e., about one-third the size of the common house fly. It is world-wide in distribution and frequents storage and curing rooms and other situations where suitable breeding places may be found. Besides bacon it may attack and be reared from cheese, dried fish and flesh, and carrion.

The Egg.

The egg is a tiny, white, slightly curved, narrow body, somewhat tapering at each end and measuring about 1/30 inch in length. The eggs are usually deposited singly over the surface of the bacon, particularly in cracks or broken surfaces. Hatching at 65 deg. Fahr. occurs in thirty to forty-eight hours.

The Larva.

The newly hatched maggot is transparent and so small as to be hardly visible. At temperatures of 65 to 95 deg. Fahr. full growth is reached in eight to fifteen days, and at this stage the larva is yellowish-white, tapering towards the head and about $\frac{5}{8}$ inch in length (Plate 68, fig. 2). The peculiar habit of the larva in curving both ends together and then suddenly springing to a distance of three to six inches has given it the name of "skipper."

The Pupa.

When mature the larva comes to the surface, seeks a secluded place, and changes into the pupa enclosed in a hard-shelled, brown case about $\frac{1}{5}$ inch long. Pupæ may be found under the bacon cloth or in dark places in the storerooms. At 65 to 95 deg. Fahr. the adult fly may emerge from the pupa in seven to twelve days. Thus the entire life cycle may be passed in about seventeen to twenty-nine days.

The Losses Caused by the Bacon Fly.

The maggots are confined to the fatty tissues of the cured product in which they burrow and feed. The actual damage caused by their presence, unless they occur in large numbers, is not very extensive, the losses being chiefly due to the unwholesome appearance of the infested bacon, the annoyance to manufacturers and dealers, the expenses connected with control treatment, and a lessened consumption by the individual who is naturally disgusted by the presence of the maggots.

Control Measures.

(1) Strict cleanliness in all parts of the factory and its surroundings is essential. The fly is capable of breeding in the smallest accumulation of grease, and has been known to breed successfully in the small amount of grease that accumulates on cutting up and packing benches. Scrap-meat, trimmings, &c., should be disposed of as soon as possible. Regular limewashing of all floors and walls of storage rooms is recommended, as this measure aids in maintaining hygienic conditions.

(2) All bacon returned from retail shops as maggoty should be at once destroyed without opening. It is well known that in Brisbane, at least, fair numbers of this small fly frequent retail shops, and the bacon blown by these flies is returned to the factories. Opening such returned bacon entails grave risks of introducing further numbers of the fly.

(3) Bacon should be clothed as soon as possible after curing and the cloth kept firm and smooth.

(4) The bacon should not be stored for any length of time except in cold storage. Temperatures of 30 to 36 deg. Fahr. are sufficiently low to kill all stages of the fly except perhaps the egg.

(5) Screening with 24 to 30 mesh gauze is decidedly useful in keeping out the flies attracted from elsewhere. The species is exceedingly common during the warmer months, and as it may successfully breed in carrion the need for screening is stressed.

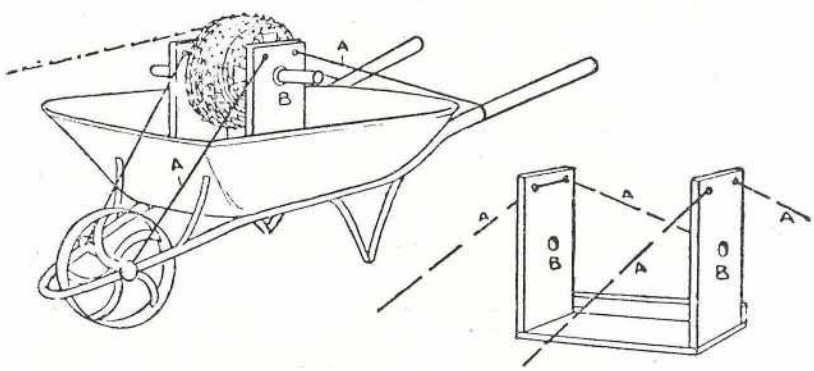
(6) Frequent spraying with insecticides may give results, but the operation is tedious. Fumigation would, of course, be most likely to give the best results, but, unfortunately, the data concerning its use is too meagre to warrant its recommendation.

It is only by the repeated application of the above measures and the observance of strict cleanliness that the pests can be controlled. It should be remembered that these control measures should be enforced and maintained so long as flies can be seen, and the practices of spraying, &c., only when the flies are bad are likely to give but temporary respite.

A ONE-MAN FENCING ARRANGEMENT.

The illustration is of assistance to fencing when only one man is available.

Trying to pay out barbed wire when alone usually ends in twisting it round your neck or tramping backward and forward over the same ground because the wire has stuck on the roll.



I always take my tools in the wheelbarrow when going to do a job, and by fastening the wooden frame, as illustrated, in the wheelbarrow by the wires, or riems (A), passing a crowbar or stick through the roll and two holes (BB) and fastening the loose end of the wire to the straining pole and pulling the barrow (wheel behind), the wire pays out.—"Farmers' Weekly" (South Africa).

10,000 YEARS IN A SILO.

Grains of barley believed to be 7,000 to 10,000 years old, which were discovered in Egypt some years ago, were exhibited by Dr. E. S. Beaven in England recently. The barley was found in a pit lined with woven straw, and is in a remarkably good state of preservation. Dr. Beaven was presented with the Horace Brown medal for "eminent services on the scientific or technical side of the fermentation industries." In his lecture on "The Culture of Barley for Brewing," Dr. Beaven said that the origin of all the present races of cultivated barley was the wild forms of Hordeum, still to be found growing in Palestine, Syria, Persia, and further east. Evidence went to show that barley was the first plant cultivated by man, and the rise of civilisation could be dated from the time when it was first deliberately sown for food.

THE VALUE OF POSTMORTEM EXAMINATION IN DETECTING DISEASES AND DISORDERS IN POULTRY.

By P. RUMBALL, Instructor in Poultry Raising.

IT is well at the outset to point out that the writer does not recommend as a general practice the treatment of poultry for sickness. At the same time, it is of considerable advantage to the general breeder to have a working knowledge of diseases to enable him to prevent or combat the outbreaks.

There are many diseases which cannot with any degree of certainty be correctly diagnosed while the bird is still alive. By most breeders dead birds are either burnt or buried immediately they are found, and the early evidence of possibly a serious outbreak of troubles is lost.

The practice of burning or burying dead bodies is not discounted by the above remarks, but all diseases of a bacterial or highly contagious nature have a small beginning, many spreading per medium of the droppings, and the fact of having burnt or buried a diseased bird has not eliminated the possibility of further losses, but it has withheld information which if it had been available may have been responsible for earlier measures being taken for the prevention of further trouble.

Apart from actual diseased conditions being disclosed, there is the more or less physical aspect to be considered, such as the general conditions of the internal organs due to feeding, and also as a means of definitely determining to what extent internal parasites are present.

There are many methods of making a postmortem examination, but the system outlined in this article is both simple and effective. Even by examination it will be somewhat difficult to make a definite pronouncement as to the cause of death, but all poultry keepers should have by actual experience in dressing healthy stock a fair knowledge of what healthy organs are like, and by the constant examination of birds that die on their farms become more efficient.

The lines suggested to open a bird are—first with a sharp knife slit the skin between the legs and abdominal walls; this allows the hip joint to be easily dislocated, the legs bent at right angles causing the bird to lay fairly firmly upon its back as shown in Fig. 1. Then with a pair of scissors cut the skin from leg to leg, bearing around in a circular fashion, getting as close to the vent as possible. Next tear the skin off right up to the head as in Fig. 2. This removes all the feathers, and in opening abdomen particles of feathers are not obstructing examination.

Fig. 3 shows the bird with the breastbone completely removed, exposing the internal organs in their natural position. This is done by cutting around the abdominal wall as close to the back as possible and right through the bones. To do this work a good pair of curved scissors having a ball point are an advantage, but failing these the work can be performed with ordinary scissors or a pair of tin snips such as most poultry breeders possess.

EXPLANATION OF FIG. 4.

1. Œsophagus; 2, crop; 3, proventriculus or stomach; 4, gizzard; 5, duodenum; 6, intestines; 7, cæca; 8, cloaca; 9, vent; 10, egg in oviduct; 11, oviduct; 12, kidney; 13, ovary; 14, lung; 15, heart; 16, trachea; 17, liver; 18, spleen; 19, gall; 20, developed egg yolk.

Having the internal organs exposed, the next stage is to commence on their examination. In their present position the liver is the most prominent organ, and an organ of considerable importance. It is this organ which prepares the bile, one of the principal digestive juices, and it also assists in some of the necessary chemical changes of the blood. It contains many blood vessels, and is particularly subject to the attacks of parasites, which are carried there per medium of the blood stream.

Among the principal abnormalities found in this organ is its enlargement. This enlargement may be due to many infectious diseases, such as tuberculosis, fowl cholera, hepatitis, &c., and in these cases the liver is generally of a spotted appearance, due to dead tissue; but possibly the greatest cause of liver enlargement is due to the lack of exercise combined with improper feeding, or from the feeding of mouldy or putrifying foods. The excessive feeding of protein foods is merely indicated by a blueish grey streakiness; while yellow streakiness is generally an indication of a fatty condition which frequently results in internal hemorrhage. The latter trouble is frequently met with in heavy breed varieties of poultry which are confined and fed on stimulating foods. They are by nature lazy or inactive, thereby laying on surplus condition.

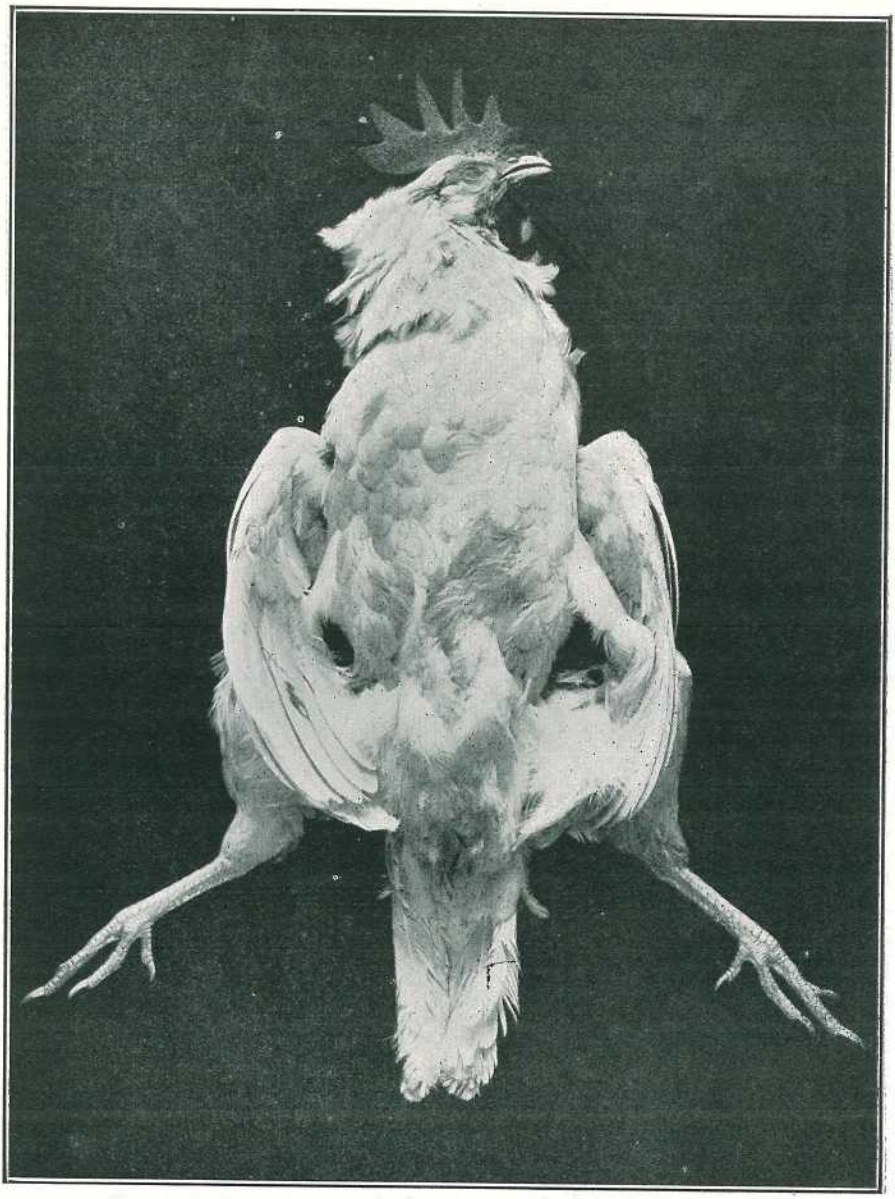


Plate 69 (Fig. 1).—First Stage of Postmortem.

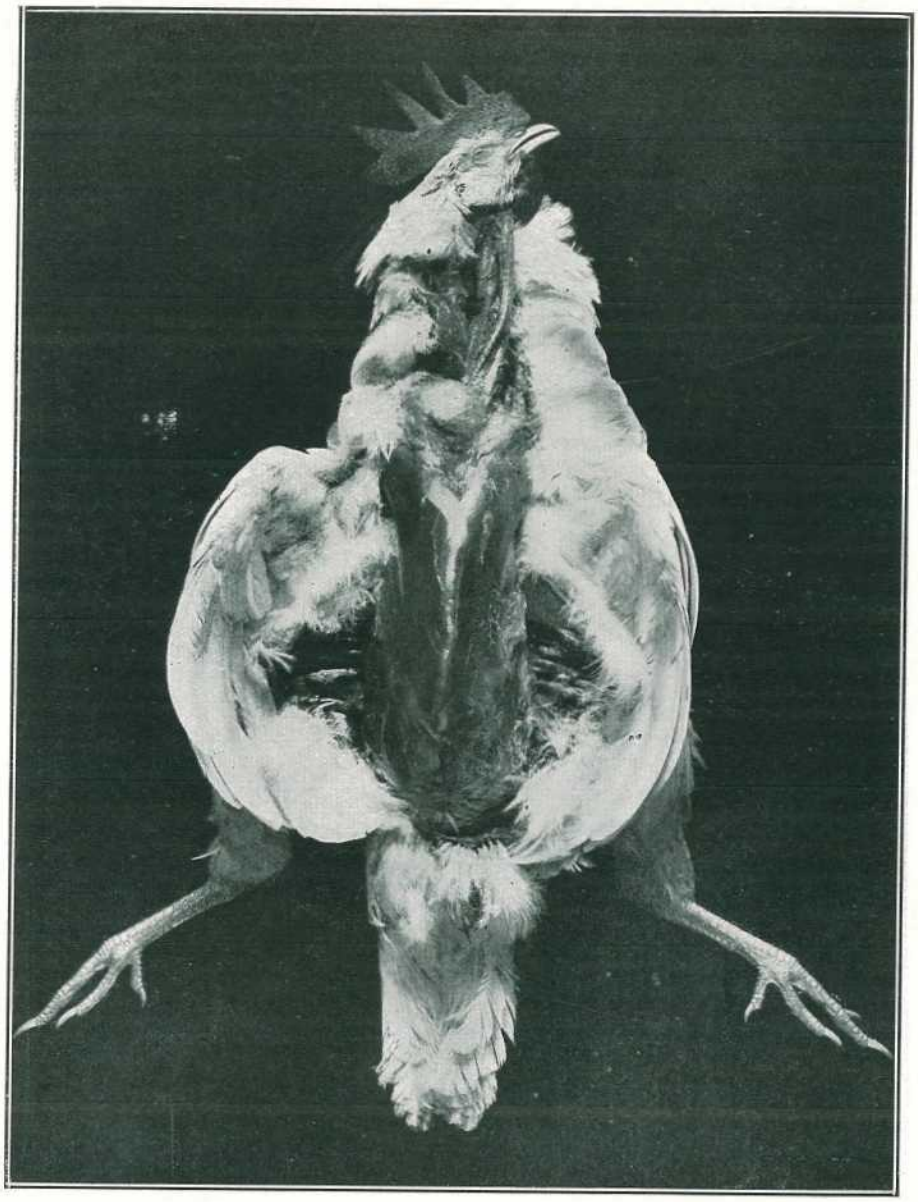


PLATE 70 (Fig. 2).—SECOND STAGE IN MAKING POSTMORTEM.

To proceed with the examination sever the gizzard from the proventriculus. The gizzard and intestines are then easily separated from their attachment and readily drawn out for examination. The chief thing to look for in the intestines is imflammation. This inflammation may be due to worms of all descriptions, the feeding of mouldy or putrifying foods, foods containing excessive quantities of fibrous matter (especially when fed to young chickens), poisons and infectious bacterial diseases. However, in Queensland, most losses by diseases of a bacterial nature occur among young chickens. This is undoubtedly due to the confined conditions under which they are reared. The cæca when distended and filled with pus and particles of blood indicate bacterial trouble, while if trouble is caused through feeding fibrous or poisonous foods blood only is generally present. Worms of various species will be found in the cæca, intestines, gizzard, proventriculus, and crop, causing inflammation of the various parts if infestation is severe, consequently heavy losses.

The gizzard acting as a grinding organ breaks down grain and hard foods, preparing them for the digestive juices. If grit is not supplied to assist in the grinding process indigestion is likely to occur. This organ is subject to attacks of a special class of worm, the presence of which is only known by postmortem. Following up the digestive track the proventriculus or glandular stomach is met. The walls of the organ are of considerable thickness and its capacity slight, being fed gradually by the crop. In the walls of this organ are glands which secrete juices for the digestion of the albumenoids. This organ is subject to inflammation, due to improper digestion of food. If the gizzard is not functioning as rapidly as it should, due to the lack of grit or presence of worms, the stomach becomes unduly distended, and the contents being retained too long cause an irritation. Impure drinking water, ingestion of too large a quantity of food, inferior and improper foods, and similar substance would also be responsible for trouble. The crop, acting as a reservoir, as it were, for foods, is subject to the irritating effect of incorrect feeding, which causes a catarrhal condition or inflammation. The withholding of water, food, or grit for some considerable time induces a bird to gorge, with the consequence of the crop becoming distended, and the muscular coat partially paralysed. The crop is also subject to impaction, due to the bird swallowing long grass, feathers, &c., but postmortem is not essential to diagnose this trouble.

The spleen lies to the right of the proventriculus and gizzard. Its colour is reddish brown, and in form is generally rounded. This organ in common with the liver is liable to infection with tuberculosis.

The reproductive organs of the hen consist of an ovary where the ovums or egg yolks are formed, and the oviduct where the yolk is encased in the various layers of albumen, and finally the shell. They are both very vascular organs and subject to congestion due to errors in feeding, as well as to many disorders which may be classed as physical disorders. Physical or structural disorders are of interest only, and are in no way of an epizootic nature. Inflammation of the oviduct and ovary, due to the prolonged feeding of food of a highly nitrogenous nature, have to the writer's knowledge been responsible for exceptionally heavy losses among leghorn hens. No other treatment than mild purgatives and a change of diet is of any value.

Kidneys and Ureters.—The bird has two kidneys and two ureters. The kidney is divided into three distinct lobes each connected with the ureter. They commence from the rear of the reproductive organs, continuing one on each side of the spine to the rectum. They are elongated in shape, fitting themselves into the irregularities of the bony structure of the bird. The ureters continue along the surface of the kidney, ending in the lower portion of the cloaca. The kidney is not an organ frequently affected with disease, but cases of abscesses have been reported, while the prolonged feeding of food excessively rich in protein causes whitish areas and a general paleness of the kidney.

