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# QUEENSLAND AGRICULTURAL JOURNAL

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PART 3.

## Event and Comment.

### The Brisbane Show.

**S**PEAKING at one of the official functions of Exhibition week, His Excellency the Governor-General, Lord Stonehaven, said that the Brisbane Show played an invaluable part year by year in helping the producer, and in doing that it carried out precisely the work which the Royal Agricultural Society is doing in Britain. That society had been incorporated only in 1840, and it was universally admitted that the immense improvement in the breeding of stock and the standard of agricultural products had been greatly stimulated by its work and influence. It had encouraged the formation of other societies throughout the old country in exactly the same way as the Royal National Association of Queensland had done, and it had set up a standard that had led to an improvement nothing else could have achieved. And the parallel did not cease there. It afforded scope for the carrying out of a tradition which had existed for many centuries in the old country, that the ownership of land involves the discharge of a great deal of onerous unpaid work. When he thought of Mr. Baynes and of his colleagues on the council of the National Association, and the splendid work they were doing for the State of Queensland, for Australia, and for the Empire, he felt they were fully entitled to the proud privilege of carrying on those British traditions. And even that was not the end of the parallel. It had been claimed for the Royal Agricultural Society that it encouraged practical farming on sound scientific principles. In these days of efficiency nothing but the best was good enough, and that was what the Royal National Association of Queensland, following the same lines as the Royal Agricultural Society of Britain, was helping this State and the Commonwealth to achieve.

### A Problem to Solve.

CONTINUING, Lord Stonehaven said that the next stage to be reached was really one outside the scope of such associations. When he saw such excellent products as were displayed at their shows—tropical fruits and other products—and realised that they could not produce enough of them to supply the demand, it was evident to him that they had a problem to solve. He looked forward to the day when they would make as big and as concentrated an effort on the packing, shipping, and the marketing of their products as they now were concentrating on the producing of them.

### The Position of the Commonwealth—An Optimistic Outlook.

LORD STONEHAVEN went on to say that if they read the newspapers they would come to the conclusion that Australia was passing through a bad time. Now, he would suggest to them that that was only true in a relative sense. The latest available figures showed that Australia last year had 106,115,100 sheep, or 10,000,000 more than the average of the last six years, and from that it would appear that the wool industry was not in a really bad position. Then there was a good deal heard about a drop in the price of wool. He had read that it was estimated that the clip for 1929-30 was likely to be 100,000 bales less than last year, and the same industrious people who had worked out those figures said that if the price remained the same as it was at the end of last season the value of the clip would be £3,000,000 less than the average for the last five or six years, which was £53,000,000. But even with that reduction it would be more than £20,000,000 above what it was before the war. So, although there certainly had been a drop in the price of wool, he would suggest that there was no cause for pessimism, and that the optimistic view which had been taken by representative men who had come from overseas to investigate conditions in Australia was fully justified. There were other points that might be regarded as distinctly cheering. The exports of Australian mutton and lamb last year, for instance, were 85 per cent. in value higher than in the previous year. The exports of beef were 22 per cent. higher, and of butter and cheese 10 per cent. higher. Australia exported £20,000,000 worth more wheat last year than in the year before, the crop being the third largest in the history of the Commonwealth, and the value of the wheat exported was 40 per cent. more than that of the previous year. When they read figures that seemed to be depressing, he hoped they would take into consideration the more cheering points to which he had referred. It must be remembered that there was no industry in which more ups and downs were experienced than that of the pastoralist or the farmer, and, taking all things into consideration, there was no room for gloom or depression, because things were not so bad to-day as they were a few years ago.

### The Call of Country Life.

AT the same function His Excellency the State Governor, Sir John Goodwin, said it was always a delight both to Lady Goodwin and himself to attend the Brisbane Show. They both learned a great deal from what they saw there, and it was a keen pleasure to them to meet their friends, old and young, from all over the country. All his life he had been devoted to the land and to the work of the farmer; but unfortunately his duties had taken him abroad, and his work in the army had prevented him from seeing as much of it as he would have liked to do. With regard to the dairy cattle and the exhibit in the meat hall, he would say without hesitation that they compared favourably with anything that could be seen in any part of the world. The district and family exhibits he had always considered to be very valuable indeed. He saw one exhibit on the previous day the exhibitor of which had been second for seven years in succession, but this year he had come out on top. That was typical of Queensland and its people—to go on trying until finally victory was attained. He regarded the annual shows as especially valuable from an educational point of view and for the encouragement given to science. Its educational value indeed was beyond all words. He had been greatly interested in the farm boys' camp, in which twenty-seven boys from all parts of the State were taking part and showing themselves most eager to work and to learn all they possibly could. He was pleased to find that the boys were students from Gatton College and undergraduates from the University.