The heart is affected with several troubles, dropsy of the heart sac being by far the most frequent. The trouble, however, is not of a serious nature in flocks receiving the ordinary amount of care and attention. Rupture of the heart or large blood vessels also occurs occasionally in birds over-exerted or in their effort to escape capture. The trachea right and left bronchial tubes and right and left lung forms the principal parts of the respiratory system. Many of the troubles affecting these organs can be determined without postmortem examination, while congestion of the lungs, a trouble frequently affecting young birds and birds during the moulty period, is readily diagnosed by examination. With this trouble the engorgement of the blood vessels causes pressure upon the air cells, resulting in death from asphyxia, or there may be a rupture of a blood vessel which blocks up the bronchial tubes. Pneumonia is a stage beyond congestion; as well as congestion a liquid collects which by coagulating makes the lung more or less solid, rendering it useless as an organ of respiration. Another trouble is the development of a mould fungi which is

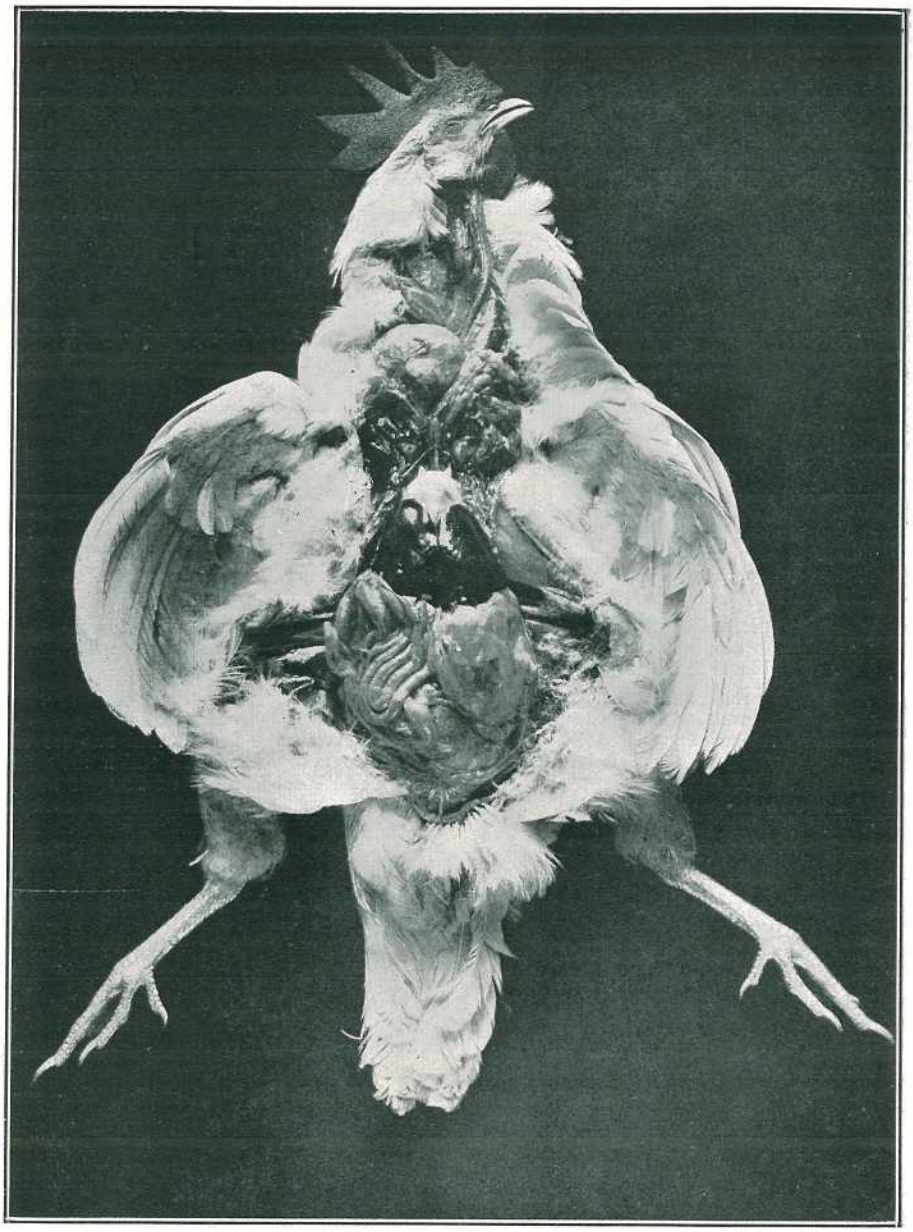


PLATE 71 (Fig. 3).—THIRD STAGE, WHICH EXPOSES INTERNAL ORGANS.

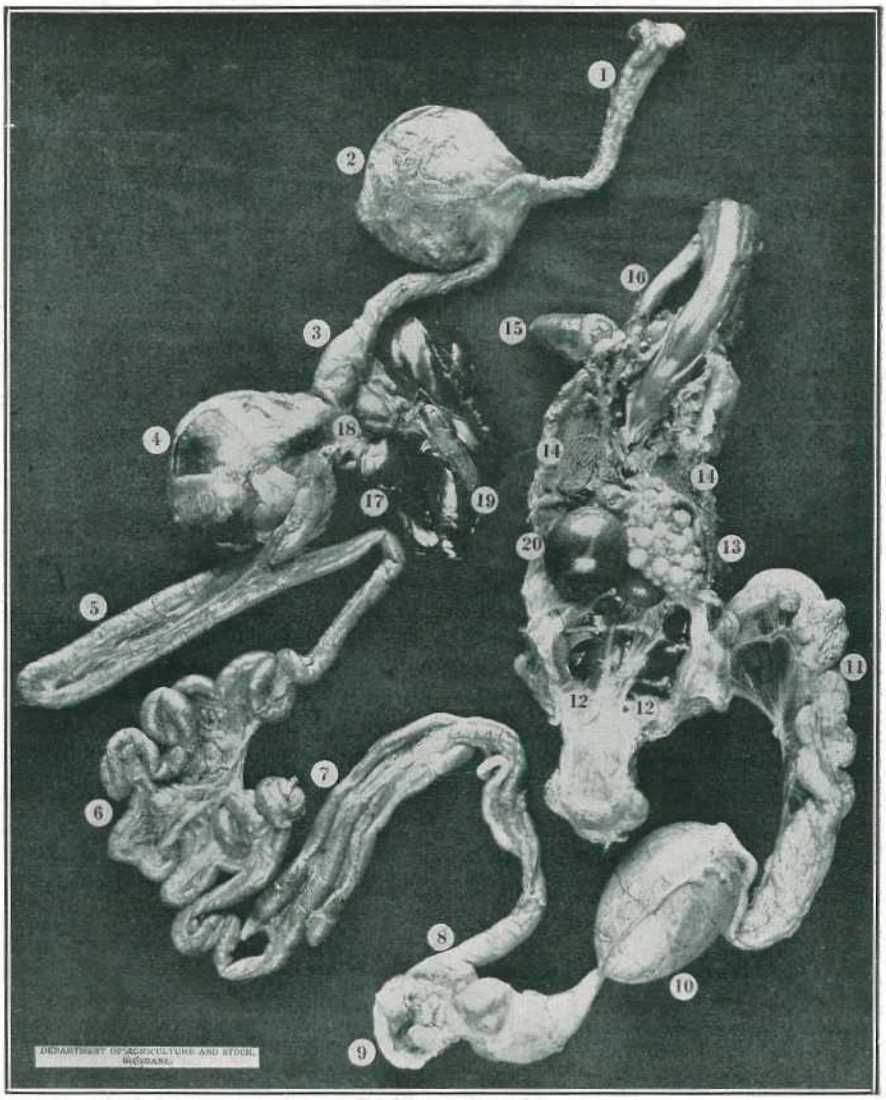


Plate 72 (Fig. 4).—Internal Organs of Hen.
(*See page* 230 *for Explanation of Block.*)

present in musty straw and grain. This fungi develops very rapidly in warm weather. Presence of this trouble is indicated by tubercular-like nodules varying in size from a pinhead to that of a pea in the tissue and even in the bones. On the lining of the air tubes a membraneous formation an eighth of an inch in thickness may be found. These patches are at first soft, but become firmer with age and yellowish in colour. The lungs of poultry, in common with other internal organs, are subject to general tuberculosis, but it has not been the writer's experience to encounter any case where the lung has been affected.

Peritonitis, inflammation of the peritoneum, the delicate membrane covering the abdominal cavity and the organs in that cavity, is another frequent cause of death. It is generally due to disorders of the liver, kidneys, or perforations of the intestines caused by worms allowing the escape of some of the intestinal content, or it may be caused through the septic condition arising from severe bruises or body blows.

From postmortem, therefore, a definite knowledge of the reason of losses can be secured which enables the breeder to take timely steps to prevent diseases of an epizootic nature from spreading. If the trouble be due to errors in feeding and housing have them rectified. Although poultry-keepers will not admit that the conditions under which they keep their fowls are responsible, they are in the main the predisposing cause for outbreaks of sickness. An ill-nourished, badly-housed, or wormy-infested flock offer little resistance to the inroads of disease organism. Once an outbreak of disease of an epizootic nature has occurred, a thorough clean-up of the premises should be made and disinfection practised. The runs should be ploughed in order to bury the excreta and parasites and bring fresh soil to the surface, but previous to ploughing, if it is possible to keep birds out of the pens, it could be dressed with a good coating of lime. Birds which are apparently sick should be either destroyed or isolated, and a careful watch kept upon the balance of the stock.

THE ANCESTRAL RECORD.

WHAT TO LOOK FOR IN HERD SIRES.

A Canadian editor tells us that pedigree is the ancestral record of an individual, but in purchasing a herd sire or breeding females the individual should be considered as well as the pedigree. A pedigree is good just in so far as the individuality and breeding qualities of the animals it represents are good.

It has been demonstrated times without number that a pure-bred sire is the cheapest sire a farmer can use, and at the present time they can be purchased at a price that should place them on every farm where a sire is kept. Grade sires may be good individuals, but there is no record of what is back of them.

While the blood of the immediate animal is most influential, yet an influence is exerted by the ancestors for several generations. Thus the importance of knowing something of the history of the herd sire purchased.

In dairy breeds it is not enough that the immediate dam has made a high record in any one particular year. It is of more importance to consider the records of the daughters of the sire of the bull you are buying and to determine what kind of production is back of his sire and dam.

In beef cattle show-ring performance of the immediate ancestors is given due consideration, but something should also be known about the commercial market qualities of near relatives in the ancestral line. After all, it is the utility end that counts.

There are some who lay great stress on certain families, and will pay considerably more for a member of that family than for one of another family, not because of individuality, but because it traces to a cow of that name a number of generations back.

The emphasising of certain families has been over-worked, yet there are certain lines of breeding that are much more valuable than others because close and careful observation has been exercised in building up a certain line of descent.

Family groups are built up by saving the best female progeny from the best breeding cows and mating them with the best sires that can be secured.

The members of these family groups are prized because of the individuality of each member of the group, and it is this that makes a valuable pedigree.

The bulls used in the development of a certain family must be considered as well as the female line of descent.

Because a pedigree traces to a certain animal eight or ten generations back does not necessarily make a good pedigree unless the individuality and utility of every individual represented in the line of descent are good.—"Farmer's Advocate," London (Ontario).

FARMERS' SHEEP AND WOOL.

By J. CAREW, Senior Instructor in Sheep and Wool.

PART IV.

This is the fourth article of a series planned for the purpose of supplying information sought from time to time by readers interested in sheep and wool; and also with the hope of stimulating interest in sheep-raising in Queensland on comparatively small holdings.

LAMB RAISING ON THE COAST.

MIXED farming in Queensland has so far developed as to give rise to the question: Can sheep be raised successfully and profitably in combination with other farm activities?

Big changes have taken place in sheep-raising during our short history. When merinos were first introduced they were slow to improve and made little progress until they were tried on the drier inland pastures. There they have adapted themselves so thoroughly and have proved their superiority over all other breeds to such an obvious extent that we need not discuss their claims here. We find in every case, however, that any one breed of sheep has a tendency to evolve a distinct type, thus showing that environment plays a very important part in sheep breeding.

Knowing what has actually taken place in relation to our merinos in the localities in which they thrive, is it not also possible that the same success would attend other breeds or crosses were they tried out in our coastal country? We have breeds and crosses that have given very satisfactory results and that can be recommended with confidence, but there still remains much ground work to be performed in providing the most satisfactory breed or type for our "inside" country and the sea-coast. Past experience in this region was that sheep breeding was not altogether successful. There is no comparison, however, between the conditions existing then and now. The large holdings on which the sheep were run on the coastal side of the Main Range were mostly newly ringbarked forest flats or green timbered ridges; jungle or rain-forest lands not then being cleared or grassed.

The big holdings have since given way to smaller areas, and schemes of closer settlement have encouraged many men to try their lot on the land. This army of settlers, who follow, in the main, diversified farming, coupled cultivation with pasture and devoted time, energy, and capital to improve their holdings, making full use of the ridges for grazing to allow the richer flats to be put under the plough. Jungle has been cleared and put under introduced grasses. Roads have followed settlement; and drains cut where necessary to enable all surface water to drain off, leaving clean, sweet pastures.

These operations in themselves would bring about a vast improvement, and with our better knowledge of breeds other than the merino, the breed then used and bred purposely for wool, there is soundness in the belief that lamb-raising on the coastal country and nearer "inside" territory would be a profitable undertaking. At our command are the British mutton breeds which have already proved more or less adaptable to such an environment. These breeds have generations of breeding under somewhat similar conditions behind them and should prove most suitable in any mixed farming enterprise.

When we compare the price of wool and mutton fifty years ago with present day values and the values for the last ten years, it must be conceded that, even under the most favourable circumstances, sheep and wool growing in the "good old days" carried very small profits. That we are better organised at the present time as regards transport both by land and sea must also be readily admitted, while science in agriculture, feeding, and stock diseases has advanced to such a degree as to give a far greater security to the farmer than formerly.

When small owners commenced pioneering on their own holdings it was not unusual for them to sow a crop and then take up temporary employment while the crop matured. Successful sheep-raising in such circumstances would be impossible; therefore the conditions now are far more favourable for sheep-raising combined with mixed farming than ever they were in the past.

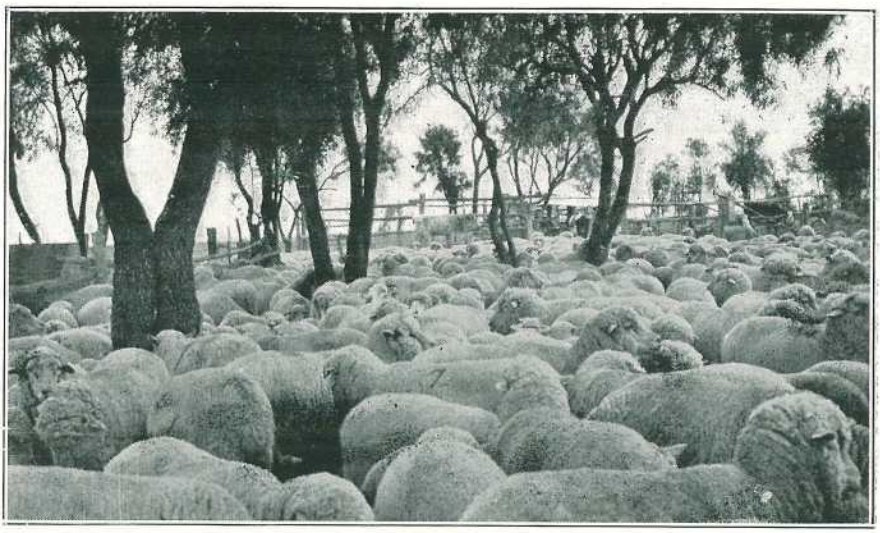


PLATE 73.—FARMERS' SHEEP.

A fine mob of merino ewes on a Queensland farm where wheat and sheep are a profitable combination.

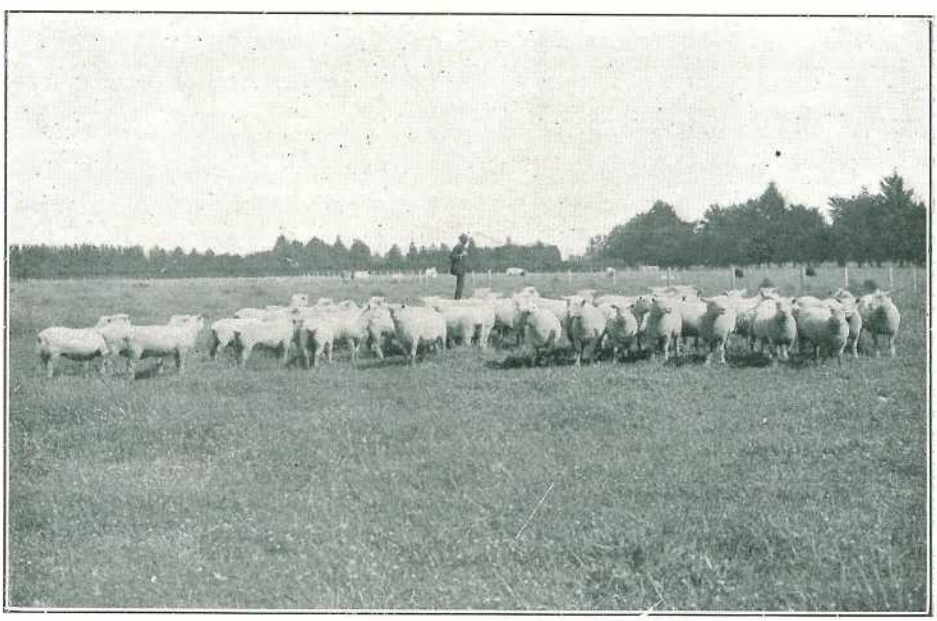


PLATE 74.—A FARMER'S FLOCK IN NEW ZEALAND.

The male progeny of this fine mob of Southdown ewes will be mated with long-wool ewes (mostly Romney Marsh). The ultimate resultant ram from this cross is considered, in parts of New Zealand, to be the right type of sire for the fat lamb trade.

Profits in the undertaking are the chief consideration. It is not advisable for those already in profitable enterprises to change for something they do not understand; but where any other combination is not proving satisfactory, and where soil and other conditions are suitable, I consider that sheep take pride of place as a side line on the farm.

On well grassed forest country or on jungle lands, laid down with couch, paspalum, or Rhodes grasses, sheep will do well in normal seasons. In seasons of heavy rainfall, when the growth of grass is rank, cattle are a decided advantage on a farm where a small flock is kept, for they eat off the tops and thus cause a stooling out of young shoots, which the sheep relish. On newly ringbarked country where rank grass is in abundance sheep will not thrive. That, together with the unsuitability of the merino to coastal conditions, was the trouble in the old days that gave rise to a general belief that sheep would not "make a do of it" east of the Dividing Range.

When sheep eat a paddock right out it should be spelled before cattle are run on it. This is when the subdividing fences are essential. If crops are grown, and in agricultural areas they should be, small paddocks, in which rotational grazing may be practised, become an important factor in the success of the undertaking. In our coastal areas we find conditions favourable for raising crops suitable as sheep food; and curiously enough the sheep suitable to these areas are also ready to take to and do well under these conditions.

In Britain the breeds are standardised, each locality having developed on lines suitable to its requirements principally from a mutton point of view. There they have a higher rate for mutton and markets close at hand. Their taste for prime being educated to a higher pitch, they are prepared to pay for it. Here we find our chief aim to be first for wool and second for mutton, but since the falling off in the price of wool the value of the carcass has become an important factor.

The pure British breeds are not our ideal, the wool of the long-wools being too coarse for our requirements and the Downs short-wools being deficient in length, quality, colour, and weight per fleece. It is, therefore, necessary for us to look for something that will give a finer wool than the long-wool breeds produce, and a longer, brighter, and better quality wool that will give a greater weight per fleece than the Downs breeds yield. These points will be discussed in the next instalment of this series.

[TO BE CONTINUED.]

BEGINNINGS OF AGRICULTURE.

The world, as known to the ancients, consisted of not more than half of Asia, and of a small part of Africa and Europe. During the inundation of the deluge a remnant of man, and of other animals, is related to have been saved on the top of the high mountain of Ararat, near the Caspian Sea, and, when the waters subsided, to have descended and multiplied in the plains of Assyria. As they increased in numbers they are related to have separated, and, after an unknown length of time, to have formed several nations and governments. Of these the principal are those of the Assyrian empire, known as Babylonians, Assyrians, Medes, and Persians, in Asia; of the Jews and the Egyptians, chiefly in Africa; and of the Grecians, chiefly in Europe. Least is known of the nations which composed the Assyrian empire; of the Jews, more is known of their gardening and domestic economy than of their field culture; the Egyptians may be considered the parent nation of arts and civilisation, and are supposed to have excelled in agriculture; and something is known of that art among the Greeks.

The history of agriculture among the nation is involved in impenetrable obscurity. Very few facts are recorded on the subject previous to the time of the Romans. That enterprising people considerably improved the art, and extended its practice with their conquests. After the fall of the Empire it declined throughout Europe, and, during the dark ages, was chiefly preserved on the estates of the church. With the general revival of arts and letters, which took place during the sixteenth century, agriculture also revived; first in Italy, and then in France and Germany, but it flourished most in Switzerland and Holland; and, finally, in recent times, has attained its highest degree of perfection in Britain. The modern agriculture of America is copied from that of Europe, and the same may be said of the agriculture of Australia and European colonies established in different parts of the world. The agriculture of China and the native agriculture of India seem to have undergone no change for many ages.

WOOL SHED EXPERTING PLANT.