### Our Reliance on Rural Industry.

THE Premier, Hon. A. E. Moore, met with a rousing reception on the same occasion. He said he thought he had made it quite clear in his public utterances for some time past that he considered that the progress and prosperity of Queensland was dependent to a very great extent on the industry and enterprise of its rural

population. Consequently, he thought any association that was doing what was in its power to stimulate and encourage the producer in his work was rendering a real service to the community.

The farmer also who produced seed which would yield better crops was serving a like good purpose. Not only were they reaping a benefit for themselves, but, by distributing that better stock or better seed throughout the length and breadth of Queensland, their action must have an ever-widening effect for the benefit of all. The National Association was doing splendid work in giving encouragement to such enterprise.

It had been said by people who should know that if the knowledge already gained could only be made of general application it should be possible, by the top-dressing of the pastures, to increase the productive capacity of the pastoral lands. By such means as this, by the use of licks as an adjunct to the stock foods, and by the application of other scientific discoveries the wealth of Australia would be doubled. The Royal National Association was putting forward the results attained by the few with the object of encouraging the many to follow the good example set.

So far as the Government was concerned, he did not think it could be better employed than in encouraging scientific research for the combating of pests and for increasing the productive capacity of the land generally.

### The Council of Agriculture—Lessons of Farmer Organisation.

**T**HE Minister of Agriculture and Stock, Hon. Harry F. Walker, was elected unanimously to the presidency of the Council of Agriculture at its recent annual meeting. On taking the chair, Mr. Walker expressed his appreciation of the action of the Council of Agriculture in electing him as its president. He regarded the occupancy of the presidential chair as an honour accorded to him by farmer leaders with whom he had been associated for many years. There were three reasons particularly which led him to especially value the honour, and they were, firstly, because he was a farmer himself; secondly, because he had learnt the value of co-operative organisation in the hard school of experience; and thirdly, because, as Minister of Agriculture, he realised the value of personal contact with the representatives of the producers in the study of their problems.

As a farmer, he knew the difficulties attendant upon any phase of primary production. He had personally experienced all that is entailed in the carving of a holding out of the bush—the climatic diversity and perversity, the disappointments, the marketing complexities and perplexities, and all that is involved in the life of the man on the land. Because of that experience he would always be able to understand the viewpoint of the individual farmer, and welcomed the opportunity of service which direct association with their organisation would give him.

As a dairyman and as one who held the chairmanship of one of the leading co-operative dairy companies for many years, he understood the value of co-operative organisation. He had taken part in its preliminary organisation, which was followed by the successful establishment of a large manufacturing plant; and afterwards it was his privilege to join in the binding together of the co-operative factories themselves. The work of the Co-operative Dairy Companies' Association thus formed, and of the Butter Pool and of the Paterson Stabilisation Committee, had only to be mentioned to a gathering of producers to bring about a realisation of what their activities had meant in pounds, shillings, and pence to the dairymen. Similarly, in other branches of rural industry many instances could be given of the value of co-operative combination. Inasmuch as he had been associated with co-operative enterprise in the past, he hoped to be able to continue to place whatever influence he possessed on the side of any co-operative organisation formed and controlled by farmers. He had been given an assurance that the activities of the several units of the Queensland Producers' Association, of which the Council of Agriculture is the executive body, are of a strictly non-political character. He had also been assured that the organisation is functioning along co-operative and economic rather than political lines. He hoped the organisation would remain non-political always, and his acceptance of the position of president had therefore no political significance.

As Minister of Agriculture, he knew how necessary it was to establish close contact with the farmers and the associations they had established for their protection and betterment. He felt that his position of President of the Council of Agriculture would assist him in maintaining that contact. With an understanding of the actual view of the man on the land regarding some of his problems, he hoped to be able to deal with any aspect of those problems presented to him as Minister intelligently and sympathetically, and in that way continue the goodwill between himself and his Department on the one hand and the farmers and their organisations on the other.

## Bureau of Sugar Experiment Stations.

### ENTOMOLOGIST'S ADVICE TO CANEGROWERS.

By EDMUND JARVIS.