INSTALLATION AT THE TECHNICAL COLLEGE.

STUDENTS attending the experting class in the Wool School, Central Technical College, have had, until now, to go to Sydney to complete their training in wool-shed machinery experting. By the installation of a new Wolseley two-stand shearing plant in the wool room, that disability has vanished, and Queensland students will be able to receive the highest technical training in their own State.

The college already has a modern wool scour, which has more than paid its way by the purchase and treatment of small flock owners' wool. Recently the Wool Advisory Committee suggested that an experting plant should be installed at the college, and C. H. Buzacott (Queensland), Limited, generously offered to present the college with a Wolseley two-stand plant. The firm has installed the machinery, which is of the latest type, and includes improvements up to the end of February, 1931. The firm has also agreed that its experts shall inspect the plant and instal any other modern improvements that may be brought in later. This will enable the students to keep themselves conversant with the latest developments in shearing plants, and will arm them with knowledge that will be of inestimable benefit to them in the future.

After inspecting the wool section of the College, the ceremony of switching on the plant was performed by the Premier, Hon. A. E. Moore, on Friday, 13th March, in the presence of a representative gathering of woolmen, and others interested in the pastoral industry.

At the request of the Principal, Mr. R. A. Wearne, and Mr. C. H. Jamieson, M.L.A. (representing Mr. W. A. Russell, M.L.A., a member of the Wool Advisory Committee), the Premier declared the plant open for instruction.

Speech by the Premier.

Mr. Moore said that greater knowledge in all sections of the wool industry was of vital importance. He had been impressed with the efficiency of the college, which was able to buy wool for instruction, treat it, and sell it at a profit. Sixty per cent. of Queensland's export values represented wool, and the rising markets gave them considerable hope; for one of the greatest calamities that could happen to the State was a collapse in the industry. Out of the present difficulties, however, might come good in the shape of a revivified fat-lamb industry, which, he thought, had been set back mainly because of high prices for wool.

HON. A. E. MOORE.

Beef Herd Improvement.

A scheme to spend £10,000 a year for five years was then announced by the Premier. He explained that the Empire Marketing Board had made available £5,000 a year for the five-years period, the Government would give £2,000, and graziers and other interests would contribute the other £3,000. The money would be spent through the Council for Scientific and Industrial Research. The Queensland Government had made available Gindi State Farm and Northern lands. Stock diseases would be the main line of investigation, but tests would also be made of crossing with Zebu cattle in an effort to evolve a tick-resistant strain that could be used in the Gulf country, where so much land was now lying idle. The artificial fertilising of pastures would also be investigated.

A Fine Training for Queensland Boys.

"The training the boys get here will have a far-reaching effect upon the industry," declared Mr. E. G. Parnell, a member of the Wool Advisory Committee. He said it was intended to extend the tuition to the classing and mating of sheep, expert knowledge in which would add many thousands of pounds to the industry.

Mr. R. D. Huish, managing director of Buzacotts (Queensland), Limited, promised that the plant would be kept up to date by his firm.

Proposing a vote of thanks to the Premier, the Superintendent of Technical Education (Mr. Leonard Morris) said that the college possessed the best wool-instruction plant in the Commonwealth.

Other speakers were Messrs. J. E. Walker, M.L.A., M. J. Kirwan, M.L.A., W. G. Brown (formerly Government Sheep and Wool Expert), and Sinclair Smith.

An inspection of the work carried out by Buzacotts' shows that it has been done exceptionally well. The machinery runs entirely without vibration, and is of the very latest pattern and complete with full equipment of handpieces, duplicate parts, and tools for the repair and adjustment of machines.

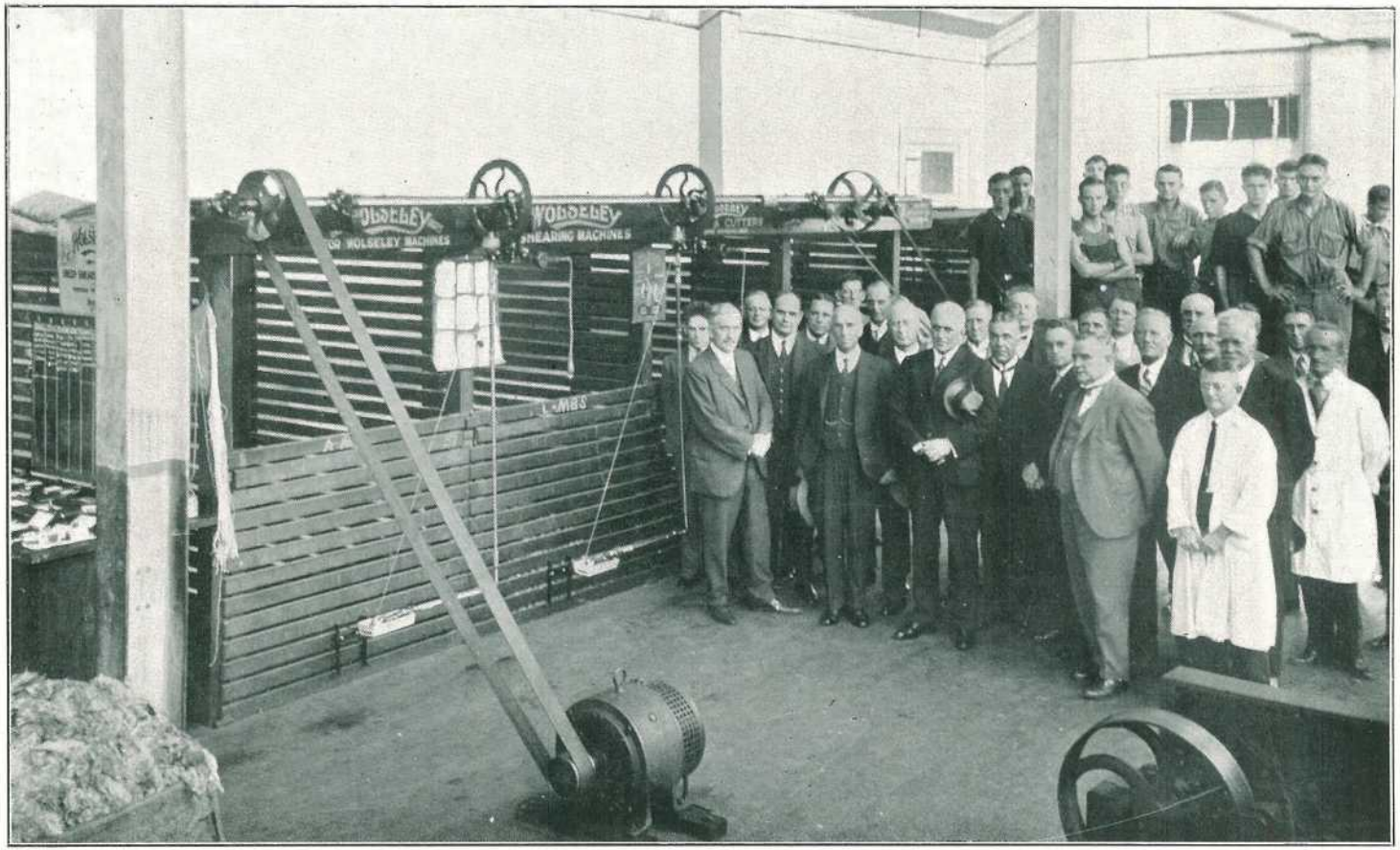


Plate 75.—Installation of Shearing and Experting Plant at Brisbane Technical College.

The Premier, Hon. A. E. Moore, is in the centre of the group, which includes representatives of pastoral and commercial interests and of the Departments of Public Instruction and Agriculture and Stock. Present day students are grouped in rear.

A SOLID-FLESHED TOMATO.

Mr. Paul Donnier, of Kelvin Grove, Brisbane, has supplied the following additional note on a new tomato, described in our last issue as a "New Fruit Tomato," which he has introduced and propagated with satisfactory results:—

This new variety of tomato (second year of its existence in England) was introduced by me into Queensland in August last. The seeds were sown in an old flower bed on 21st September without previously manuring the ground. In approximately three weeks the young plants were ready for transplanting. Germination of seeds was 100 per cent. The young plants grew at a wonderful rate, far beyond my expectations, and developed in a remarkably short time into a picture of health and vigour, and would have reached a height of 7 feet had they been allowed to grow unchecked. The fruit developed at an equal rate with the plants, forming clusters of from five to nine fruits on each cluster. The foliage is large and plentiful, well protecting the growing fruit. As to the fruit itself, it may safely be assumed as the perfection of a tomato from every point of view. The fruit is round, smooth-skinned (no corrugation whatever), going on an average three to four to the pound.

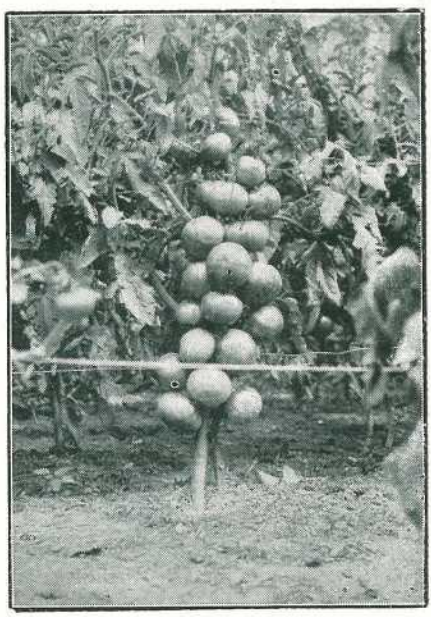


PLATE 76.—A TOMATO NEW TO QUEENSLAND.

The skin is of a very fine texture and may be peeled like the skin of a newly boiled potato. The core is very short. The flesh is solid right through, so that the tomato may be eaten like an apple, while in comparison to other varieties the seeds are few. Its travelling qualities also appear to be of an excellent character as, for instance: Picking several fruits just showing a reddish hue ten days before a local horticultural show, they were, at the date of the exhibition, just ripe for consumption. My crop of approximately 200 plants grown on very poor and shaley soil, yielded on an average 8 lb. to the plant; but, of course, better results can be expected when cultivated under more favourable conditions.

Many controversies have taken place over a point which may be of interest —i.e., can tomato plants be grown from cuttings? I have in my garden at the present moment a tomato plant in bloom grown from a pinched lateral which was stuck in the ground as an experiment.

DISEASES OF THE PIG.*

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

[*Continued from the January issue.*]

PART IV.

In the preparation of information dealing with Diseases of the Pig, an endeavour has been made to describe in the simplest language possible the various conditions, abnormal and otherwise, associated with the incidence or appearance of disease in swine. The suggested preventive measures and methods of treatment are such as may be successfully carried out by any careful farmer, excepting only in cases where the services of a qualified veterinarian are advised, and in these cases the best methods to follow will be suggested on the spot by the surgeon himself.

The pig is notoriously a bad patient and a difficult animal to handle when indisposed, hence great stress has been laid throughout this treatise on the necessity of preventive measures, for prevention is not only much better than cure, but is invariably less costly and a great deal more satisfactory.

In dealing with methods of treatment and the engagement of qualified aid, it has been realised there are numerous difficulties in the way, because Departmental officers or practising veterinarians are not always immediately available in town or country districts. Again, therefore, we stress that prevention is better than cure, and we might even qualify this further by adding prevention is more necessary than cure.

Mr. Shelton's bulletin, representing as it does much labour and the fruits of careful study and observation, is a welcome contribution to current pig literature.—Editor.

OTHER PARASITES.

INFESTATION by flies, fleas, mosquitoes, and bush ticks varies in its intensity in accordance with the care and attention given to pigs and by the environment in which they are kept. Stock kept on low-lying swampy areas are always liable to infestation by parasites, such as mosquitoes. Pigs kept in paddocks in which there is an abundant growth of blady or bush grass are liable to bush tick infestation, while pig paddocks and yards on dry sandy ridges are more liable to infestation by fleas, sandflies, and mosquitoes than by ticks.

These parasites may, to a large extent, be cleared out of the piggery if an ample supply of disinfectant solution is available and is sprayed regularly over the sty walls and around the food troughs, water pools, and wallows, and if the pens are kept clean and free from accumulations of filth.

* The typescript and illustrations of the Farmers' Bulletin on Diseases of the Pig have been submitted to the Chief Inspector of Stock, Major A. H. Cory, M.R.C.V.S., Department of Agriculture and Stock, Brisbane, Queensland.

Copies of the Bulletin may be had gratis on application to the Under Secretary, Department of Agriculture and Stock, Brisbane, Queensland.

In the compilation of this paper the writings of recognised authorities in other States and other parts of the world have been drawn on, and the assistance thus received, also that freely given by other Departmental officers, is acknowledged gratefully.

An excellent skin dressing may be made up of buttermilk and flowers of sulphur; this will tend to soften the skin and put it into good condition. Repeated washings with lukewarm soapy water, and the application of coconut or other oil, or petroleum jelly, will always do an immense amount of good, even if the animals are not infested with parasites.

For ridding premises of fleas, a preparation well recommended is a mixture of 4 oz. of napthalene and 2 oz. of tobacco dust. Sprinkle this around the pens, sties, and sheds once weekly and so reduce infestation. A reliable insecticide to be used as a spray for the extermination of fleas and other pests, which also is useful as a household spray, is made up as follows:—One gallon of liquid ammonia, 4 lb. of best white soap, 8 oz. of salt petre, and 8 gallons of soft water. Handle very carefully. Have the soap chipped finely and pour the water over it, then boil until dissolved. Allow it to become cold, then add the salt petre and stir until dissolved. Strain, let the suds settle, skim off the dry suds and add the ammonia, and bottle and cork at once. This is an old-time recipe with a good reputation.

Another effective method is to spray heavily with kerosene emulsion after thoroughly cleansing the pens and ridding them of accumulations of cobwebs, rubbish, dusty bedding, &c. Walls and floors should be sprayed, and spraying should be repeated two or three times. If pigs are infested with fleas, they should be sprayed with the kerosene emulsion or washed with a 3 per cent. solution of creolin and water, or any other standard creosote compound. Kerosene emulsion should be made according to the following formulæ:—1 lb. hard soap, 1 pint kerosene, 1 gallon water. Boil water, add soap, and when soap is dissolved remove container from fire and allow to cool slightly, then add kerosene and stir well until emulsified.

The Bacon Fly and Bacon Weevil.

Other insects—perhaps of greater interest to the manufacturers, wholesalers, and retailers of bacon than to the breeder—are the bacon fly and bacon weevil. The bacon fly, *Piophila casei*, is a cosmopolitan pest, and is better known to the manufacturer and retailer in the larval form—the larvæ being commonly known as jumpers. (See note by Mr. Roberts in this issue.—ED.)

Besides bacon the fly will readily breed in cheese, dried fish, and even in carrion. At times it has caused severe loss in bacon factories, but may be successfully combated by screening and maintaining highly sanitary conditions. The bacon weevil (*Dermestes lardarius* and *Dermestes vulpinus*) are not thought to cause very much loss in stored bacon, though their presence has been frequently reported. Their hairy larvæ are also to be found attacking skins and similar stored products.

Itching of the Skin.

Technically, itching of the skin is known as Pruritis. Pigs infested with external or internal parasites always appear to suffer from an itching of the skin. Lice, ringworm, pox, fleas, mange, ticks, mosquitoes, nettlerash, sunburn, sunscald, each give rise to the condition, and they are all a source of annoyance to neglected stock that have not the benefit of a comfortable warm, dry shed in which to rest.

In all these cases careful observation will enable the farmer to gain some idea of the actual cause of the trouble.

Ringworm.

Ringworm is an affection of the skin caused by a vegetable fungus, technically known as *Trichophyton* (*tinea tonsurans*). It is not of great economic importance in well-kept piggeries, but spreads rapidly through a neglected herd. Ringworm is contagious. The disease may affect the person in attendance on the pigs, particularly if he attempts with his hands to remove the crusts or scales when treating the animals. The areas most frequently affected in the pig are the sides, back, belly, loin, and underside of the hams. In sows suckling litters the disease spreads along the udders and flanks and may be communicated to the young pigs. In appearance the effects of ringworm are not unlike severe sunscald. The affected areas are variably in size, usually about the size of a half-penny. They have a reddened, inflamed appearance, and towards the centre of the "ring" may be seen small bladders or vesicles (blisters) which burst and discharge a sticky fluid that dries off and crusts. It is the rubbing off of these crusts that carries infection to human beings and other animals on the farm.

Treatment.—Ringworm is not treated so readily in pigs as in the case of horses or cattle, hence stringent measures are necessary. Painting the affected areas is probably the most efficient remedy and has been effective when ointments and similar preparations have failed. Zinc ointment is useful and is usually effective, as also is a dilute solution of iodine. Preliminary treatment consists of carefully washing the affected areas with warm water and soft soap and drying these with a soft cloth before applying ointment or iodine. A 2 per cent. ointment of Chrysophanic acid or Goa powder and vaseline is the best and cheapest in the treatment of other animals, and where used no internal treatment is necessary.

In cases where a sow suckling her young is suffering with ringworm, it would be advisable to wean the litter before beginning remedial treatment. If this is not possible the young pigs should be watched very closely and be treated immediately any indication of the trouble presents itself.

Having regard to its infectious nature, a pig suffering with ringworm should be isolated until risk of infection has passed.

Breeding sows rearing large litters of pigs are subject to several affections of the udder, amongst which is *variola suilla*. It is an eruption, similar in appearance to cow pox, and as such may attack any part of the skin, but most commonly the parts devoid of hair, and particularly the teats and udders. It is rare and not of great economic importance, and does not cause any serious loss, apart from inciting irritability on the part of the sow when suckling her pigs. Ewes, cows, and mares are subject to a similar trouble, though in each instance it is known by different names (cow pox, sheep pox, horse pox, &c.). Apart from maintaining the animal in good condition by careful housing and by attention to diet and keeping the bowels and kidneys in good order, nothing need be done unless the ailment appears to be spreading, in which case washing the affected areas and painting them with a dilute solution of iodine daily should suffice. It is necessary to give the sow an ounce of Epsom salts and a teaspoonful of sulphur daily for a few days, in the slop food, and the udders should be washed with soap and water and kept clean. Generally speaking, the ailment is only of a temporary nature, passing off when the sow weans her pigs. In appearance it is not unlike ringworm, and might easily be diagnosed as this trouble in the absence of microscopic examination of scrapings from the affected areas.

[TO BE CONTINUED.]

DAIRY HERD IMPROVEMENT.

By CHAS. McGRATH, Supervisor of Dairying.

HERD production recording establishes a relationship between the quantities of butter-fat produced and the percentage of purebred and high-grade dairy stock constituting many of our dairy herds. The enthusiasm of the breeders has resulted in the establishment of high class pedigree dairy stock throughout the dairying districts of this State. Although high-class pedigree dairy cattle constitute a small percentage of our dairy stock, it can be said that the dairy sire and cow of definite breeding characteristics are to be met with in gradually increasing numbers in the far northern, central, and southern dairying sections. The influence of the bred-for-production pure sires is reflected in increased returns, both from purebred and grade dairy herds. A significant economic gain to the dairy industry must result from the raising of the standards of our grade dairy cattle and the replacement of grades by bred-for-production pure breeds.

Many dairymen, however, have not yet realised the urgent necessity of placing the better-class pure sire at the head of the herd and so ensure the breeding of better cows possessing a greater inheritance of butter-fat production characteristics. Increased production definitely determines the success or otherwise of the breeder's activities and makes the breeding of dairy cattle lucrative and fascinating.

As the number of breeders of bred-for-production pure breeds increase, an impetus is given to the demand for the better-class pure breeds, and keener competition and improved prices will result.

Many of the breeders of pure breeds are submitting their females for yearly test for entry in the advanced register of the Pure Breeders' Association conducted under the supervision of officers of the Department of Agriculture and Stock and the number is gradually increasing. Some remarkable production records have been made by individual females of each breed, creating an interest in the performance of daughters of certain dairy sires, and giving prominence to lines of blood that have greater inheritance for milk production. The herds of our successful stud breeders will supply the sires of daughters whose production will exceed that of their dams, and thereby increase the average production of the dairy herds of the State.

The percentage of purebred dairy cattle is low, however, and even with increasing interest in pure breeds, and the introduction of high-class dairy sires to head the grade herds, there is essential work to be carried out in the testing of the whole of the females constituting the herds so that the unprofitable cows may be discovered and eliminated.

Far-reaching benefits will result from recording of all purebred females and provide the information that will enable the breeder to remove from his stud all animals whose ancestry has not been bred generation after generation for economic production of butter-fat.