The common cane pests in evidence during this month are usually limited to the "weevil borer," termites (white ants), army worms, and grasshoppers.

#### The "Weevil Borer" or "Cane Borer."

Unfortunately, this insect is, perhaps, only too well known to many of our growers. It is a slender, dark-brownish, reddish-brown, or dark-grey coloured beetle about three-quarters of an inch long, having its head produced into a prominent beak-like snout. Although able to fly well during nightfall, its movements by day, when cut out of a cane stick, are always slow and clumsy, and upon falling to the ground it will often sham death for several seconds before trying to crawl under cover. Signs of its presence in a cane stick are indicated by clearly cut small holes or fissures in the rind; these being found mostly at the basal portion of canes, although in cases of severe attack the tunnels and holes made by these weevils may extend more or less, throughout the affected stick.

Artificial methods of fighting them are trapping or collecting the beetles, trashing the cane to admit more wind and light, &c. Happily, however, a more simple remedy has been found by enlisting the services of a natural parasitic enemy which destroys the grub or larval form of this pest.

These useful flies will be liberated by officers of the Sugar Bureau, free of cost, on plantations harbouring weevil borers. Application for a consignment of such parasites should be made to the Entomologist at Meringa Experiment Station, near Cairns.

#### Termites or "White Ants."

Growers north of Townsville occasionally meet with white ants eating their cane setts or nesting amongst the roots of old ratoons. Such trouble, as a rule, only occurs on newly-cleared land planted for the first time. Fumigation of the affected soil with carbon bisulphide, and of any subterranean nests or conical anthills chancing to exist in the immediate vicinity with ordinary benzine, can be recommended as being suitable remedies.

#### "Army Worms" or "Caterpillar Plague."

Little trouble is likely to arise from the activities of this moth pest until the end of the present month (September). Growers should, nevertheless, keep a sharp lookout for indications of damage to their young ratoons or plant cane by leaf-eating caterpillars, with a view to preventing entire destruction of the foliage. This Experiment Station is now provided with very efficient spraying apparatus, suitable for combating any species of "grass caterpillars," "army worms," or leaf-eating beetles, &c. Timely notice should be made to the Entomologist of all outbreaks of such nature which may occur here, in order that remedial measures may be undertaken with the least possible delay.

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### DISEASE SURVEY IN PROSERPINE DISTRICT.

*The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (20th August, 1929) from the Pathologist, Mr. A. F. Bell:—*

The Division of Pathology is now carrying out a disease survey of the Proserpine district. A total of 112 farms has been inspected, and the survey completed in the Breadalbane, Glen Isla, Waterson, and Banana Pocket sections, and practically completed in the Up River and Hamilton Plains sections. In general, the disease situation is satisfactory, except for the large amount of Mosaic on the farms in the Proserpine River district. This disease was found on the majority (43) of the farms in the neighbourhood of the river; the percentage infection is

highest in the fields right on the river bank, and decreases as the distance from the river becomes greater. Mosaic was also found on three or four farms at Banana Pocket, and is known to occur to some extent at Conroy.

Mosaic disease is the most common of the important cane diseases of the world, and in the past twenty years has been responsible for disastrous losses in a number of countries. It is spread from plant to plant by an aphid which lives on corn, sorghum, &c., and a number of wild grasses. The spread is rapid close to the river bank on account of the large amount of grass there providing a favourable breeding ground for the aphid. The main measures to be adopted for the control of Mosaic disease are (1) The careful selection of disease-free cane for planting purposes; (2) careful inspection of the plant cane and the uprooting of any diseased stools found; and (3) cultivation to keep the fields as free from grass and weeds as possible.

Red Rot is also common throughout Proserpine, especially in the variety H.Q. 426. This disease may be controlled in part by the selection of seed, and any sets showing a red discoloration should not be planted.

Downy Mildew, or leaf stripe, was found in one field of B. 208. This variety is very susceptible to both Mosaic and Downy Mildew, and should not be planted except on the advice of the officers of this Bureau.

The selection of seed cane is one of the most important aspects of canegrowing and should be carried out by the farmer himself. In the case of Mosaic, when infection is light seed selection is a simple matter, but when the percentage infection is over about 5 per cent. the seed cane should be purchased from a disease-free farm.