The replacing of the unprofitable cow unit of our dairy herds by individuals of higher production capacity will be a tremendous economic gain to the industry.

Generally dairy cattle-breeding is on a sounder and more progressive basis than ever before, and the future rate of progress is dependent in a great measure upon the work of the pure dairy cattle breeders in making available to dairy farmers high-class dairy stock.

That many of the stud breeders realise the value of production recording is evident from the regular entry of females from their herds into the advanced register of the Pure Breeders' Association.

Following are tabulated particulars of Departmental tests which tell their own tale.

TESTED HERDS.

Particulars of cows officially tested by officers of the Department of Agriculture and Stock, These cows have qualified for entry into the Herd Book of the Australian Illawarra Shorthorn Society, and the Jersey, Guernsey, and Holstein Cattle Societies of Queensland. The final tests were carried out during the months of November and December, 1930. (273 days periods unless otherwise stated.)

Name of Cow.	Age.	Milk Production.	Butter Fat.	Sire.	Dam.	Owner.
AUSTRALIAN ILLAWARRA SHORTHORN.						
		Lb.	Lb.			
Copper of Koh-i-noor	Senior (3 years)	11,110·35	503·956	Plums Laddie	Copper of Wyanga	A. E. Lawrence, Moregatta
Sparrow 4th of Lynfield	Mature	10,342·1	480·174	Dandy of Blacklands	Sparrow 3rd of Lynfield	H. D. Giles, Biggenden
Kitty IV. of Rhodesview	Junior (2 years)	6,866·903	248·827	Colonel Rose of Rosenthal	Kitty of Rhodesview	W. Gierke and Sons, Helidon
Dolly 5th of Greyleigh	Mature	10,635·609	373·879	Foch of Greyleigh	Dolly 3rd of Trevor Hill	M. C. Lester, Laidley Creek
Fancy 3rd of Railway View	Mature	8,571·5	378·364	Rufus Pride of Greyleigh	Fancy 2nd of Railway View	A. T. Waters, Lanefield
Polly 4th of Kingsdale	Junior (3 years)	6,751·65	288·413	Diamond Boy of Burradale	Polly II. of Kingsdale	A. A. King, Mooloolah
Empress of Werona	Mature	9,265·16	353·713	Young Kitchener of Burradale	Empress of Waughope	J. W. Johnston, Wooroolin
Trixy III. of Illawah	Junior (4 years)	11,416·915	413·205	Veteran of Greyleigh	Trixy of Illawah	B. C. Tuckett, Brookfield
Pretty Girl of Blacklands	Junior (2 years)	7,621·25	329·083			A. Pickels, Wondai
Rainbow 6th of Upton	Senior (4 years)	10,722·875	416·849	Kisma of Upton	Rainbow 3rd of Upton	W. F. Kajewski, Glencoe
Ethel 8th of Darbalara (263 days)	Mature	8,531·375	379·911	Kitchener of Darbalara	Ethel 2nd of Darbalara	Macfarlane Bros., Radford
Norah 3rd of Oakdale	Mature	8,898·25	381·574	Dandy 4th Chief of Greyleigh	Norah 2nd of Park View	W. F. Kajewski, Glencoe
Dandy's Togo Czarina 4th of Cedar Grove (265 days)	Junior (3 years)	7,682·6	348·001	Dandy of Ocean View	Togo's Czarina 3rd of Cedar Grove	A. C. Stewart, Wolvi
Lily 3rd of French View	Senior (2 years)	8,536·625	344·675	Chirnside of Thornleigh	Lily of French View	J. Lyndon, Worongary
Flora of Beechwood	Senior (3 years)	7,819·4	335·349	Royal Lad of Blacklands	Flora of Beechwood	F. W. Wooley, Millaa Millaa
Handsome 8th of Bri Bri	Junior (4 years)	8,815·75	339·522	Gay Boy of Tyrone Valley	Handsome 2nd of Bri Bri	W. Middleton, Cambooya
Gipsy II. of Springdale	Junior (4 years)	9,997·95	412·740	Reward of Springdale	Gipsy of Springdale	B. C. Tuckett, Brookfield
Duchess x of Springdale	Mature	10,523·35	397·403	Lovely's Commodore of Springdale	Duchess 2nd of Springdale	B. C. Tuckett, Brookfield
Flirt III. of Brundah	Mature	10,871·725	414·163	Thor of Greyleigh	Flirt of Brundah	B. C. Tuckett, Brookfield
Melba of Trevor Hill	Junior (2 years)	8,741·241	326·462	Prince of Braemar	Princess of Trevor Hill	G. Gwynne, Umbiram
Primrose of Eacham Vale (228 days)	Mature	12,585·85	546·69	Pyree Boy of Pyree	Mayblossom of Eacham Vale	J. K. English, Malanda
Duchess XIV. of Springdale	Senior (2 years)	10,089·8	358·494	Don of Springdale	Duchess 9th of Springdale	V. Dunstan, Wolvi
FRIESIAN.						
Winana Colantha 2nd of Ryfield	Mature	11,115·595	459·759	Bell De Kol Ongarue	Winana Colantha of Ryfield	P. P. Falt, Tingoora
Dairymaid 4th of Oaklands	Junior (3 years)	10,671·25	421·722	Price Colantha 2nd of Ryfield	Oaklands Dairymaid 2nd	W. Richters, Tingoora

TESTED HERDS—*continued.*

Name of Cow.	Age.	Milk Production.	Butter Fat.	Sire.	Dam.	Owner.
				JERSEY.		
		Lb.	Lb.			
Zenobia's Golden Princess of Woodstock	Mature ..	6,602·5	372·623	Golden Jolly	Princess Zenobia	C. F. Klaus, Mundubbera
Inasfayl Romance	Mature ..	7,131·1	361·151	Norwood Model	Innisfail Babbette	McGeehan Bros., Kairi
Inasfayl Ebony Lass	Junior (3 years)	5,531·2	284·017	Norwood Model	Innisfail Ebony	McGeehan Bros., Kairi
Britannia of Rosehill	Junior (2 years)	5,650·7	319·588	Raleigh's Lad of Rosehill ..	Queen of Roschill	J. F. Burnett, Harrisville
Kelvinside Favourite Narcissus ..	Junior (3 years)	6,478·05	314·721	Springmead Tarzan	Favourite's Fuchsia of Kelvinside	J. and R. Williams, Glencliff
Kelvinside Creamy's Cleony	Senior (2 years)	6,808·25	333·632	Springmead Tarzan	Creamy of Oaklands	J. and R. Williams, Glencliff
Tot of Burnleigh (365 days)	Junior (2 years)	8,480·0	453·372	Noisy Jim of Burnleigh ..	Trixie of Burnleigh	Chas. Klaus, Mundubbera
Butterfly of Rosehill	Junior (2 years)	4,937·25	253·712	Raleigh's Lad of Rosehill ..	Talgai Madeline	T. Gillespie, Ravenshoe
Favourite's Fern of Brooklands ..	Mature ..	7·773·5	375·648	Golden Fern's Idyl	King's Favourite	W. S. Conochie, Sherwood
Pineview Rosina	Senior (2 years)	5,086·5	310·83	Oxford Renown	Pineview Golden Gem ..	J. Hunter and Sons, Borallon
Dot of Hamilton	Mature ..	7,547·75	403·798	Larkspur's Oxford	Countess of Hamilton ..	J. W. Evans, Boonah
Glengariffe Noble's Velvet 2nd ..	Mature ..	6,673·6	398·487	Glengariffe Noble's Hereward	Glengariffe Noble's Velvet ..	Cox Bros., Maleny

DEPARTMENTAL HERD TESTING SCHEME.

FREE OF COST TO THE DAIRYMAN.

The Herd Testing Scheme under the control of the Department of Agriculture and Stock offers to dairy farmers an excellent opportunity of testing individual cows in their herds, so that unprofitable cows may be culled and the efficiency of the dairy farmers' operations improved.

In order to arrive at the productive value of each cow it is essential that the record shall extend over a period of at least 273 days. During this period the dairy farmer is required to weigh and sample the milk of each cow at intervals of sixty days.

On receipt of an application a case containing the required number of sample bottles is forwarded to the dairy farmer who records the production of each cow over a period of forty-eight hours, and takes a sample of each individual cow's milk. The records and samples should be then returned to the Herd Testing Section, Department of Agriculture and Stock, Brisbane.

When the lactation period is completed the records of each individual cow submitted are computed, and the records of the herd are forwarded to the individual dairyman.

A perusal of the herd records will enable the dairy farmer to determine the returns from each cow tested, and allow of the culling of the "boarder." The following record of two herds that have just completed a lactation period indicates that the use of the scales and Babcock test is essential in securing efficiency in the industry.

At the beginning of this season upwards of 12,000 cows were undergoing a production test, and it is hoped that the number will soon be considerably increased.

RECORD OF A GRADE HERD, YEAR 1930.

Name of Cow.	Date of Calving.	Yield for 273 Days Lactation.		Value at 1s. 6d. per lb.
		Milk.	Butterfat.	
		Lb.	Lb.	£ s. d.
Charm		5,736	251	18 16 6
Granny		4,098	190	14 5 0
Matilda		5,419	312	23 8 0
Stumpy		5,162	261	19 11 6
Pearl		5,729	214	16 1 0
Peggy		3,901	185	13 17 6
Nancy		3,172	207	15 10 6
Daisy		3,638	186	13 19 0
Snowy		4,214	168	12 12 0
Lovely		3,503	165	12 7 6
Star		5,405	229	17 3 6
Lady		3,056	104	7 16 0
Tiny		5,055	239	17 18 6
Hope		6,153	302	22 13 0
Brindle		3,714	194	14 11 0
Bessie		5,187	267	20 0 6
Roney		7,771	386	28 19 0
Silver		5,026	227	17 0 6
Duchess		5,325	234	17 11 0
Poley		5,483	222	16 13 0
Lucy		5,327	260	19 10 0
Sunshine		4,956	214	16 1 0
Pansy		5,173	224	16 16 0
Bell		4,985	233	17 9 6
Nellie		4,479	203	15 4 6
Beauty		4,837	259	19 8 6
Jean		5,606	211	15 16 6
Leopard		6,653	270	20 5 0
Butterfly		5,528	216	16 4 0
Total for 29 Cows				£497 9 6
Average per Cow				£17 3 0

RECORD OF A PURE BRED HERD, YEAR 1930.

Name of Cow.	Date of Calving.	Yield for 273 Days Lactation.		Value at 1s. 6d. per lb.
		Milk.	Butterfat.	
		Lb.	Lb.	£ s. d.
Lady	1 July, 1929	9,065	381	28 11 6
Bella	14 Feb., 1929	8,640	356	26 14 0
Carnation	3 Nov., 1928	6,583	238	17 17 0
Cherry	14 June, 1929	9,380	314	23 11 0
Dolly	18 May, 1929	7,471	284	21 3 0
Diamond	7 July, 1929	11,342	399	29 18 6
Fashion	18 Apr., 1929	6,401	249	18 13 6
Mona	12 Feb., 1929	7,553	297	22 5 6
Melba	23 May, 1929	8,827	339	25 8 6
Nora	16 May, 1929	9,303	369	27 13 6
Rosie	22 June, 1929	7,976	289	21 13 6
Rainbow	8 Apr., 1929	8,080	302	22 13 0
Rosetta	24 May, 1929	9,654	347	26 0 6
Snowie	3 Apr., 1929	9,277	375	28 2 6
Sussie	17 June, 1929	7,965	335	25 2 6
Violet	18 May, 1929	6,171	251	18 16 6
Lily	2 Oct., 1929	7,004	268	20 2 0
Polly	22 Sept., 1929	6,755	260	19 10 0
Queenie	28 Sept., 1929	11,076	362	27 3 0
Total for 19 Cows	..	..	..	£450 19 6
Average per Cow	..	..	..	£23 15 0

Further information may be obtained on application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"TB." IN COWS.

That a stage has been reached when it appears to be definitely practicable to make cows immune from tuberculosis is stated by the Empire Marketing Board in a review of research work at Cambridge and at the Ministry of Agriculture's laboratories at Weybridge. Professor J. B. Buxton and Dr. Stanley Griffith have been working at Cambridge, under the auspices of the Medical Research Council and the Marketing Board, on a special vaccine known as "B.C.G." or Bacillus Calmette-Guerin, so called because it was discovered by Professor Calmette in 1906. It is stated that a cow which was vaccinated with B.C.G. as a heifer and subsequently inoculated with tubercle germs had given birth to a calf which, though it was reared by its mother, did not react to the standard test for tuberculosis, and so was free from infection.

"Other animals vaccinated with B.C.G. were slaughtered over a year after inoculation with enough tubercle germs to kill 'control' calves in a few weeks, and their resistance to infection was so high that they were found to be suffering only from slight chronic symptoms of the disease."

"Many more years of work," it is said, "are necessary before B.C.G. can be regarded as an established immuniser. No one knows, for instance, how long its effects last, and whether the vaccination would have to be repeated at intervals, as with smallpox immunisation in man. This work is of vital importance not only to farmers, but also from the standpoint of human health. Human beings are susceptible to bovine tuberculosis, and about 30 per cent. of tuberculosis of the bones and joints is caused by the bovine germ."

OBITUARY.

MR. H. W. POTTS.

The death occurred at Innisfail on 13th February of Mr. H. W. Potts, F.C.S., F.L.S., Commissioner for Malta, whose headquarters were in Sydney. Mr. Potts held a high reputation throughout Australia as an agricultural scientist. Born in Northumberland, he first arrived in Brisbane in 1873, being then a qualified agricultural chemist and botanist. He was employed subsequently by the Victorian Government as agricultural scientist in the organisation of the first butter factory in Australia, chiefly in teaching the managers the application of science to dairying. In 1902 he accepted the position of Principal of the Hawkesbury Agricultural College, at Richmond, New South Wales, and during the nineteen years he remained there he established a reputation which extended throughout the Commonwealth and even to other countries. He retired in 1920. Since then he had been five years in England as a principal of the Australian Farms' Training College at Lyndford Hall, Norfolk. Following the accidental burning of the hall, it was decided not to rebuild it, when Mr. Potts carried the property on as a stock farm, until last December. Lord Strickland, the Premier of Malta, asked the late Mr. Potts to report on the agricultural and live-stock conditions existing on that island. Lord Strickland also invited him to be Commissioner for Malta for the whole of Australia, which position he occupied at the time of his death. The deceased gentleman was held in high esteem by the 5,000 Maltese in Australia.

The late Mr. Potts was a prolific writer on live stock and agricultural subjects. He was editor of the "Australian Cotton Journal" and of the "Hawkesbury Agricultural College Journal." His book on "Pigs and their Management" is the text-book on the subject. He also edited the first journal of agriculture for the Victorian Government. From 1896 to 1899 he was a member of the Victorian Royal Commission on Education, which reorganised the whole of the educational services of Victoria. The late Mr. Potts is survived by a widow, three sons—Messrs. George Potts (Leeton, New South Wales), Garnsey Potts (Brisbane), and Frampton Potts (Mudgee, New South Wales)—and two daughters, the Misses Unee and Colina Potts (Cremorne, Sydney, New South Wales).

MR. H. W. BECK.

Mr. Henry William Beck, formerly Stock Inspector of the Agriculture and Stock Department, passed away at his residence, Rutherglen, Indooroopilly, on 25th February. The late Mr. Beck was born in London in 1847, and sailed from there in the "Queen of the Colonies" on 13th June, 1865, arriving at Brisbane in September of the same year. From Brisbane he went to the Wide Bay and Burnett districts to engage in station work. In the year 1871, at Rockhampton, he married Ellen Carey, daughter of the late John William Carey, who was a foundation member of the first bowling club formed in Brisbane, and also of the Booroodabin Club. In 1874 he was appointed quarantine-keeper to the Department of Agriculture and Stock, Brisbane district, the first quarantine station being then situated at Highgate Hill, South Brisbane. On its removal to Indooroopilly, Lytton, and Colmslie, he served at those places successively. While at Lytton he was gazetted as an inspector of stock. Altogether he served forty-seven years in the department, and at the time of retirement was its oldest officer. He was regarded as a conscientious, capable, and painstaking man, and some of the most valuable imported cattle, horses, and sheep passed through his hands. He had resided at Indooroopilly for the past ten years, and left a widow, four sons, three daughters, thirty-four grandchildren, and two great-grandchildren.

CLIMATOLOGICAL TABLE—FEBRUARY, 1931.

SUPPLIED BY THE COMMONWEALTH OF AUSTRALIA METEOROLOGICAL BUREAU, BRISBANE.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·83	90	75	100	8	70	23	912	13
Herberton	..	84	65	93	9	59	21, 28	369	6
Rockhampton	29·85	88	71	96	9	65	23	889	8
Brisbane	29·96	82	67	90	21	59	23	1909	13
Darling Downs.									
Dalby	29·94	84	62	90	20, 21	49	23	615	4
Stanthorpe	..	77	58	87	20	41	23	332	7
Toowoomba	..	77	60	87	21	46	22	879	10
Mid-interior.									
Georgetown	29·82	97	74	102	9	68	25	318	5
Longreach	29·83	103	73	108	8, 9, 10	62	22, 23	8	1
Mitchell	29·91	93	68	100	20	48	23	15	2
Western.									
Burketown	29·81	98	77	104	5, 9	71	24	13	1
Boulia	29·81	105	76	111	10, 11, 20	61	22	0	0
Thargomindah	29·86	97	75	104	9, 19, 20	59	22	0	0

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING FEBRUARY, 1931, AND 1930 FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of Years' Records.	Feb. 1931.	Feb. 1930.		Feb.	No. of Years' Records.	Feb. 1931.	Feb. 1930.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	10·38	30	4·87	17·26	Nambour	9·48	35	23·08	5·76
Cairns	15·49	49	14·60	13·74	Nanango	4·16	49	6·92	2·35
Cardwell	17·11	59	11·77	17·67	Rockhampton ..	7·91	44	8·89	4·39
Cooktown	13·59	55	9·12	19·13	Woodford	8·39	44	24·12	5·11
Herberton	7·72	44	3·69	9·59					
Ingham	16·56	39	5·49	18·04					
Innisfail	22·46	50	15·98	14·98					
Mossman	18·35	18	4·76	34·27	*Darling Downs.*				
Townsville	11·40	60	3·50	7·69					
					Dalby	2·84	61	6·15	1·23
					Emu Vale	2·60	35	2·36	1·22
Central Coast.					Jimbour	2·64	43	4·93	2·00
					Miles	2·77	46	3·11	1·49
Ayr	9·10	44	5·18	4·12	Stanthorpe	3·28	58	3·32	1·36
Bowen	8·84	60	4·23	6·89	Toowoomba ..	4·51	59	8·79	4·26
Charters Towers ..	4·49	49	2·23	3·41	Warwick	3·13	66	2·78	2·05
Mackay	11 47	60	6·48	5·62					
Proserpine	12·39	28	6·26	13·00					
St. Lawrence	8·00	60	4·77	4·96					
					Maranoa.				
South Coast.									
					Roma	3·03	57	2·36	0·30
Biggenden	4·33	32	8·85	3·54					
Bundaberg	6·19	48	23·77	5·00					
Brisbane .. .	6·41	80	19·09	1·81	*State Farms, &c.*				
Caboolture .. .	7·37	44	34·24	3·85					
Childers .. .	6·55	36	14·42	4·02	Bungeworgorai ..	2·39	17	1·36	0·20
Crohamhurst ..	12·93	38	32·17	9·28	Gatton College ..	3·34	36	6·64	3·56
Esk .. .	5·44	44	13·32	6·57	Gindie	2·94	32	0·10	0·85
Gayndah	4·31	60	4·68	3·51	Hermitage	2·60	25	2·22	1·55
Gympie ..	6·64	61	14·61	5·64	Kairi	9·91	17	5·53	8·18
Kilkivan	5·00	52	5·83	4·27	Mackay Sugar Experiment Station ..	10·48	34	5·32	4·38
Maryborough ..	6·41	59	23·56	5·00					

GEORGE G. BOND, Divisional Meteorologist.

TEMPERATE FRUITS IN QUEENSLAND.

The Minister for Agriculture and Stock, Hon. Harry F. Walker, has received the subjoined report on the cultivation of temperate fruits in Queensland from Mr. Geo. Williams, Director of Fruit Culture.

TEMPERATE fruits have a fairly wide distribution over the colder parts of the southern inland division of the State, but commercial production is almost entirely confined to the Granite Belt, where the majority of the orchards are of comparatively recent establishment. Over fifty years ago the Toowoomba district produced in very limited quantity excellent fruit of several varieties, particularly apples and pears. Later commercial plantings were undertaken by a few enthusiastic persons in the Stanthorpe district, where the industry has gradually expanded until the production, as given in latest returns available, is valued at £350,000 per annum. In the meantime the results have not always been encouraging, and many failures, partial or complete, have been experienced. Contributing factors have principally been: Planting in unsuitable soil, unprofitable varieties and others not adapted to local conditions, inadequate attention, pests and diseases, and inferior nursery stock.