For the purposes of ensuring a supply of disease-free cane for planting purposes, the value of the farm nursery cannot be over-estimated. The farm nursery should be planted up each time with disease-free cane, and the resultant plant cane should be inspected frequently, and any suspicious stools removed. The nursery should be kept free from weeds and given the best possible tillage and fertilisation. If the nursery is removed some distance from the rest of the farm so much the better. A plan for the layout of a farm nursery and propagation field is given in the "Queensland Agricultural Journal" for June, 1929 (page 400).

Any farmers desirous of purchasing cane for plants are advised to get in touch with the Cane Inspector or the Secretary of the Canegrowers' Association, as the Bureau has furnished these officials with lists of the farms on which least disease was found.

## CANE PESTS AND DISEASES.

*The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (6th August, 1929) from Mr. A. N. Burns, Assistant Entomologist, Mackay:—*

### **The Golden Beetle (*Calloodes mastersi* Macleay), in the Mackay District.**

This rather showy beetle is recorded as ranging from the Ingham district to somewhere about St. Lawrence; it is, however, very plentiful in some seasons in parts of the Mackay district, also on the Lower Burdekin, and often very abundant around Ingham. Some years ago in the area round the Macknade Mill (Ingham) they were collected by beetle gatherers and paid for by the Local Pest Destruction Board, at the rate of 1s. 6d. per quart, but at that time and until quite recently there was no actual evidence that their grubs attacked cane roots.

In the Ingham area the beetles are recorded as feeding on the leaves of bamboos and the introduced "pink burr" which is so plentiful along cane headlands, roadways, &c. In the Ayr district their favourite feeding-tree appears to be a large-leaved, soft-wooded tree or shrub which much resembles the wild tree hibiscus (*H. tiliaceus*), whilst in the Mackay district their feeding-tree is the prickly cork tree (*Erythrina verspatilia*), sometimes called the "bat-wing" leaved tree on account of the peculiar shape of the leaves, which somewhat resemble a bat with its wings half expanded. As far as the writer has observed, this tree appears to be the only feeding-tree of this beetle in this district. The beetles sometimes occur so plentifully as to completely defoliate one of these trees in the course of a few days. Normally the beetles fly about Christmas time, and during the past season they were in full flight by the 24th December, 1928, and they remained in evidence till the middle of January.

### Habits of the Beetles.

These beetles appear to revel in sunshine, for, when watched on one of their feeding-trees where they were in hundreds, they were in a state of constant activity whilst the sun shone, and were flying from twig to twig, but if the sun became obscured by a cloud, they quietened down considerably. They are rapid and voracious feeders; one of the trees that was under observation was about 14 feet high, with dense and fairly spreading foliage, and it was completely denuded of leaves within a few days. Mating takes place in the daytime on the feeding-trees, the male resting on the back of the female. This act apparently takes some time, because many pairs thus observed remained so during the whole period of observation, which was considerably over half an hour. Any sudden jar or movement of the twigs or leaves causes the beetles to take to wing; they however soon settle again and recommence feeding. They do not appear to be readily attracted to artificial lights, as only occasional examples flew to light, whilst collecting beetles with a lantern, and these were invariably males. An odd specimen could sometimes be collected from under the electric lights at the street intersections.

That the grubs of this beetle attack cane has been definitely proved by the writer during both the 1928 and the present season. Whilst making a grub survey at Mount Jukes on 22nd February, 1928, grubs were obtained at cane roots. At first they were thought to be grubs of the Pentodon beetle, but when taken to the Laboratory and bred through, proved to be those of the Golden beetle. Grubs are at present being bred at the Laboratory, and are feeding freely on cane sets and roots; the nature of the injury is very similar to that occasioned by grubs of the Christmas beetle (*A. boisduvali* Bsd.). These grubs appear to favour fairly heavy scrub soils; where they were collected at Mount Jukes the cane was growing in rich scrub land. At the Laboratory also grubs in cages containing heavy soil appeared healthier and grew faster than those caged in sandy soil.

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*The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (16th August, 1929) from the Assistant Entomologist at Mackay, Mr. A. N. Burns, for the month ended 12th August:—*

### Bandicoots in Canefields.

Whilst making inspections of cane farms for insect pests, farmers frequently ask the question "Is the bandicoot a friend or an enemy?" Many growers hold differences of opinion regarding this point. It is true that in almost every canefield there are indications of their excavations at cane stools, but these diggings are invariably greatest and most numerous in patches of cane where grubs are prevalent.

Growers are often of the opinion that the exposure of the cane roots and partial undermining of the stools tends to cause withering of the cane, and, in extreme instances, to lose its anchorage with the soil, and thus fall over. The latter condition would, in the writer's opinion, be hardly possible without the assistance of grubs, when the roots that were not exposed through the bandicoots' diggings would also be destroyed. No doubt several holes made round a stool by these animals would tend to allow moisture to evaporate away from the roots.

The diet of the bandicoot appears to be very varied, perhaps some roots are eaten whilst the animal is excavating at a stool, but the amount of injury thus caused would probably ensue as a result of grub injury; therefore, if the bandicoot destroys two or even one grub at each stool, the good done by the destruction of those grubs at least compensates for the amount of root injury done. On the other hand, there are many growers who regard the bandicoot only as a friend, their explanations for this being that the only places on their farms where the work of these animals occurs is in the patches that are attacked by grubs. In the experience of the writer, certainly by far the greatest number of "excavated stools" has been observed in areas where grubs were attacking the cane. These animals are said to be possessed with a very keen sense of smell, which enables them to locate the presence of grubs in the soil.

The following extract from Bulletin No. 13, 1921, Bureau of Sugar Experiment Stations, gives the following remarks with regard to the stomach contents of a bandicoot. A specimen was dissected and the stomach contents examined; these contained "a cutworm larva, five unknown caterpillars, four locusts (winged grasshoppers), one centipede, two large and eight small spiders, two slugs, a small beetle, many small ants, three large ants, eight large crickets and six small ones,

sixteen legless beetle grubs, similar to those of the cane beetle borer or New Guinea borer, numerous portions of ground beetles, and remains of other insects. Some portions of vegetable matter were found as well; these included a piece of bark, three small roots, a couple of bits of grass, two leaves of some weed, and a small piece of dry stick."

It is quite possible that the bark, leaves, and wood were eaten with the insects—perhaps swallowed by accident—whilst the bandicoot was foraging for insect foods.

It may be seen from this examination that the majority of the stomach contents was insectivorous; this particular examination, too, it is recorded, was made at the time of year (July) when insects are comparatively scarce.

In June and July cane grubs, both of the greyback and Frenchi beetles, burrow downwards to form their pupal or resting cells. This would likely account for no grub remains being discovered in the stomach contents that were examined. In the same Bulletin (No. 13, 1921) reference is made to examinations made of the stomach contents of bandicoots during the month of March when cane grubs are always prevalent. This further record states—"These examinations showed a strong preference for this pest (i.e., cane grubs), because the stomach contents were usually well supplied with the chitinous (heads) remains of cane grubs, and no plant tissues."

Bandicoots in Victoria frequently dig holes into rotten logs and stumps, or round the roots of very old and rotten trees, in the search for beetle grubs which are plentiful during the spring and summer months in such situations. The writer has also occasionally observed their excavations in the large nests of some of the large sugar ants (*Campanotinae*) and bulldog ants (*Myrmecinae*).

It is really only during a great scarcity of insects that bandicoots might partake of any appreciable amount of vegetable food; but in a sub-tropical or tropical climate such as exists in the Queensland canegrowing areas, insects of some kind are always more or less plentiful at every month of the year, therefore the good done by these animals may assuredly be considered in excess over the destruction sometimes attributed to them.

#### Large Moth Borer (*Phragmatiphila truncata* Walk.)—Injury to Mature Cane.

Several inquiries have recently come to hand from farmers who were engaged in cutting plants, of "ring-necked sticks," the ring neck or borer tunnel round the stick usually occurring just above or below the nodes. Tunnelling may also occur in the internodes, but in these situations it is usually longitudinal instead of horizontal.

The softer varieties of cane such as H.Q. 426 (Clark's Seedling) and B. 208 are particularly susceptible to attack from these borers, and inspections made during the past month on farms where these varieties were growing revealed in one or two instances appreciable injury. It is usually the outer cane rows adjoining the headlands or fences that are subjected to the worst attack. Other varieties of cane are also injured by these borers, but not to nearly so great an extent as the two abovenamed varieties.

When cutting cane for plants care should be exercised to exclude any "bored plants" as these would possibly not strike, but would simply rot or ferment in the ground as a result of the damage caused to their tissues.