Fruitgrowing in the Granite Belt.

The variations at short intervals in the condition of the soil contained within the Granite Belt are very marked; instances where 20 acres or over of an even formation of fruit land exist are rare. Areas of 10 to 15 acres almost invariably show defect in part or parts. The best local soil is of granitic origin, fairly free, and of good depth, and in this stone fruits, as well as other kinds, also grape vines, luxuriate; but unfortunately such land is usually accompanied or interspersed with soils of shallow depth over a subsoil generally referred to as cement, or rock basins, at shallow depths. There being no possibility of soil aeration except to a very shallow depth, the roots become cramped and their fibres are destroyed during extended periods of wet weather. The average temperature of the soil is most equitable at a depth of about 2 feet. In climates with such a wide range of temperature as that experienced in the Granite Belt, shallow rooting, which predominates, renders the roots liable to the effect of excessive heat during the hot months of the year, and the effect of cold during the winter. The natural corollary of this is stunted or dwarfed trees, and where it cannot be or is not overcome the distances between trees can be most appreciably reduced.

In the absence of congenial soil conditions, the application of cultural methods, fertilizers, &c., shows but modest results. In many places where orchards have been situated that are now defunct the natural conditions are such that their profitable working is practically impossible. This may be also applied in parts to numerous existing orchards. In the majority, draining is essential. The particular area may be small or extensive. Agricultural pipes are utilised for the purpose, but their price is now prohibitive except where small plots are being dealt with. Stones properly placed make an efficient substitute, but entail much labour in collecting, handling, and placing, and also in the quantity of excavating necessary for their reception.

The space between the drains (which should not be less than 3 feet deep) varies somewhat according to the texture of the soil, but 20 to 35 feet apart is recognised as being reasonable limitations. It has been noted that in many of the Stanthorpe orchards patches of ill-drained soil of varying dimensions and shape exist. Indication varies as to the extent to which excessive moisture may be present and the term of its duration. Land which becomes excessively wet during the wet season invariably becomes hard and dry and practically impervious during the dry months. In some cases it may be possible to remedy this natural defect by one or two drains; in others many would be required. Where a rock basin or bank is the means of holding back the water, it may sometimes be necessary to cut through this to the necessary depth to allow for the escape of water, though any difficulty usually may be overcome by slight deviation. To more accurately determine alignment of drains, where loose stones are not appreciably present, a soil auger may be used for a preliminary survey, and under wet conditions a light crowbar will be more satisfactory. So far as soil improvement applies in this district, draining, where necessary, takes preference over all other methods that can be applied. The effect of ill-drained land upon

the roots of different trees varies considerably, those of the peach being particularly susceptible. No system which can be applied to land will bring it to an equal state of that where the required conditions are provided by nature, but the position may be so ameliorated that the cost is considered warranted.

In following upon, in many cases, unsuitable soil to start with, the selection of varieties was rather indiscriminate, there being really nothing as a guide in this important aspect, experience being practically nil, consequently planters selected a variety which appealed to them either from acquaintance with the fruit or published descriptions. Frost injury, susceptibility to disease, vigour, and general adaptability could not be determined, chance alone being relied upon.

Stocks were subsequently found to exercise a very important influence upon the development of the trees, and though satisfactory results have in some earlier instances attended the use of the Northern Spy apple, it has not on the whole been a success. It has a tendency to produce clusters of small fibrous roots, which are most pronounced particularly in the shallower soils. This form of root growth is detrimental, and the development of a moderate root system where it prevails is seldom present. Following upon the use of the Paradise stock for general use, the adoption of the Northern Spy became almost universal, mainly on account of its being described as blight-proof or immune to the attacks of Woolly Aphis. The demand for this particular stock would appear to have resulted in its general depreciation, due no doubt to quality giving place to quantity and the application of the most rapid means of propagation. The constitution thus became impaired, and the undesirable tendency in having the root system more pronounced.

The most suitable apple stock for the district is still undecided, though it is ceded that in most of the States seedling stocks or hardy commercial varieties are the most satisfactory. Vegetative stock of different origins have commanded much attention during the last few years, and have advocacy from authoritative sources; but confliction of opinion exists and will so continue. Different systems or methods must be varied to meet the conditions of general environment, and it is probable that no definite pronouncement on the subject will ever receive universal approval.

In some instances where special attention has been applied to stocks over a number of years, it is expected that the influence of the stock upon the grafts is the sole factor; but opportunity is taken of expressing a contrary opinion, that the head of the tree exercises, according to its natural habit, a most marked influence upon the stock, a bushy tree of dense growth will induce the formation and maintenance of numerous fibrous roots, where an open habit of growth, and more particularly where this has a vertical tendency, it will be found to show very much less fibre, but longer and comparatively bare roots.

One cannot but express regret that the orchard established in connection with the soldier settlement on soil of varying consistency and containing an extensive collection of trees and grape vines should have been relegated to oblivion. In the absence of such an institution perhaps more could have been expected from individual or collective effort, particularly in the direction of establishing a nursery for the supply of local trees for planting, instead of relying on importations which were frequently of most indifferent quality. The unsuitability of certain apple and other fruit tree stocks has been determined; time and effort only can determine the most suitable types and varieties for local production.

Among stone fruits soil influences are very important. The use of peach stocks in sour or badly drained land is fatal, and it is suggested that the appearances of mould when conditions favour their development can to a great extent be ameliorated by giving more regard to the class of soil in which trees are planted or to its drainage, it being recognised that moulds are harboured by dead or dying wood, which will ever be more or less present where drainage is deficient, and much more evident in some varieties than in others. Stocks suitable for plums are a subject of concern. The range of choice is limited, and trials of different kinds should be conducted on similar lines on a number of soils. Otherwise they cannot be accepted as being generally applicable to the district.

Selection of Varieties.

Regarding varieties, selectors have now the opportunity of advice from the local Departmental officers, whose observations cover the whole of the district, and who are consequently intimately conversant with the suitability of such varieties as it may be desired to include. This advice should be availed of. The choice should be guided by two factors—adaptability to local conditions and market requirements. The longevity of the tree under existing conditions must be considered in respect of adaptability, also the possibility of a crop being destroyed in its

early stages by light frost. The former applies particularly to plums, and, although the latter applies generally to early fruits, the apricot is outstanding. Frost injury is a danger present every season, as is also hail damage. Insurance against the latter has been frequently discussed without result, and it would appear that the loss from both cases must remain with the individual. Against frost injury various recommendations were received, particularly in respect of smoke-screens, but in all of these the fact that heat and not smoke was the actuating influence was not appreciated. A limited number of smoke bombs were imported from France, but the result of their use was innocuous. Rockets containing explosive for use in the dispersal of hail clouds were also introduced, but so far there has been little occasion for use. Tangible results in any case cannot be anticipated.

Pests and Diseases.

Fruit fly in varying quantity has been present in the Stanthorpe as well as other fruitgrowing districts, practically ever since cultivated fruit was available for it to deposit its eggs in. Woolly Aphis, Codlin Moth, scale insects, and Peach Aphis are later introductions. The former has in numerous seasons made very serious inroads on orchard returns. With the advent of rigorous application of the Diseases in Plants Act, re-collecting and destroying infested fruit, based upon a much earlier but practically unaccepted recommendation, the menace has been very much reduced. The fallacy that the pest was to be disposed of by one fell sweep, and that it was not migratory, was forcibly demonstrated the year following its pronouncement. The local Entomologist, Mr. Jarvis, conclusively proved that the pest did not winter in the orchards, and has subsequently very materially added to control measures by perfecting an inexpensive lure by which the adult flies are readily induced to encompass their own destruction. The results of investigations conducted by Mr. Jarvis have been most helpful to the fruitgrowers by whom they are fully appreciated, as are also those of the local instructor, Mr. Pratt, and his staff. For the introduction of Aphilinus, which has so successfully combated that previously ruinous pest, the Woolly Aphis, growers have also to thank Mr. Jarvis. Codlin Moth still continues to take a varying toll of the fruit, as it does in all lands where pomaceous fruit are included and the pest exists. Luring the adult moth has for some time received consideration, and recent reports suggest this as being a satisfactory method. Scale insects also aphides are kept in complete subjection, except in such places as are from time to time found to be in a neglected condition, by spraying. Neglected orchards have from the past been far too frequent, and the cause of the dissemination of pests and diseases. With wider powers now conferred on the inspectors their elimination is progressing. In respect of diseases the district is most fortunate in remaining so far free from infestation by Black Spot of apples and pears, and the close application of the regulations governing the introduction of Southern fruit into the district should materially assist in maintaining it so. Unfortunately Crown Gall has been introduced, but its presence is not considered by any means general. Brown Rot of stone fruits is persistent under humid conditions, also other forms of fungi less pronounced in effect but worthy of further investigation. Grape culture has expanded to pretentious dimensions. Generally the conditions are favourable as to the quality and abundance of yield, as the supplies received from the district amply testify. The firm-fleshed berry suitable for distant transport may be retained in cool stores. It is represented in several excellent varieties, as are also the most popular muscats. With the increased production consideration is being given to extensive export. For this purpose only the former type is suitable, and as an absorbent material for packing, cork dust is considered the most satisfactory. The quality, size, and general appearance of the fruit, particularly when matured under dry conditions, as it must be for satisfactory export, are unexcelled in any part of the Commonwealth. The necessity for spraying vines against fungi, which is of paramount importance on the coast, is reduced to a limited number of applications; but this must be supplied for the suppression of both Downy Mildew and Black Spot.

Reconditioning of Orchards.

This must receive attention where the trees are not reasonably developed and productive. In most cases the owner could not entertain the idea of treating more than a small portion of his orchard annually; but it is obvious that all-round improvement cannot be effected by other means. Following soil improvement, the elimination of stagnant trees and replanting under improved conditions must first be considered. Many trees will retain sufficient vigour to warrant attention. The amputation of much of their root growth must be balanced by the reduction of the head proportionately. In replanting, lessening the distance between trees might well be considered.

Summary.

Summarised, the principal features in connection with the industry for consideration are:—Selection of orchard sites; more consideration is necessary before selection, with provision made at the outset for draining where required; shallow soils otherwise should not be considered. Varieties:—Plant only a limited number of kinds of known quality and productivity under local conditions. If experimentation is desired, limit the number of kinds or of plants to two or three of each; the experimental part of an orchard is rightly looked upon as unprofitable. Planting:—Do not plant land that is unsuitable or that which has not been properly prepared. Planting on the square system is recommended. Be advised by your local instructor regarding the distribution of varieties for interpollination, after following his advice in respect of site and soil preparation. Plant one-year-old trees in preference to stags. Standards are now prescribed for fruit trees for planting; see that those supplied to you comply with these standards. Subsequent attention:—If growing green crops or weeds, in starting trees in the same land keep the two separate. It is not easy to locate the young tree when closely surrounded by other growth, and as its development under such conditions will be nil, it may be entirely lost. Recollect that in intercropping the collected produce leaves the land so much poorer. Instead of depleting land in this way, fertilize and grow a green crop for ploughing in before recropping. This will be of mutual and general advantage. Your land may be rich in potash, but this alone will not stimulate growth. In suitable, well-worked soils the trees will respond to good treatment, but will also show an adverse effect where the conditions are indifferent. Complete every operation thoroughly and, though exceptional circumstances may on some occasions prevent it, have them completed on time. Delay often means disaster. The completion of operations successfully cannot be obtained where one endeavours to encompass too much. Restrict the area to that commensurate with your capabilities. Systematic attention and efficient working over a reasonable area will give a much higher monetary return than equal energy expanded over a wider field. Intercropping is mainly practised with the object of contributing to the wherewithall until the trees attain a profitable age, tomatoes and various vegetables being used for the purpose. The fertilizer requirements of each should be considered, and applied prior to planting, though nitrogenous fertilizers may also be beneficially applied as a top dressing to such crops as profit thereby. Consult the bulletin by the Agricultural Chemist, "Complete Fertilizers for Farm and Orchard," and follow the directions given. Do not take it for granted that the one general fertilizer will answer equally for, say, tomatoes, beans, and cabbage, also that the requirements of the trees may be similarly met by injudicious fertilizing. Indiscriminate applications are seldom profitable. Do not hesitate to invoke the aid of advice of your instructor, even on what you may consider trivial matters. It is his pleasure to advise and assist in every way possible.

QUEENSLAND SHOW DATES, 1931.

Oakey: 11th April.
Goondiwindi: 10th and 11th April.
Dalby: 15th and 16th April.
Chinchilla: 21st and 22nd April.
Goombungee: 22nd April.
Miles: 29th April.
Beaudesert: 29th April to 2nd May.
Taroom: 4th to 6th May.
Murgon: 7th to 9th May.
Boonah: 6th and 7th May.
Mundubbera: 6th and 7th May.
Ipswich: 12th to 15th May.
Mitchell: 13th and 14th May.
Atherton: 21st and 22nd May.
Roma: 19th, 20th, and 21st May.
Kilkivan: 20th and 21st May.
Biggenden: 21st and 22nd May.
Kalbar: 23rd May.
Emerald: 20th and 21st May.
Maryborough: 26th to 28th May.
Marburg: 2nd and 3rd June.
Wowan: 4th and 5th June.
Lowood: 19th and 20th June.
Mount Larcom: 19th and 20th June.
Rockhampton: 23rd to 27th June.
Kilcoy: 2nd and 3rd July.
Home Hill: 3rd and 4th July.
Townsville: 7th to 9th July.
Gatton: 8th and 9th July.
Cleveland: 10th and 11th July.
Caboolture: 16th and 17th July.
Rosewood: 17th and 18th July.
Ithaca: 18th July.
Laidley: 22nd and 23rd July.
Esk: 24th and 25th July.
Maleny: 29th and 30th July.
Royal National: 10th to 15th August.
Wynnum: 28th and 29th August.
Imbil: 2nd and 3rd September.
Beenleigh: 18th and 19th September.
Rocklea: 26th September.

HOME-MADE CHEESE.

METHOD OF MANUFACTURE.

By C. F. McGRATH, Supervisor of Dairying.

TAKE, say, 10 gallons of milk, which should not be sour, but should have developed sufficient sourness or lactic acid necessary to be present in milk intended for conversion into cheese. Milk drawn from the cow at the evening and kept overnight, when mixed with equal quantities of morning's milk (freshly mixed), and providing the evening's milk has not gone sour, generally meets the requirements. The evening's milk should be stirred and cooled after milking, and be kept in well-scalded vessels in a cool, clean atmosphere. This milk should be put into a clean tinned vessel about 2 feet long by 1 foot wide by 1 foot deep, which should stand in another vessel 2 feet 6 inches by 1 foot 6 inches by 1 foot 3 inches deep, and should rest on three pieces of wood laid on the bottom of the larger vessel, which will bring the top edge of inside vessel a little higher than the outside one. Hot water is then poured in the outside vessel, and the milk in the inside vessel should be stirred with a wooden pat till it reaches a temperature of 86 degrees Fahr. Should the water used at this period be of sufficient warmth to further heat the milk it should be drawn off by a water cock inserted in the bottom of the outside vessel; this water can be put back into the heating boiler if desired. When the milk is 86 degrees Fahr. add about fifteen drops of cheese colour and stir thoroughly; then add about ½ oz. of rennet, and stir for two minutes; then cover with a cloth (a piece of calico answers), and let the milk rest until coagulated and of such firmness that, when you insert the finger into it and raise the finger to the surface bent forward, the junket will make a clean break in front of the finger. This stage usually takes from twenty-five to fifty minutes from the time of adding the rennet, according to the sourness of the milk and the strength of the rennet.

Careful Attention Necessary.

This stage of the process requires careful attention. When the junket reaches the condition above described it should be cut into cubes about ½ inch square. For this purpose a vertical and a horizontal curd knife are used. The curd is first cut lengthwise with the horizontal knife, then crosswise and lengthwise with the vertical knife. The curd is then stirred for a minute with the hands or a pat; then more hot water is run into the outside jacket, and the curds and whey brought up to a temperature of 100 degrees Fahr. This should take twenty to thirty minutes. By this time the curd should become firm to the touch. A small piece of the curd (about the size of a walnut) should be taken and squeezed dry in the hand, and placed on an iron which has been heated to almost redhot. The curd should be firmly placed on the iron on a part that is just hot enough to hold the curd but not burn it; then draw the curd gently away from the iron. If sufficient acid is developed it will be noticed that small threads about ¼ inch long adhere to the iron. If the curd has not developed an adequate amount of acidity these threads will break away, or, if very sweet, the curd will not show any threads at all. In the latter cases the curd must be kept at the above temperature or not allowed to fall below 98 degrees Fahr. until it shows thickly populated threads ¼ inch to ½ inch long on the hot iron. When this is accomplished the whey should be drawn from the curd. This can be done by shifting the curd to one end of the vessel and dipping the whey out at the other. The end of the vessel should then be raised to allow the whey to drain away from the curd.

Draining Off the Whey.

After the whey is drawn off the curd will readily become mattered. It should then be cut into blocks about the size of bricks and turned over; the turning should be repeated about every fifteen minutes to allow the whey to drain off. In the course of about forty minutes the hot iron test is again brought into requisition, and a piece of curd applied as before, and when the curd shows fine threads about 1 inch long the correct acidity for cheese purposes has been attained. This usually takes from about an hour to an hour and a-half after drawing off the whey. The curd is next cut into pieces about the size of broad beans. There is a mill for this purpose, but a small quantity of curd can be cut with an ordinary butcher's knife. This completed, the curd is stirred with the hands just sufficient to separate any pieces that may have united. Stir and keep from matting for about thirty minutes. Then add 4 oz. of fine salt (or at that rate) and mix thoroughly.

Hooping and Pressing.

In seven to ten minutes the curd is now ready for hooping and pressing into cheese. For this amount of curd two 5-lb. 7-inch cheese hoops and one half-dozen yards of 7-inch binder are required. The half-dozen yards of binder are sufficient for 100 cheese of the weight above mentioned. After the curd is put into the hoops it should be pressed for twenty or twenty-four hours under a ton pressure. If the milk is too sweet at the outset it takes a long time to get the required acid (hot iron test), or if too sour the acid is developed too rapidly, and the cheese will be sour and probably leak on the shelves. Try to strike the medium. A nice time for completion of the process is about four to five hours from the time the rennet is added to the milk until the curd is in the hoops, preparatory to the application of pressure. In connection with the manufacturing of cheese from separated milk for home use, it will be found to be of advantage to the product if about one-third of whole milk be added to the separated milk.

THE CARE OF THE CAR.

WET WEATHER DRIVING ON BAD ROADS.

AS autumn approaches a period of good rainfalls may be expected, and to the motorist that lives in the country wet weather usually means motoring under difficult conditions. Provided that roads are good, wet weather merely decreases the pleasure of driving, but when roads are unmade the question of "getting through" without being bogged is often a very vital one, particularly to those in the flat country. The novice when travelling along a water-logged road usually makes the mistake of trying to dodge the water-filled wheel tracks and favours the more dry-looking earth at the side of the road. This is usually a fatal mistake, as the wheel tracks generally have a hard bottom, whereas the virgin ground is usually very soft. The very fact that the water is held in the wheel tracks is evidence that the bottom is packed so hard that the water cannot soak away. There is, of course, no danger of becoming bogged on metal, asphalt, or concrete roads, but on certain classes of asphalt there is grave danger of skidding. Asphalt on which the metal shows through is usually safe, but that which presents a smooth oily surface must be treated with care, as often the surface is as slippery as ice.

Correcting a Skid.

A car usually skids on the back wheels only, and a skid of this kind can usually be corrected if the right action be taken. The skid usually occurs when the car is being driven or being braked. If the skid occurs while the accelerator is depressed release the accelerator immediately, and at the same time steer in the direction of the skid. Similarly, if the skid occurs while the brake is being applied, release the brake and steer into the direction in which the car is skidding. By steering into the skid as it is called is meant steering the front of the car to go the same way as the back of the car is skidding. Sometimes the driver is inclined to doubt the wisdom of releasing the brakes when he wants to stop because of something in front; however, releasing the brakes momentarily will help appreciably to stop the skidding, as the wheels turn and get a new grip. Where the road is at all dangerous and there is any likelihood of a skid, the driver should proceed slowly in low gear. Mountain roads where the track is of red volcanic soil should be treated with great respect. However, many roads on the plains are such that skidding is not at all dangerous, as there is nothing to hit, yet at the same time patches of the road are so greasy that the car seems to go sideways as readily as forwards. On roads of this type the car should be kept moving, and every time the car begins to skid the clutch should be disengaged. A free coasting car will not skid on the most slippery surface unless an attempt be made to turn. Very often remarkably bad patches can be travelled over by coasting.