At this time of year practically all the injury done to cane by these caterpillars is confined to the mature sticks; now that cutting has commenced and young ratoons will soon be appearing, growers should keep a lookout for the appearance of "dead hearts" in the young cane shoots. As a rule, young plant cane does not appear to be quite so seriously attacked as ratoons, though it often suffers considerable damage. The reason that young ratoons are slightly more susceptible to injury from these borers is owing to the fact that the point of entry of the caterpillar into the shoot is usually in the side and near the basal portion of the shoot; in plant cane this part is mostly between the ground surface and the point of attachment with the set, whereas in ratoons considerably more of the lower parts of the shoots are exposed or aboveground.

Natural parasites—the principal one of which is a minute Braconid wasp—that infest the caterpillar stage of this insect, do not apparently exert much control as shown by breeding out a large number of specimens at the laboratory last year. The examples that were kept under observation were collected from a field of H.Q. 426 first ratoons, where the percentage of attacked shoots in three particular rows was estimated to be 70 per cent. No parasites emerged from the caterpillars collected from these rows.

The earliest indications of the presence of moth borer caterpillars in young shoots is a shrivelling of the central folded leaves, followed by a wilting and complete dying. When dead, if pulled gently these central shoots will come away, and if examined the lower part will be seen to be eaten through and rotten. It frequently emits an offensive odour, and often little whitish maggots may be seen in the rotten material. These are not the borer caterpillars, but are purely secondary in their occurrence; they are the maggots or larvæ of small flies which breed in decaying vegetable matter.

The most practical method of controlling moth borers is to cut out from as near as possible to the point of attachment with the stool any shoots which show indications of shrivelling or wilting in the central leaves. If cutting these is delayed until the centre leaves are quite dead, the cutting out of such shoots at so advanced a stage is useless, because the borer caterpillar will have left and entered into a fresh shoot. One caterpillar may account for a number of shoots, and will not necessarily confine its attacks to one stool only.

The fully-grown borer measures from  $1\frac{1}{2}$  inch to  $1\frac{3}{4}$  inch in length, and is of a light pinkish or purplish brown colour on the back and sides. It is pale greyish or pinkish on the central or under surface. A complete description of its life history and habits in the Mackay district was detailed in the entomological report of this station for the month of May last year.

### RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING JULY, 1929, AND 1928, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	July.	No. of Years' Records.	July, 1929.	July, 1928.		July.	No. of Years' Records.	July, 1929.	July, 1928.
<i>North Coast.</i>					<i>South Coast—</i>				
Atherton .. ..	In. 1.00	28	In. 0.52	In. 2.23	Nambour .. ..	2.78	33	0.30	1.02
Cairns .. ..	1.58	47	0.46	1.50	Nanango .. ..	1.70	47	0.25	0.84
Cardwell .. ..	1.38	57	0.18	0.64	Rockhampton ..	1.45	42	0	0.30
Cooktown .. ..	0.99	53	0.54	0.26	Woodford .. ..	2.41	42	0.38	1.38
Herberton .. ..	0.79	42	0.29	2.58	<i>Darling Downs.</i>				
Ingham .. ..	1.54	37	0.50	0.73	Dalby .. ..	1.73	59	0.57	1.18
Innisfail .. ..	4.72	48	1.49	5.15	Emu Vale .. ..	1.57	33	0.57	2.07
Mossman .. ..	1.39	16	0.03	0.86	Jimbour .. ..	1.58	41	0.35	1.32
Townsville .. ..	0.64	58	0.06	0.02	Miles .. ..	1.67	44	0.39	2.15
<i>Central Coast.</i>					Stanthorpe .. ..	2.05	56	1.11	2.54
Ayr .. ..	0.72	42	0	0	Toowoomba .. ..	2.04	57	0.69	1.61
Bowen .. ..	0.94	58	0.66	0.08	Warwick .. ..	1.82	64	0.76	1.84
Charters Towers	0.66	47	0	0.09	<i>Maranoa.</i>				
Mackay .. ..	1.67	58	0.22	0.05	Roma .. ..	1.45	55	0.19	0.82
Proserpine .. ..	1.36	26	0.05	0.55	<i>State Farms, &amp;c.</i>				
St. Lawrence ..	1.30	58	0.02	0.09	Bungewongorai ..	1.43	15	0.06	0.50
<i>South Coast.</i>					Gatton College ..	1.34	30	0.65	0.79
Biggenden .. ..	1.38	30	0.12	0.64	Gindie .. ..	0.95	30	0	0.23
Bundaberg .. ..	1.85	46	0.04	0.96	Hermitage .. ..	1.72	23	0.76	1.65
Brisbane .. ..	2.24	78	0.53	0.72	Kairi .. ..	1.20	15	..	1.21
Caboolture .. ..	2.20	42	0.32	1.04	Mackay Sugar Experiment Station ..	1.46	32	0.16	0
Childers .. ..	1.73	34	0.04	0.67	Warren .. ..	1.20	14	0	..
Crohamhurst ..	2.04	36	0.32	1.43					
Esk .. ..	1.98	42	1.19	1.50					
Gayndah .. ..	1.47	58	0.05	0.67					
Gympie .. ..	2.16	59	0.55	1.39					
Kilkivan .. ..	1.64	50	0.39	0.86					
Maryborough ..	1.60	57	0.03	1.20					

GEORGE G. BOND,  
Divisional Meteorologist.