"Getting Set" and "Getting Out."

When the car stops in a soft patch and the wheels begin to spin, it is said to be "set" or bogged. Once the car is "set" to keep the wheels revolving only means digging in deeper. The first effort to get out should be made by backing, as it is possible that the car will go out over its own tracks. However, if this fails, it is time to get out and inspect. A rope wound around the wheels will help considerably towards giving the wheels grip, and, of course, pieces of wood or stones packed under the wheels will help. When chains are available they should be fitted, but as very few motorists carry chains they are not generally available when required.

When a piece of rope is wound around the tyre care should be taken to see that it does not foul the brake gear when the wheels rotate.

When the driver has company the following is an ingenious method of getting the car out of a bog. Remove all the spark plugs so that the engine will have no compression, put the car in low gear, and then use the crank handle to rotate the engine. Most cars have a low gear ratio of between fifteen and twenty to one, so that the car can be wound out of a hole in this manner. The virtue of using man power rather than engine power lies in the fact that it is perfectly controllable, and the wheels will be rotated so slowly that the assistant may place sticks or stones under the wheels as they are rotated. Sometimes it will be found that one wheel only will rotate, and that this wheel has no grip. If it is desired to make the other rotate, the rotating wheel may be spragged so that the differential will transfer the drive to the desired wheel. This procedure is perfetly safe when the engine is being wound by hand, but is liable to cause a breakage if the engine be driven by its own power.

Getting Out of Deep Water.

Sometimes it is necessary to ford a stream a foot or more in depth. Many drivers believe in the rushing tactics, which is all right if the stream be narrow, but where water of any width must be crossed the wisest course is to tackle it at a walking pace in low gear. The radiator should be covered, or the fan belt removed, as otherwise the fan will blow the water splashed into the radiator all over the engine, and thereby cause trouble with the ignition system.

Where there is any possibility of the water coming up high enough to flow into the carburetter a piece of hose should be attached to the carburetter and tied so that it will draw air from above the water level. If water in any quantity is drawn in the carburetter intake it will partly fill the cylinders with water. Water, of course, is incompressible, and when the pistons try to compress it the piston or cylinder will be broken. Once the water reaches the intake the damage will be done before the engine stops revolving, even if it were switched off the moment the water reached the carburetter.

A water-blocked exhaust pipe will also cause the engine to stall, so that when fording deep water the exhaust should be extended. However, the blocking of the exhaust pipe will not lead to any more serious damage than the stalling of the engine.

After passing through water the brakes should not be trusted until they have had a chance to dry, as sometimes good brakes are made useless by becoming water-logged. Wet roads do not usually wet the brakes, as the brake drums throw the splashed water off by centrifugal force, but when the wheels are immersed up to the drums in water, and are only turning slowly, the water quickly finds its way between the brake drum and the brake shield.—"Radiator," in "The Farmer and Settler."

ROLLED BARLEY AS A FOOD FOR PIGS.

In the course of a recent visit to America and Canada, Mr. F. C. Sargeant, of Thorpes, Ltd., Stock Food Specialists, Sydney, gained information of value to Australian pig breeders in that he found rolled barley a line of feed which enjoys enormous sale for all classes of animals, including poultry. Californian experience indicates that rolled barley is a superior food, even more valuable than ordinary whole barley or barley meal. When preparing barley in this form it has to be steamed very heavily so that the live steam will permeate the grain to such an extent that when it passes into the rollers it will flake out into a thin flake instead of breaking up. This heats up the grain to such an extent that there is a partial cooking of the starch cells, and it is this that is generally held to be responsible for the animal liking the feed better and doing better on it.

Rolled barley has proved of particular value in the fattening of pigs, for not only is there a greater gain in proportion to the feed used than any other food that has been tested, but the resultant pork is whiter, better grained, and altogether a superior product to flesh produced on any other food. The University of California has been conducting tests over several years and find that rolled barley with skim milk fed at the rate of 1 lb. of rolled barley to 3 lb. of skim milk gives excellent results, the average of a number of tests showing that there is 100 lb. of gain to 282.48 lb. of rolled barley consumed. This would appear to be a very good food for use on dairy farms where plenty of skim milk is available. The value of a combination of such a food with maize and other protein foods is also emphasised.

Answers to Correspondents.

State Forests and Bee-Keeping.

The Secretary of the Provisional Forestry Board, Mr. C. J. Trist, advises, in reply to inquiries received from time to time from apiarists as to the possibility of securing leases of the State forests for bee-keeping purposes, that it will no doubt be of interest to bee-keepers generally to know that the Forest Service will assist wherever possible by making leases available at a nominal rental.

Treatment of Blight in Cattle.

X. Y. Z. (Kilkivan) writes—

Several of my cows have a sort of a scum over one eye, which renders it temporarily blind. Is there any effective remedy for this?

The Chief Inspector of Stock, Major A. H. Cory, M.R.C.V.S., advises that it is apparently what is commonly known as blight, and suggests a trial of this treatment:—A lotion composed of 20 grains of sulphate of zinc in 6 oz. of water should be obtained, and a few drops applied two or three times daily by means of a small glass syringe. It is necessary that early application be made, otherwise difficulty will be experienced in relieving the blight, which if neglected for any length of time will become incurable.

BOTANY.

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

Bella Sombra Tree.

C.P. (Jandowae)—

The specimen is the Phytolacca or Bella Sombra Tree, a native of South America, but largely planted as a quick-growing ornamental tree in most of the warm regions of the world. In Queensland and in South Africa it has received some praise as a valuable fodder for stock. Stock, particularly poddy calves and cows, seem to eat the leaves readily and they have a good nutritive value. The plant grows to a large size, and there are male and female trees. Propagation is readily effected by seeds. We do not know how cuttings would strike, but they are worth trying. The tree is cut down by frosts on the Downs, but otherwise it grows well and recovers on the approach of warm weather.

Brisbane Box Tree.

W.S.C. (Sherwood)—

The specimen is *Tristania conferta*, the Brisbane Box or Scrub Box, very common in the neighbourhood of Brisbane, and when planted making an ideal shade tree. It is largely planted in the Southern States as a shade and street tree, particularly in Sydney suburbs, where it is mostly grown under the name of *Lophostemon australe*. The practice there is when the trees attain a fair height to lop them off about six feet from the ground, causing them to produce a fine umbrageous head. We do not think seeds are stocked by Brisbane nurserymen, but most of the Southern nurserymen list plants in their catalogues, either under the name of *Tristania* or *Lophostemon*. The plant, however, seeds very heavily, and the envelope you sent was full of seeds that had dropped out of the seed capsules. If you wish to raise plants gather some of these seed capsules, lay them out on a sheet of paper for several days, and they will shed the seed. This can then be sown in flats or a garden bed, the young seedlings when a few inches high pricked off into pots and tins, and then planted out when large enough in their permanent positions.

Marram Grass.

W.A.McD. (Mackay)—

Marram Grass—The botanical name is *Ammophila arenaria* Link (Syn. Psamma arenaria, Roem. et Sch.), a grass widely spread, either native or planted, over the Atlantic Coast of North America and the sandy sea coasts of Europe and Northern Africa. It is a very valuable sand-binding grass and has been largely planted in the Southern States. It has been tried to a limited extent in Queensland, but on the whole the Queensland climate is too hot for it.

Ragweed. Wild Sage.

W.R.B. (Mount Larcom)—The specimens are:—

1. *Erigeron linifolius.*—Commonly known in Queensland as Ragweed. It is a tall growing, coarse weed that over-runs scrub farms at times but which is not known to possess any harmful properties.
2. *Salvia plebeia.*—A species of Wild Sage or Mint Weed. Most of the members of this family taint milk rather badly. The one you send is moderately common, but we have had no experience of the extent to which it would taint milk.

Hibiscus.

E.L.J. (Orkabie, N.C. Line)—

The specimen is *Hibiscus splendens,* a large Hibiscus very common in parts of coastal and sub-coastal Queensland. Along with others of the same genus it is comonly known as Native Rosella. The plant belongs to the family Malvaceæ or Mallow Family, very few of which are known to possess any harmful properties, and nothing is known to the detriment of the particular species you send. It is just possible that the hairy covering of the leaves may have a mechanical effect on stock, but the plant is certainly not known to possess any poisonous property.

Cotton Bush.

L.J.P. (Gayndah)—

The specimen is a species of Cotton Bush, either of Kochia or Enchylæna, but in the absence of seeds it is impossible to say which, as the leaves and stems are so very alike, the distinctions between the species being based on the seed. Cotton Bushes are closely allied to the Salt Bushes and are very common on Downs country in Queensland, less so in other places. They are very common along stock routes, being generally left to the last by stock. In spite of their harsh appearance, however, they have some value as a fodder, especially during times of drought, the plants being very drought-resistant. Under ordinary circumstances the plants are not particularly aggressive weeds and can be usually eradicated by cutting off below the ground level.

Turkey Bush. Wild Cherry. Wax Creeper. *Passiflora foetida.*

W.J.G. (Watsonville)—The specimens have been determined as follows:—

1. Turkey Bush, *Grewia latifolia.* The genus Grewia belongs to the family Tiliaceæ. There are several species in Queensland, and one or two, including the one you send, are popularly used throughout the North and the Northern Territory as a cure for dysentry and diarrhœa. This belief seems well founded, the curative properties of the plant being due to a mucilage it secrets when placed in water.
2. *Exocarpus latifolia.* A plant of the Santalaceæ or Sandalwood family, known locally as Doughboy by the children of your locality. It is often known as Wild Cherry in other places.
3. *Hoya australis.* Wax Creeper or Wax Flower. In times of drought this plant is sometimes eaten by cattle with fatal results as it causes severe gastro-enteritis.
4. *Passiflora fœtida.* This passion flower is a common species over the tropics, and in plantations is used as a cover crop to keep down weeds and is also ploughed in as a green manure.

Cape Cotton. Glycine Pea.

R. C. B. (Chinchilla). Your specimens are—

1. *Gomphocarpus fruticosus.* Cape Cotton. This plant is a native of South Africa, and is a great pest on some coastal farms. After the scrub has been cleared it comes up in a dense mass, somewhat in the same way as Inkweed and Wild Tobacco. The silk cotton contained in the seeds has no value as a true cotton, but has some slight value as a silk cotton or kapok. The plant has been accused of poisoning stock at different times, and belongs to a dangerous family, but stock rarely touch it or at least not to any extent.

2. *Glycine tabacina.* The Glycine Pea. A small legume common in the average native mixed pasture, and generally regarded as a useful fodder herb.

North Queensland Plants Identified.

J. J. W. (Alligator Creek, N.Q.).—The specimens have been determined as follows:—

1. *Sida rhombifolia*, commonly known in Queensland as *Sida retusa.* In New South Wales this plant is commonly known as Paddy's Lucerne, and is generally regarded as quite good fodder for stock. It is not known to possess any poisonous or harmful properties.

2. *Cassia occidentalis.* Wild Senna. Of the plants you send this is the most likely cause of your trouble. The green leaves of the Wild Sennas have been known to cause trouble in stock, a characteristic symptom being diarrhœa.

3. No flowers or seed heads on the specimen, but I should say a species of *Sida.* The same remarks apply to this as to No. 1.

4. *Sida acuta.* The same remarks apply here regarding properties as to Nos. 1 and 3.

5. No flowers or seed heads on the specimen, but I should say *Eurina lobuta*, commonly known in Queensland as Pink Burr or Chinese Burr, though this latter name is now applied to a number of plants. It is very common in several parts of Queensland, but possesses no harmful properties.

6. *Sida cordifolia.* The Flannel Weed, not known to possess any harmful properties.

7. *Acanthospermum hispidum.* Starr Burr, a native of Tropical America now naturalised in North Queensland, and a great pest in many places. It is not known to possess any poisonous or harmful properties.

8. *Euphorbia pilulifera.* Asthma Weed. This plant is regarded as very useful in giving relief to persons suffering from asthma. It is dried and used in the same way as ordinary tea, a wineglass full being taken as a dose.

9. *Malvastrum tricuspidatum.* A plant of the Mallow family very common in Queensland, but for which I have not heard a common name. It is not known to possess any poisonous or harmful properties.

10. *Scoporia dulcis.* A moderately common weed in Queensland with a very small flower and seed. It is not known to possess any harmful properties. I have not heard a common name for it.

11. *Amarantus spinosus.* Needle burr, not known to be poisonous or harmful in any way. The young shoots of most Amaranths are used in India and China as a spinach.

12. *Alternanthera denticulata.* A plant of the Amaranth family generally regarded as quite useful fodder and not known to possess any harmful properties.

13. No remark on the specimen, but seems simply like leaves of one of the Grass Trees, *Xanthorrhœa sp.* The Grass Trees have been suspected of poisoning stock, but feeding experiments carried out with them, both with the flowering poles and the leaves, have yielded negative results. On the better class Grass Tree country stockowners say that stock feed quite freely on Grass Tree without any ill effects following; in fact, they look upon the plant, particularly the young flowering poles, as having some considerable fodder value.

General Notes.

Pygmy Goose Protected.

An Order in Council has been issued under the Animals and Birds Acts totally protecting throughout Queensland the pygmy goose (Cheniscus coromandelianus). This bird is one of our rarer Anserine birds, and is rapidly dying out in Queensland, although some are occasionally seen in the Rockhampton district. Alternative names of the pygmy goose are the white-quilled pygmy goose and the goose-teal.

Citrus Crop on the Blackall Range.

The Minister for Agriculture and Stock (Mr. H. F. Walker) has received a report from the Instructor in Fruit Culture at Mapleton that the citrus crop for the Mapleton and Flaxton districts is a moderate one, but the fruit is well advanced, clean, and bright, and promises to be of good size and quality. In orchards receiving good cultural treatment trees are vigorous and healthy, with a satisfactory showing of wood for future crops. Owing to weather conditions a second blossoming is breaking in a number of orchards. The Instructor advises that the damage reported during the recent storms was not as great as estimated, and only in isolated cases was any material loss sustained.

Open Season for Ducks in Southern Queensland.

The present close season for ducks in Southern Queensland, which commenced on the 1st October, 1930, was due to end on the 30th April, 1931. In order to give sportsmen the chance to shoot ducks during the Easter holidays, however, an Order in Council has been issued ending the close season at midnight on the 31st March, 1931, instead of on the 30th April. This applies only to No. 1 district constituted for the purposes of the Animals and Birds Acts as described in an Order in Council of the 27th March, 1930, comprising, roughly, only that portion of Queensland south of Bundaberg.

Amendment of Slaughtering Act Regulations.

Regulation 32 under the Slaughtering Act has been amended. This Regulation, which has been in force since 1925, has provided that no person shall treat at, dress at, or bring into or upon any butcher shop, slaughter-house, or public abattoir the carcass or any portion of any stock which has died or been killed prior to arrival at such slaughter-house except for purposes of boiling down. This Regulation has now been amended so that from now on no person shall treat, &c., at any butcher shop, slaughter-house, or public abattoir the carcass or any portion of any stock which has died or been killed *elsewhere than at a slaughter-house or public abattoir* except for purposes of boiling down.

Staff Changes and Appointments.

Messrs. W. L. Childs, L. F. Childs, and F. Coombes have been appointed Honorary Rangers for the Nudgee Golf Links Sanctuary.

Mr. J. Carew, Senior Instructor in Sheep and Wool, and Mr. J. L. Hodge, Instructor in Sheep and Wool, have been appointed Inspectors under the Diseases in Stock Acts.

The Officer in Charge of Police at Nanango has been appointed an Inspector under the Brands Act.

Mr. F. J. Harris, Analyst in the Agricultural Chemical Laboratory, has been appointed an Analyst under the Fertilizers Acts.

Mr. H. Collard, Assistant Instructor in Fruit Culture, Department of Agriculture and Stock, at present attached to the Banana Experiment Station, Kin Kin, as Acting Manager, has been transferred to Rockhampton for general instruction in Fruit Culture in the Central District.

Mr. H. G. Crofts, Acting Secretary, Banana Industry Protection Board, has been appointed Secretary, Banana Industry Protection Board, as from the 31st July, 1930.

The appointments of Messrs. P. Mitchell, J. H. Mitchell, E. L. Miles, F. A. Drake, C. N. Morgan, W. G. Hancock, and J. M. Wills as Agents, Banana Industry Protection Act, have been confirmed as from the 31st July, 1930.

Fruit and Vegetables Act.

Till the present time the Fruit and Vegetables Act has applied only to potatoes, onions, green peas, green beans, and turnips as vegetables. The Governor in Council has now declared cabbages, carrots, cauliflowers, parsnips, and pumpkins to be vegetables for the purposes of the Act, and so in future the provisions of the Act will also apply to these vegetables.

Canary Seed Board Election.

The election of two growers' representatives on the Canary Seed Board resulted as follows:—

George Burton, Cambooya	68 votes.
Michael Coleman, Nobby	62 votes.
Garrett Denis O'Neill, Allora	60 votes.

Messrs. Burton and Coleman will therefore be reappointed for a further term of one year as from the 1st March.

Banana Experiment Stations—Rescission of Levy.

On the 31st July last an Order in Council was issued providing for a levy on banana-growers for the upkeep of the Banana Experiment Stations. This levy, which was at the rate of ¾d. per case on cased bananas and 1d. in the £1 sterling on bunch bananas, has now been rescinded, and will not be deducted from proceeds of sales by agents after the 28th February, 1931. The levy for the Banana Industry Protection Board (at the rate 1½d. per case for cased bananas and 2d. in the £1 sterling on bunch bananas) will still remain and continue to be deducted by agents.

Sanctuaries for Animals and Birds at Nudgee and Cunningham's Gap.

An Order in Council under the Animals and Birds Acts has been issued declaring the following properties to be sanctuaries under the Acts:—

1. Nudgee Golf Links.—The property of Mr. W. L. Childs, Nudgee, known as the Nudgee Golf Links, comprising subdivisions 1, 2, and 3 of portions 293 and 294, parish of Toombul, county of Stanley; area, 70 acres.

2. Reserve for National Park, Cunningham's Gap.—The Reserve for National Park, Cunningham's Gap, parish of Gladfield, county of Merivale, as reserved and declared by Proclamation dated the 1st July, 1909, and published in the *Government* Gazette of the 3rd July, 1909, page 14; area, 3,100 acres.

Wessex Saddleback Pigs.

The first of this old-world breed of pig to arrive in Australia were imported by Mr. R. Turpin, of The Springs, Manly, Queensland, per s.s. "Matakana," which arrived on Monday, 9th March. Black in colour with a collar of white across the shoulders, this breed of pig originating in the British Isles has a reputation for producing first-class bacon of a type in demand in this country—i.e., with a maximum of flesh and a minimum of fat, withal a quick growing useful type of pig under English conditions. What their future will be in Australia remains to be seen; the first pair have been reported on favourably by those who have seen them. After undergoing the usual fourteen days quarantine at the Federal Quarantine Station, Colmslie, they will be transferred to the farm at Manly. Both pigs come from well-known prize winning strains, and from studs with a world wide reputation.

Control of Brumbies.

The Diseases in Stock Act Amendment Act passed last session of Parliament provided, among other things, for the destruction of brumbies (wild horses) on stock holdings in Queensland on certain conditions. The provisions, however, apply only to such portions of the State as are proclaimed by the Governor in Council, and are limited to a period of not more than four months in any year.

A Proclamation has now been passed declaring the Bowen, Maryborough, and Townsville Stock Districts to be districts in which the provisions relating to the destruction of brumbies shall apply, but they shall apply in these districts only for the four months from the 1st April, 1931, to the 31st July, 1931. Destruction of brumbies may therefore be carried out in these districts by stock-owners at any time during the said four months, provided that all formalities required by the Acts have first been observed.

Queensland Made Leather Goods.

Purchasing leather goods from the firm that actually makes leather goods is the safest method and surest way of obtaining best values. L. Uhl and Sons, Limited, recognised as "the Premier Saddle House," whose premises are in Queen street, Brisbane, are actual manufacturers of these goods, and their first-hand knowledge is available to all.