## PESTS OF BANANAS.\*

By ROBERT VEITCH, B.Sc., F.E.S., Chief Entomologist.

Banana-growing in Queensland is unfortunately probably more handicapped by the incidence of pests and diseases than any other branch of fruit culture in this State. The entomologist has to handle such extremely serious and difficult pests as the banana weevil borer and the banana thrips; less serious but still important sources of loss that come within his province are such pests as the fruit-spotting bugs, fruit-eating caterpillars, and the banana fruit fly. There are quite a number of other insect enemies of the banana, but they are all, at least at present, of trifling importance to the grower, and reference need not be made to them in these notes, except in the case of the banana aphid. The latter is of no consequence so far as actually weakening the plant by sap-sucking is concerned, but it is of first-class importance as the insect vector of bunchy top.

The banana weevil borer has been the subject of an exhaustive investigation by J. L. Froggatt, and readers who wish to acquaint themselves with all aspects of the borer problem should consult the bulletin prepared by that investigator. Banana thrips has also received considerable attention and a bulletin thereon has been written by Girault, and here again the reader may consult a much more extensive fund of information than can be given within the pages of a handbook such as this. Girault's investigation was followed by further work by Froggatt, dealing more particularly with the question of the field control of the banana thrips.

### The Banana Weevil Borer.

The banana weevil borer (*Cosmopolites sordida* Chev.) is without doubt the most destructive insect enemy of the banana plantations of Queensland. Not only is its attack frequently one of great severity, but there is also every reason for believing that few, if any, districts in this State are free from infestation. The available evidence apparently indicates that this species is not a native of Australia, but it is now a matter of extreme difficulty to indicate with any degree of confidence the native home of this very destructive weevil. It has been recorded from Africa, Australia, Ceylon, Fiji, India, Java, Mauritius, New Hebrides, Philippines, Raratonga, Samoa, South America, and the West Indies.

### NATURE OF INJURY.

The damage to the banana plant in the case of this species is caused entirely by the grubs of the weevil borer feeding in the tissue of the attacked plant. (Plant 81.) The grubs hatch from eggs laid by the beetles, and in feeding in the bulb or corm of the banana plant they tunnel through the corm to such an extent, in the case of severe infestations, as to seriously weaken the plant. In its weakened condition both the quantity and quality of the fruit produced by the infested plant are very appreciably reduced, and thus the growers suffer very severe losses. This reduction in yield and quality is particularly noticeable when the plant is growing under unsuitable soil conditions, and is also much in evidence during an unfavourable season characterised by unusually low rainfall.

\*Reprinted from "Pests and Diseases of Queensland Fruits and Vegetables," by Robert Veitch, B.Sc., F.E.S., and J. H. Simmonds, M.Sc., published by the Department of Agriculture and Stock, Brisbane, 1929.