Here is a list of the main items procurable from this progressive saddle house:—Saddles for all manners of service—poley, stock, farm, station, military, polo, Bosca race saddle, Bosca exercise, boys' and youths' saddles, riding pads, cowboy saddles, Professor Bates's saddle, pack-saddles, &c. Harness includes American chaparejos, cowboy bridles, Mexican and plain spurs, bits, gags, collars and collar pads, buggy and sulky harness, plough harness, farm harness, hames, winkers, shaft harness, saddle cloths, bridles, chains, whips. Among other lines stocked are leather coats, leather caps, oilskin coats, leggings, men's boots, fishing tackle, belts, gloves, water bags, army combs, brushes, clipping machines, dog collars, straps and chains, camp requirements, ropes, saddlers' tools, brush pots and cases, saddle bags, water canteens, camp ovens, stocks and dies, leather portmanteaux, kit-bags, farmers' and blacksmiths' tools, Taubman paints and brushes, garden requirements, and carpenters' tools.

For all these lines Uhls claim that their prices are as low as it is possible to make them, and in every case only the highest grade articles are sold. Inquiries are welcomed, and an illustrated catalogue will be posted on application.

Commodity Boards Elections.

Nominations have been received at the Department of Agriculture and Stock in connection with the election of members for the following Boards:—

Egg Board.

District No. 1 (Caboolture-Bundaberg)—R. B. Corbett, Woombye (returned unopposed).

District No. 2 (Brisbane North-Redcliffe)—M. H. Campbell, Albany Creek; A. A. Cousner, The Gap, Ashgrove.

District No. 3 (Brisbane South-Cleveland)—T. Hallick, Mount Gravatt (returned unopposed).

District No. 4 (Moreton District)—Nomination incomplete.

District No. 5 (Darling Downs)—F. B. Common, Toowoomba (returned unopposed).

An election for District No. 2 only will therefore be necessary, and ballot-papers will probably be issued to owners of 50 or more fowls in that district early next month. The date fixed for the return of the ballot-papers to the Returning Officer is on or before the 30th April.

Honey Board.

For this Board four growers' representatives are required and they will be elected from the following candidates:—

F. W. Bentick, Stanthorpe.
R. J. Bestmann, Caboolture.
A. R. Brown, Park Ridge.
C. W. Edwards, Greenbank, via Kingston.
H. E. Fagg, South Killarney.
John Schutt, Perthton, via Dalby.
O. N. Tanner, Samford.
G. H. Whiting, Coowoonga, Rockhampton.
R. V. Woodrow, Woodford.

The date fixed for this election is the 14th April.

Barley Board.

Two members are required for this Board and the only nominations received were from Messrs. H. Kessler, Cambooya, and Edward Fitzgerald, Felton East. The retiring members, Messrs. Burton and Coleman, did not seek re-election and the new members will be appointed at the expiration of their term of office—namely, the 23rd April, 1931.

Central Sugar Cane Prices Board Assignments.

In the "Government Gazette" of the 10th April, 1930, appeared Orders in Council assigning lands of canegrowers to certain sugar-mills in Queensland. As it has been found necessary to amend these assignments in certain particulars, an Order in Council has now been issued putting into effect such amendments. All persons whose assignments have been altered have been notified to that effect by the Central Sugar Cane Prices Board.

Bordeaux Mixture—Purity of Ingredients.

Though Bordeaux mixture is purchasable in commercial form, it is much more economical for the farmer or orchardist to prepare it for himself if it is to be used in any quantity. Full directions are given in a free departmental pamphlet on this subject, which contains the following note on the question of purity of the ingredients—copper sulphate (bluestone) and lime.

The bluestone available on the local market is of 98 per cent. purity, and this strength is usually prescribed in regulations under Pest Destruction Acts. Sulphate of iron may be present as an impurity in some samples—in most cases in minute quantity only; in others in appreciable quantity. Bluestone should be in the form of dark-blue crystals. It may be tested by dissolving a small quantity in water, and diluting this solution in a tumbler. A little ammonia should then be added and the mixture well stirred. A pale-blue precipitate is first formed, which dissolves to an intense blue colour. If iron be absent the solution will remain bright and clear. The formation of a reddish-coloured precipitate or sediment indicates the presence of iron.

It is of importance that the lime is freshly burnt. To test whether it is so, a few lumps should be placed in a heap and sprinkled with water, when it will gradually fall to pieces, becoming very hot in the process, giving off a quantity of steam, and crumbling to a fine, white powder. Some limes may not slake readily with cold water, but may do so with hot water. If it does not get hot enough to give off steam even with hot water, then the lime is unsuitable.

Diseases in Plants Acts—Amended Regulations.

The amendments to the Diseases in Plants Act that were passed last session of Parliament have made necessary some amendments to the Regulations under the Act.

The Regulations, in order to comply with the new definition of a nursery, have been amended to provide for a registration fee of ten shillings for any place where plants are offered or exposed or kept for sale. Definitions of "Diameter," "Fruit Tree," "Sale" or "Sell" and "Sub-package" have been inserted.

New Regulations have been made to provide for the sale of fruit trees and grade standards for same. These new Regulations provide that all fruit trees supplied by nurseries must be graded in conformity with certain standards, and must be of such variety as the tag or label indicates, and in the case of seedlings the tag must bear that word. Trees must be worked upon such stocks as they are purported to be or as defined by the purchaser. Stocks of trees must be of good quality, and in the case of apples and pears the roots must be of normal development, free from clustered or bunched small roots. All worked trees must be propagated by a single bud or graft, not double worked, and of one season's growth from same.

The following standards apply to size:—

(*a*) Apples and Pears.—Diameter not less than half an inch, except that in small-growing varieties of pears it may be seven-sixteenths of an inch.

(*b*) Apricots, nectarines, peaches, and plums.—Not less than half an inch in diameter.

(*c*) Citrus.—Diameter not less than half an inch, and trees of upright growth, well developed, and free from yellowing or chlorotic colouring of foliage.

Trees of standards (*a*) and (*b*), if branched, must be of fair shape with not less than three branches of not less than 18 inches in length.

The usual penalty of £5 for a first offence and not less than £5 nor more than £20 for a second or subsequent offence is provided for a breach of these new Regulations.

A Separator Stand Hint.

When setting the separator on a wooden block, first cover the whole top with a seamless piece of tin, cut to shape. This ensures greater cleanliness from drops of oil, milk, or cream. The wood, if unprotected, will absorb any fat, and besides looking dirty will harbour dust and germs. The tin can be kept as shiny as the machine.—"Spes" in the "Brisbane Courier."

Rumination.

When the cow begins to ruminate an automatic nervous control goes into effect. This is the rumination centre located in the brain, and it ensures co-ordination of all the factors involved in this complicated process. The lips of the œsophageal groove open, permitting the partial vacuum in the œsophagus to draw material back into this tube. At the same time there is increased pressure in the abdomen, and this helps to force food into the œsophagus. Whereas the normal function of the œsophagus is to contract its muscular walls in such a way that food is carried from the mouth to the stomach, under the stimulation of the rumination centre it does just the opposite, contracts at the bottom first, and a wave of contraction carries the material which is in the œsophagus back to the mouth. The water upon which this feed was washed into the œsophagus is immediately reswallowed, but the solid material is thoroughly ground and then reswallowed.

Honey Blending—An Aid to Profitable Marketing.

When it is realised that two samples of honey which separately would be hard to sell can by blending be turned into a first-class sample, the practical value of the process will be evident.

The blending of honey should interest all apiarists, writes the Senior Apiary Instructor of the New South Wales Department of Agriculture, as upon it depends the retention of the local market. It is little use developing a trade with choice samples and later having to rely on lower grades to retain that trade. And that is what happens if blending is not resorted to, for it is rarely found in any part of the State that the honey produced consists entirely of choice samples. On the chief selling floors of the city the general adoption of the practice of blending has been too long delayed, and it is to be hoped that the operations of the Honey Marketing Board will demonstrate the value of the practice.

With a number of different grades available, the choice lots move off freely, and the difficulty then arises of disposing of the lower grades. Blending, on the other hand, would allow of the whole floor being cleared practically at the one time. Moreover, if some variation in flavour is desired from time to time to meet a new demand, this could be arranged.

As an illustration of the value of blending, it might be mentioned that it is possible to produce a first-grade product from two second-grade samples, one of which is strong in the points where the other is weakest. The two samples if sold as straight lines would be difficult to dispose of.

In preparation for blending, each lot of honey will need to be carefully sampled and its quality assessed as regards flavour, colour, density, and aroma. Whether it is desirable to blend for the local trade or for a wholesale house, the apiarist must keep each extraction of honey separate, for mixed samples make the work of blending very difficult, involving much additional time in sorting. Successful blending depends upon using sufficient of the higher-grade honey to tone down the darker or more highly flavoured samples.

The blending should be carried out on a small scale first, the quantities of each grade of honey used being carefully measured. This test blend is heated (not above 140 degrees Fahr.) and then thoroughly mixed, and if it is found to be satisfactory the percentages of the different grades used can be taken as a guide for the mixing of larger quantities. If the blend is darker than desired, then a larger quantity of the light grade must be used; if too strong in flavour, then it must be further toned down by a larger percentage of the mild honey, and so on. Candied honey will require to be heated in order to liquefy it and then poured into the blending tank whilst rather warm. Particular care should be exercised to see that the different lines of honey are poured into the blending tank in such order as will ensure the most thorough mixing of the various grades. Careful work in this direction will save much subsequent stirring.

If the honey is to be blended by the Honey Marketing Board, selected straight lines of honey can be sent direct to the board's floor, where expert supervision and up-to-date plant are available to blend to the quality desired.

Man's First Want.

The first want of man is food, and his first resource for it the ground. Whether herbs or fruits were resorted to must have depended on their relative abundance in the country where man found himself; but the latter would probably be preferred, till the use of fire was discovered in the preparation of the former. The first care and labour of man would thus be bestowed on fruit trees, and hence gardening may be said to be the art of earliest invention. But man is also a carnivorous animal, and this propensity of his nature would soon induce him to attempt domesticating such beasts of the earth as he found most useful in affording milk, clothing, or food, or in performing labour. Hence the origin of pasturage and the management of live stock. The invention of tillage would be coeval with the discovery of the use of the cereal grasses, and may be considered as the last grand step in the invention of husbandry, and the most important, as leading to the establishment of property in territorial surface. In the earlier stages of civilisation these branches of economy, in common with all the arts of life, would be practised by every family for itself.

Aberdeen-Angus Cattle.

After a century of hard work the outline of the Aberdeen-Angus cattle has obtained such high perfection as beef producers that they are hard to beat, writes Mr. A. J. Tanner in the "Country Life" of Sydney. They are bred with an object of producing the maximum amount of beef with the minimum amount of waste. The legs are short and straight, and bone of great quality. The body is deep rather than round, although at a glance along the back it gives the impression of being built rather rounder than it really is. The hook bones are low set, and in unison with this the ribs are not excessively wide and square on the top but gently rounded, deep, and long. The shoulders are not narrow but roomy and easily fitting. As a result of this the fattened animal has an extraordinary depth of flesh along the back and loins, and on account of their gentle rounding the depth of flesh is carried well down both the fore and back ribs. The low-set hook bones allow the rump to be full fleshed and the round of the thighs to be well developed and carried down to the hocks. Undoubtedly the Aberdeen-Angus is a wonderful producer of roasts, steaks, and rounds.

Overstocking—Its Risk.

It may be laid down as a rule to which there is practically no exception (states a New South Wales departmental bulletin) that the increase in the risk from disease occasioned by overstocking is out of all proportion to the increase in the number of stock added to those already on a given area. This increase in risk involves three types of disease—infectious, parasitic, and dietetic. The chances of infectious disease spreading, are, of course, obviously greater where animals come into more direct contact with one another, and the longer such contact is continued the greater the risk. Since in most cases of parasitic infestation the eggs or embryos of the parasites are passed out of the animal with the fæces, it is equally obvious that the more stock are crowded together the more they will tend to become reinfested with the parasites.

Dietetic diseases are in most instances only to be expected when overstocking is continued for a long period; such diseases are sometimes so delayed in their appearance, and the exhaustion of the soil is also so gradual, that it is difficult at first sight to connect the two, but the connection undoubtedly exists. This refers to overstocking of a whole holding. It is, of course, often economically sound and wise from a health point of view temporarily to overstock some portion of a holding, even to a very marked extent, and then to allow that portion a rest from stocking. Changes such as this practice leads to benefit both stock and pastures.

The danger from crowding many stock together on small areas is most marked in the case of young stock—particularly calves. Concerning the dangers peculiar to grazing on certain types of country, mention may be made of paddocks particularly subject to blackleg, of swampy and low-lying country likely to favour the development of parasites, and of small areas on which certain markedly noxious plants may be growing. In dangerous areas of the first type, spelling, or better still, cultivation, have been found beneficial; in the second, draining, cultivation, and fencing-off may be utilised; and for the third, either the cutting of the plant or the interference with its accessibility for stock. When the last-named measures are impracticable, much loss may at times be saved if when the stock first get on to the area they are watched carefully and instantly removed on the first sign of sickness. Instances, too, are not wanting where loss has followed the deliberate disregard of warnings issued by competent authorities.

The Home and the Garden.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staff of the Queensland Baby Clinics, dealing with the welfare and care of babies, has been planned in the hope of maintaining their health, increasing their happiness, and decreasing the number of avoidable cases of infant mortality.

THE INFANT'S FOOD.

BEFORE an architect can plan a house he must know something of the properties of timber, bricks, stone, and concrete. Before a mother can plan a wholesome diet for her children she must know something about the properties of common foods. Let us commence with the most important.

Milk.

It is a curious fact that many mothers, when questioned as to their children's diet, will mention every sort of food that they take except the most important. Evidently in their minds milk is not a food, but a drink, to be given perhaps to infants, but to be replaced at an early age by a darker fluid, which they call tea. Even for infants they will often buy a more expensive dried milk in tins "because that is a food you know." For two year olds they think that milk is of little consequence. No wonder we see so many poorly nourished children. These mothers seldom take milk themselves except perhaps a teaspoonful in a cup of tea. Now children are very suggestible. They are profoundly influenced by what they see their mothers do, and by what they hear their mothers say, sometimes even when they are not supposed to be listening. Therefore we are always seeing children who "won't" or "can't" take milk. It is quite true sometimes that the poor child can't take milk, but it is not the child's fault.

Fresh cow's milk properly modified is the best substitute for mothers milk, though not so good; but this is not its only use. Milk and leafy vegetables are the only foods which make up for the deficiencies of the other constituents of our diet—bread, porridge, potatoes, root-vegetables, and meat—at any age. Certainly milk is four-fifths water, but in contact with digestive juices it forms quite a respectable solid, which we call junket. The body-forming food or proteid in human milk is sufficient to enable the infant to double his weight in six months. Much of this gain is fat, but it is not all fat; brain, muscle, bone, heart, and other organs are growing too. Milk contains a sugar, which is only slightly sweet, but is easily assimilated by the baby. More important for the growing child are the fats of milk, which we call butter. They are our main source of the vitamins A and D, and without a liberal supply of these no child can grow properly. Milk again is our main source of lime, which is necessary for the growth of bones and teeth. All children should take a pint of milk a day in one form or another; many would do better with more than a pint. Milk is the one food for which there is no real substitute. It is a sad fact that Queensland is full of children who are more or less milk starved.

Milk is not a complete food for the growing child, but without milk no diet is complete. We should, therefore, take the greatest care of our milk supply. In this respect Australia is a backward country. Milk should be clean; much of our milk is dirty. Milk should be chilled; warm milk soon goes bad. Milk should be boiled or pasteurised. Owing to our long summers we have formed the habit of boiling our milk all the year round. Consequently our children rarely suffer from tuberculosis of the bones and joints, which are more common in other peoples, who have the unclean habit of drinking raw milk. We do not grow many hunchbacks in Queensland. But boiling milk, though a safeguard against disease, will not transform stale dirty milk into clean fresh milk. Milk delivered in clean bottles is protected from road sweepings and other dirt, but putting dirty milk into bottles does not make it any cleaner. Pasteurised milk is not always good milk, but fortunately in Brisbane good pasteurised milk is now obtainable. This is not so

everywhere. But if you can get milk that is fairly clean, not old and stale, bring it to the boil, then keep it cool, it should be good for twelve hours. If kept on ice it should be good for twenty-four hours.

There is still more to be said about milk. For the present we will say to every Queensland mother—be very careful of your milk supply, and give your children plenty of it. This is the foundation of good health.

BREAD-MAKING.

MARGARET A. WYLIE, Inspectress and Organiser Domestic Science, Education Department, Western Australia.*

THE science of bread making involves some knowledge of both Chemistry and Physics. A complete study of this art, therefore, necessitates familiarity with some of the fundamental principles of these sciences. Though bread has been made for countless ages, and has been the staple food of man, its successful making has been really the result of knowledge gained empirically. Modern hygiene has, however, demanded a more definite basis to justify its continuance as the main part of human diet.

Flour.—Of all cereals, wheat yields the best flour for bread. This is due to the fact that it is the only grain which contains the constituent gluten in the proper proportion and of the desired quality essential for turning out light, spongy bread. Flour also contains a large proportion of starch. The following is a simple test of their presence:—A cupful of white flour in a muslin bag, if saturated with water and pressed, leaves a yellowish, tough, elastic substance in the bag, somewhat the size of a walnut. This is the gluten, the starch having been expelled. This experiment gives a rough estimate of the proportion of gluten to starch in a standard flour.

White flours are classified differently in different countries. There is the millers' classification, the classification for commercial convenience in buying and selling, but the housewives' classification is from a very different standpoint, and should be as follows:—

1. Strong or old flour.
2. New flour.
3. Fine flour.
4. Weak or feeble bodied flour.

The first is of a deep, creamy colour, the kind that tumbles in a fluffy light manner out of a bag. If examined with a microscope, its gluten cell walls will be found to be very strong, having power to hold the gases that are formed by the action of yeast. Old flour is dry, and will absorb a large proportion of water.

The second type is whiter than the above and on account of its inherent dampness absorbs less water. It may be noticed that some flours retain their shape when pressed, an invariable sign that the flour is new.

The third, fine flour, is soft and elastic, not spongy and puffy, and producing a smaller loaf to the same proportion of flour. Its gluten is usually plentiful, its flavour in general being fine and "nutty."

Weak or feeble bodied is deficient in gluten, and hence in the capacity to retain the gases produced by the action of the yeast, as well in the power of absorbing moisture.

Strong flours therefore are most suitable for bread, fine flours for Christmas cakes, short pastes and short bread.

Yeast.—The article on jam making showed that various moulds and bacteria were the cause of decomposition and putrefaction of foods, and how the spores of moulds float about in the air. It must be remembered, however, that as well as harmful organisms, the air around furnishes useful bacteria. Wine, vinegar, and cheese are the result of these bacteria, properly employed.

Yeast also enters this category. It is a minute plant of the "fungi" family, so small that one million would cover only one cubic inch. Warmth and moisture speed its growth, its food being the sugar formed from starch. It thrives best at 78 deg. F. Its chief power is that of changing starch to sugar, and then converting the sugar into alcohol and carbonic acid gas. Provided the right food and conditions are given it, yeast propagates rapidly, at the rate of one million per hour.

* In the "Journal of Agriculture," Western Australia.

The gas generated by the action of the yeast is all important in bread making, for it is that which causes the sponge to rise, striving as it does to escape from its imprisonment in the gluten cells. It is possible to classify yeasts thus:—

(*a*) Liquid yeast.
(*b*) Distillers' yeast.
(*c*) German or compressed yeast.
(*d*) Dried yeast.
(*e*) A semi-dried form called putty yeast.

Liquid yeast is cultivated from a mixture of potatoes, sugar, water and hops.

Distillers' or brewers' yeast is a natural type, skimmed from fermented rye.

German or compressed yeast is bought in cakes, chiefly in England or the Continent of Europe. Unfortunately this often spoils in transit through the tropics.

The dried variety is made from hops and potatoes, mixed with starch and pressed into cakes.

The last type is built up in layers of semi-dried yeast.

Hops.—Hops act as an antiseptic, i.e., they help to destroy the power of certain bacteria and prevent thus the propagation of wild yeast. Consequently it is advisable to use yeast made from hops, as the use of poor potatoes and impure materials produces wild yeasts which spoil bread. As well as this negative use, hops improve the flavour of the bread.

To ensure really successful bread the making of yeast should be attended with every care and cleanliness. An old bottle (used before) can be used, but the corks and fittings must be perfectly clean, as the entry of foreign germs tends to spoil the value of the true yeast and start different cultures.

Preparation of Yeast.

Hop Yeast.—1 large potato, 1 pint water, 1 tablespoon sugar, 1 tablespoon flour, 1 teaspoon hops.

Method.—1. Boil potato, add hops while still boiling. Boil twenty minutes.

2. Strain, cool slightly, add flour and sugar.

3. Bottle and cork tightly.

4. The yeast should work in a few hours in a bottle previously used for yeast, twenty-four hours in a new bottle.

5. A fig or a raisin added will make it work more quickly.

Acid Yeast.—A medium-sized potato, 1½ tablespoons sugar, ½ teaspoon citric or tartaric acid, 1 cup warm water, 2 teaspoons flour.

Method.—1. Boil a mashed potato, add other ingredients and sufficient water to keep mixture at cupful.

2. Bottle and cork tightly.

3. Keep in a warm place twelve hours in an old yeast bottle and twenty-four hours (at least) in a new bottle.

White Bread.

Small quantity.—1½ lb. flour, ¾ pint tepid water, 2 tablespoons home-made or 1 level tablespoon brewers' yeast, 2 teaspoons sugar, 1 teaspoon salt.

Method.—1. Sift and warm 1 lb. flour, make a well in the centre.

2. Beat yeast and sugar to a cream.

3. Pour yeast and tepid water into flour and stir to a moist dough. Beat well.

4. Cover and stand in a warm place till the dough doubles its size. (Brewers' yeast takes about one hour and home-made several hours.)

5. Turn to a floured board and knead in the extra ½ lb. flour and salt until the dough is of even texture.

6. Shape into loaves, put into greased and floured tins.

7. Allow to rise in a warm place about half an hour.

8. Cook in a hot oven until the loaf is well risen and brown, then place in a cooler part until the bread is cooked through—thirty to forty minutes in all.

9. When cooked the bread should give a hollow sound when tapped on the bottom.

Wheaten Meal Bread.

1½ lb. whole meal or half wholemeal and half plain flour, 1 tablespoon yeast, 1 teaspoon salt, ¾ pint tepid water, 1 teaspoon sugar.

Method.—Proceed as for white bread, but more moisture, a hotter oven, and longer cooking is required.

The actual baking of bread is perhaps the most important part. With the utmost care in choosing flour, making yeast, and carrying out the correct procedure for mixing, if the oven is not at the right temperature the bread may be spoilt. The scientific baking of bread is to fix the air cells as quickly as possible by means of the hot oven. A novice would do well to test the oven thus:—Place a tablespoon of flour on a saucer for five minutes in the oven. If the oven is—

(*a*) Hot—the flour becomes dark brown.

(*b*) Moderate—the flour becomes a golden brown.

(*c*) Cool—the flour becomes pale brown.

The yeast will go on working or growing in the flour if the oven is too cool, still splitting up the starch and more alcohol is formed, which cannot escape. The bread has then a "beery" taste. If, on the other hand, the oven is too hot and the loaf begins to brown in less than fifteen minutes, a crust is formed and the inside of the loaf remains damp and uncooked.

Abnormal Fermentations.—The normal fermentation in bread making is due to the energy of the yeast plant growing and multiplying in the dough, giving off CO_2 and producing changes which result in making bread palatable and digestible. Other fermentations, however, sometimes occur.

Sticky or sour bread is due to lactic acid bacteria. These are associated with low-grade flour. The germs of these bacteria often lie dormant until essentials, such as warmth and moisture, necessary to their growth, are provided, and they then develop. Injurious germs also appear with yeast. This is sometimes overcome by the use of hops, which assists true yeast to overpower poor yeast. Dirty utensils and troughs harbour injurious bacteria. All crevices and cracks are teeming with unseen life, which reproduce enormously when given favourable conditions.

Musty or mouldy bread is usually noticed only after bread has been cut. This is due to damp flour in which fungi or mould has developed. Bags, containers, &c., holding this flour should be thoroughly scalded and scoured before being used for a fresh supply.

The same procedure should be carried out if bread is what is termed "ropy," or when tiny red marks appear. These, too, are the effects of wild yeasts, which have found their way into the dough.

THE FARM GARDEN.

MATURITY TABLE.

Vegetables vary considerably in the time they occupy in maturing their crop. Climatic conditions, variety, time of the year at which they are planted, class of soil, aspect of the land, and even method of cultivation influence the time taken, but the following table shows approximately the periods that should elapse between sowing and harvesting:—

Name of Vegetable.	Time usually occupied in maturing.*	Name of Vegetable.	Time usually occupied in maturing.*
Artichoke (Jerusalem) ..	5 –6 months.	Melon (Rock)	4 –4½ months.
Beans (Broad)	4½–5 ,,	Melon (Water)	4½–5 ,,
Beans (French)	1¾–2 ,,	Onion	7 –9 ,,
Beet	2½–3 ,,	Parsnip	5 –6 ,,
Cabbage	3 –5 ,,	Peas	3 –4 ,,
Carrot	2½–3½ ,,	Potatoes	3 –4 ,,
Cauliflower	4 –6 ,,	Pumpkin	3 –4 ,,
Celery	5 –6 ,,	Radish	3 –4 weeks.
Cucumber	2– 3 ,,	Shallot	3 –4 months.
Endive	2 –2½ ,,	Silver Spinach Beet ..	1¾–2½ ,,
Leek	4 –5 ,,	Tomatoes	4 –5 ,,
Lettuce	2 –2½ ,,	Turnip (White) ..	2½–3 ,,
Marrow	1¾–2 ,,	Turnip (Swede) ..	4½–5 ,,

* Approximate only, and in the case of crops that bear over an extended period calculated up to the commencement of harvesting.

Farm Notes for May.

Field.—May is usually a busy month with the farmer—more particularly the wheatgrower with whom the final preparation of his land prior to sowing is the one important operation. Late maturing varieties should be in the ground by the middle of the month at the latest.

Clover land, intended primarily for feeding off, should be sown not later than the end of April.

The necessity of pickling all wheat intended for sowing purposes is again emphasised; and for general purposes, combined with economy in cost of material, the bluestone and lime solution holds its own. To those who desire an easier but somewhat more costly method of treatment, carbonate of copper at the rate of 1 oz. to the bushel and used in a dry form is suggested.

Potatoes, which in many districts are still somewhat backward, should have by this time received their final cultivation and hilling-up.

The sowing of prairie grass on scrub areas may be continued, but should be finished this month. This is an excellent winter grass, and does well in many parts of Southern Queensland.

Root crops, sowings of which were made during April, should now receive special attention in the matter of thinning out and keeping the soil surface well tilled to prevent undue evaporation of moisture.

Every effort should be made to secure sufficient supplies of fodder for stock during the winter, conserved either in the form of silage or hay.

Cotton crops are now fast approaching the final stages of harvesting. All consignments to the ginnery should be legibly branded with the owner's initials. In this matter the consignor is usually most careless, causing much delay and trouble in identifying parcels, which are frequently received minus the address labels.

Orchard Notes for May.

THE COASTAL DISTRICTS.

In these notes for the past two months the attention of citrus-growers has been called to the extreme importance of their taking every possible care in gathering, handling, packing, and marketing, as the heavy losses that frequently occur in Southern shipments can only be prevented by so treating the fruit that it is not bruised or otherwise injured. It has been pointed out that no citrus fruit in which the skin is perfect and free from injury of any kind can become speckled or blue-mouldy, as the fungus causing the trouble cannot obtain an entry into any fruit in which the skin is intact. Growers are, therefore, again warned of the risk they run by sending blemished fruit South, and are urged to exercise the greatest care in the handling of their fruit. No sounder advice has been given in these notes than that dealing with the gathering, handling, grading, packing, and marketing, not only of citrus, but of all other classes of fruit.

It is equally important to know how to dispose of fruit to the best advantage as it is to know how to grow it. To say the least, it is very bad business to go to the expense of planting and caring for an orchard until it becomes productive and then neglect to take the necessary care in the marketing of the resultant crop. Main crop lemons should be cut and cured now, instead of being allowed to remain on the tree to develop thick skins and coarseness. As soon as the fruit shows the first signs of colour or is large enough to cure down to about from 2¼ to 2½ in. in diameter, it should be picked, care being taken to handle it very gently, as the secret of successfully curing and keeping this fruit is to see that the skin is not injured in the slightest, as even very slight injuries induce decay or specking. All citrus fruits must be sweated for at least seven days before being sent to the Southern States, as this permits of the majority of specky or fly-infested fruits being rejected. Citrus trees may be planted during this month, provided the land has been properly prepared and is in a fit state to receive them; if not, it is better to delay the planting till the land is right.

In planting, always see that the ground immediately below the base of the tree is well broken up, so that the main roots can penetrate deeply into the soil and not run on the surface. If this is done and the trees are planted so that the roots are given a downward tendency, and all roots tending to grow on or near the surface are removed, the tree will have a much better hold of the soil and, owing to the absence of purely surface roots, the land can be kept well and deeply cultivated, and be thus able to retain an adequate supply of moisture in dry periods. Do not forget to prune well back when planting, or to cut away all broken roots.

All orchards, pineapple and banana plantations should be kept clean and free from all weed growth, and the soil should be well worked so as to retain moisture.

Custard apples will be coming forward in quantity, and the greatest care should be taken to see that they are properly graded and packed for the Southern markets, only one layer of one sized fruit being packed in the special cases provided for this fruit—cases which permit of the packing of fruit ranging from 4 to 6 in. diameter in a single layer.

Slowly acting manures—such as meatworks manure—may be applied to orchards and vineyards during the month; and lime can be applied where necessary. Land intended for planting with pineapples or bananas during the coming spring can be got ready now, as, in the case of pineapples, it is a good plan to allow the land to lie fallow and sweeten for some time before planting; and, in the case of bananas, scrub fallen now gets a good chance of drying thoroughly before it is fired in spring, a good burn being thus secured.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Clean up all orchards and vineyards, destroy all weeds and rubbish likely to harbour fruit pests of any kind, and keep the surface of the soil well stirred, so as to give birds and predaceous insects every chance to destroy any fruit fly pupæ which may be harbouring in the soil. If this is done, many pests that would otherwise find shelter and thus be able to live through the winter will be exposed to both natural enemies and cold.

Further, it is a good plan to clean up the land before pruning takes place as, if delayed till the pruning has been finished, the land is apt to dry out in a droughty season.

Pruning can be started on such varieties as have shed their leaves towards the end of the month, as it is a good plan to get this work through as early in the season as possible, instead of putting it off until spring. Early-pruned trees develop their buds better than those pruned late in the season. These remarks refer to trees—*not vines*, as the later vines are pruned in the season the better in the Granite Belt district, as late-pruned vines stand a better chance to escape injury by late spring frosts.

All worthless, badly diseased, or worn-out trees that are no longer profitable, and which are not worth working over, should be taken out now and burnt, as they are only a menace and a harbour for pests.

Land intended for planting should be got ready as soon as possible, as, if ploughed up roughly and allowed to remain exposed to the winter frosts, it will become sweetened and the trees planted in it will come away much better than if set out in raw land. In any case the land must be properly prepared, for once the trees are planted it is a difficult matter to get the whole of the land as well worked as is possible prior to planting.

Slowly acting manure—such as ground island phosphates or basic phosphates—may be applied to orchards and vineyards. They are not easily washed out of the soil, and will become slowly available and thus ready for use of the trees or vines during their spring growth. Lime may also be applied where necessary.

This is a good time to attend to any drains—surface, cut-off, or underground. The two former should be cleaned out, and in the case of the latter all outlets should be examined to see that they are quite clear and that there is a good getaway for the drainage water. New drains may also be put in where required.

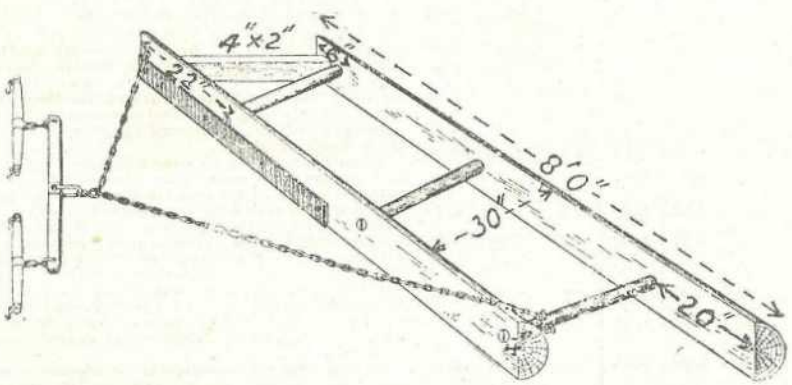
In the warmer parts citrus fruits will be ready for marketing, and lemons ready for cutting and curing. The same advice that has been given with respect to coast-grown fruit applies equally to that grown inland; and growers will find that careful handling of the fruit will pay them well. Lemons grown inland are, as a rule, of superior quality to those grown on the coast, but are apt to become too large if left too long on the trees, so it is advisable to cut and cure them as soon as they are ready. If this is done and they are properly handled, they may be kept for months, and will be equal to any that are imported.

If the weather is very dry, citrus trees may require an irrigation, but, unless the trees are showing signs of distress, it is better to depend on the cultivation of the soil to retain the necessary moisture, as the application of water now is apt to cause the fruit to become soft and puffy, so that it will not keep or carry well.

Land intended for new orchards should be got ready at once, as it is advisable to plant fairly early in the season in order that the trees may become established before the weather again becomes hot and dry. If the ground is dry at the time of planting, set the trees in the usual manner and cover the roots with a little soil; then give them a good soaking; and, when the water has soaked into the soil, fill the hole with dry soil. This is much better than surface watering.

THE SPLIT-LOG DRAG.

The designer of this drag states that one great mistake sometimes made is in building the drag too heavy. It should be so light that one man can lift it easily, when it will respond readily to different methods of hitching, and to the changing of the position and weight of the operator. Another mistake is in using squared timber, instead of that with sharp edges so that the cutting effect of the latter is lost. The log should be 7 feet or 8 feet long (Fig. 1), and from 10 inches to 12 inches in diameter, and carefully split down the middle. The heaviest and best slab should be selected for the front. Four inches from one end and 22 inches from the other end of the front slab 2-inch auger holes are bored to receive two stakes, which hold the slabs 30 inches apart. The auger-holes are bored in the back slab at 6 inches from the gutter end and 20 inches from the road-centre end. A third stake is put midway between the other two. The stakes should taper both ways from the centre without any shoulder, and be tightly wedged in position. A 4 by 2 brace should be placed diagonally to the stakes at the gutter-end, lower edge at front



1 inch from the ground, the other end resting in the angle between the slab and end stake. A strip of iron about 3½ feet long, 3 inches or 4 inches wide, and ¼ inch thick, is often placed at the gutter-end for a blade. It should be fastened ½ inch below the lower edge of the slab at the outer end and flush with the edge of the slab at the other end. If the face of the slab is perpendicular, the blade should be given a set like a plane by means of wedges. A platform of 1 inch boards spaced 1 inch apart by cleats should be placed on the stakes. The chain should be fastened round the end of the stake at the road-centre end, so that the earth can drift past the face of the drag. The other end of the chain passes through a hole in the front slab, and is held by a pin through a link. The clevis should be fastened towards the blade end of the chain to force the drag to follow the team at an angle of 45 degrees to the line of draught. The driver rides in the line of draught, as a rule. The distance from the drag at which the team is hitched affects the depth of cutting. A short hitch lifts the drag, a long hitch causes the blade to cut more deeply. This is regulated by lengthening or shortening the end running through the hole in the slab. By shifting his weight, the driver can regulate the cutting, get rid of weeds, or deposit earth in a hollow. As a rule, two horses are sufficient on an ordinary earth road. It works best when the earth is moist but not sticky. When a road is badly rutted, it may be well to use the drag once while the ground is slushy.

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.

	April, 1931.		May, 1931.		MOONRISE. April, 1931.	May, 1931.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	6.5	5.47	6.21	5.17	4.51	4.33
2	6 6	5.46	6 22	5.16	5.29	5.11
3	6.6	5.45	6 23	5.16	6.4	5.47
4	6 7	5.43	6.23	5.15	6.40	6.43
5	6 7	5.42	6.24	5.15	7.19	7.40
6	6.8	5.41	6.24	5.14	8.6	8.38
7	6 8	5.40	6 25	5.13	8.58	9.37
8	6 9	5.39	6.25	5.13	9 54	10.34
9	6 9	5.38	6.26	5.12	10.51	11.31
10	6.10	5.37	6.26	5.11	11.48	...
						a.m.
11	6.10	5 36	6.27	5.10	...	12.27
					a.m.	
12	6.11	5.35	6 28	5.9	12.44	1.21
13	6.11	5 34	6 28	5.8	1.41	2.12
14	6.12	5 33	6 29	5.7	2.36	3.3
15	6.12	5.32	6.29	5.7	3.27	3.54
16	6.13	5.31	6 30	5.6	4.14	4.49
17	6 13	5.30	6 30	5.6	5.10	5.49
18	6.14	5.29	6 31	5.5	6.3	6.48
19	6.14	5.28	6 32	5.5	6.59	7.49
20	6.15	5.27	6 32	5.4	7.56	8.48
21	6.15	5.26	6.33	5.4	8.56	9.47
22	6.16	5.25	6.34	5.4	9.55	10.43
23	6.16	5.24	6.35	5.3	10.55	11.33
						p.m.
24	6.17	5.23	6.35	5.3	11.52	12.14
					p.m.	
25	6.17	5.22	6.36	5.2	12.45	12.49
26	6.18	5.21	6 36	5.2	1.33	1.24
27	6.18	5.21	6.37	5.1	2.14	1.56
28	6.19	5.20	6.37	5.1	2.50	2.29
29	6.19	5.19	6.37	5.1	3.23	3.6
30	6.20	5.18	6.38	5.0	3.57	3.45
31	...	...	6.38	5.0	...	4.32

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 somewhat 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.

3 April	○	Full Moon	6 5 a.m.
10 „	☽	Last Quarter	6 15 a.m.
18 „	●	New Moon	10 59 a.m.
25 „	☾	First Quarter	11 40 p.m.

Jupiter may be looked for between five and six degrees south of the Moon soon after midday on the 24th by those interested in a daylight observation. Both will be near the eastern horizon about 23 degrees north.

Mercury will set at 6.28 p.m. at Warwick on the 1st, and at 6.19 p.m. on the 15th.

Venus will rise at 3.3 a.m. on the 1st, and at 3.22 a.m. on the 15th.

Mars will rise at 2.22 p.m. and set at 12.40 a.m. on the 1st: on the 15th it will rise at 1.39 p.m. and set at 12.6 a.m.

Jupiter will rise at 12.59 p.m. and set at 11.17 p.m. on the 1st; on the 15th it will rise at 12.10 p.m. and set at 10.34 p.m.

Saturn will rise at 12.8 a.m. and set at 1.42 p.m. on the 1st; it will rise at 11.10 p.m. and set at 12.49 p.m. on the 15th.

The Southern Cross will be at position IX. about 6 p.m. on the 1st, and will be upright about midnight. At the end of the month these positions will be reached two hours earlier.

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3 May.	○	Full Moon	3 14 p.m.
9 „	☽	Last Quarter	10 48 p.m.
18 „	●	New Moon	1 27 a.m.
25 „	☾	First Quarter	5 38 a.m.

Apogee, 12th May, at 11.18 a.m.
Perigree, 28th May, at 2.18 a.m.

The Moon will occult Tau Sagittarii early in the morning of the 7th. In places as far north as Hughenden observers should be on the look-out before 4 a.m. with telescope or binoculars. At Brisbane, Toowoomba and Warwick, the Moon being almost directly overhead, observers using refracting telescopes without a diagonal eyepiece, will be at much disadvantage.

When Taurus, with its famous groups of Pleiades and Hyades, has sunk below the western horizon with the setting of the Sun on the 20th, the Moon will mark an adjoining constellation, Auriga, the charioteer, who holds a goat on his left arm, where the fine star Capella indicates its position near his left shoulder. The bright stars Castor and Pollux, the twins, will then be higher up eastwards.

Mercury, which was invisible in the early part of the month, having been in inferior conjunction with the Sun on April 30th (on the near side of its orbit), will reach its greatest altitude, 25 degrees, before sunrise on the 27th.

On the 31st the occultation of Sigma Scorpii, magnitude 3, will occur early in the evening. Between 3 and 4 hours later Antares, the principal star in Scorpio, will be occulted, if viewed from places north of Bundaberg and Tambo.

The Moon's apparent path amongst the stars in May will be: In Virgo on the 1st, through Libra on the 2nd and 3rd, through Scorpio to the 4th, Orphincus et Serpens to the 5th, Sagittarius from the 5th to the 8th, Capricornus to the 10th, Aquarius to the 12th, in Pisces to the 15th, in Aries to the 17th, in Taurus and Auriga to the 21st, in Cancer to the 23rd, in Leo to the 26th, in Virgo to the 30th, in Libra and Scorpio to the 31st.