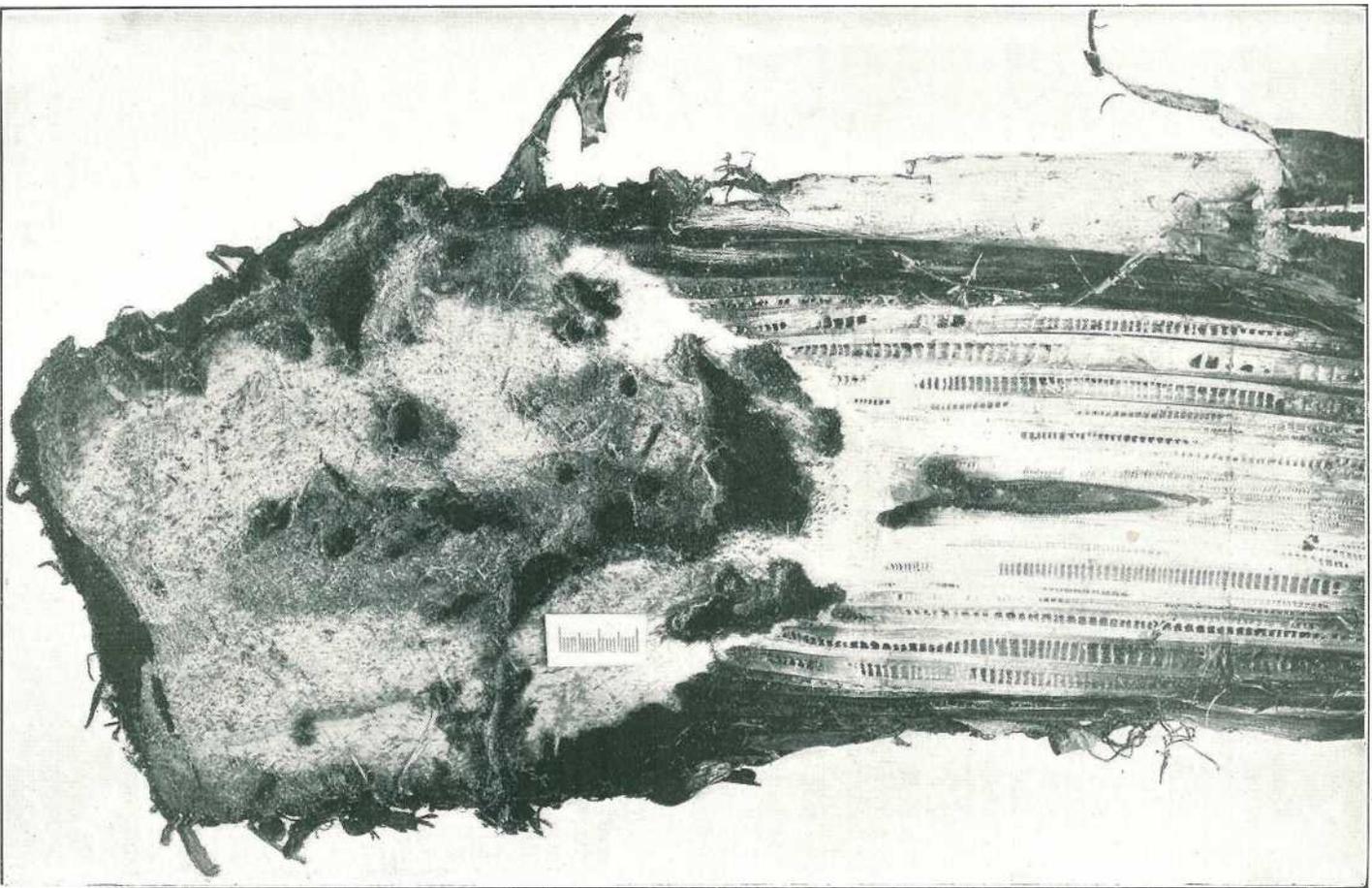


PLATE 81.—ROOTS OF BANANA PLANT ATTACKED BY BANANA WEEVIL BORER.

## PLANTS ATTACKED.

The banana weevil borer in Queensland has never been found attacking plants other than those belonging to some species of banana. The different varieties of cultivated bananas grown in this State—i.e., Cavendish, Dacca, Gros Michel, Lady's Finger, Plantain, and Sugar—do not appear to differ in any degree with respect to their susceptibility to attack.

## LIFE CYCLE STAGES.

The usual four life-cycle stages are met with in this pest—namely, the egg, grub, pupa, and adult. The egg is the stage of incubation, the grub of active feeding and accompanying rapid growth, the pupa of transformation, and the adult of reproduction.

The elongate oval egg (Plate 82, fig. 1) measures roughly  $\frac{1}{12}$  inch in length and is pearly white in colour when first laid; as the incubation period advances certain changes, however, can be noted in its colour, but these changes need not be dealt with in the present notes.

The full-grown grub or larva (Plate 82, fig. 2) measures about  $\frac{1}{2}$  inch in length and is normally distinctly curved in appearance. It is a somewhat bulky object with a creamy-white body and a reddish-brown head. Other features worthy of mention are the fact that it is legless, and that certain of its body segments are very much swollen, thus giving it the bulky appearance already mentioned.

The pupa (Plate 82, fig. 3) is about the same length as the grub, which it also closely resembles in colour when newly formed. Even a casual examination of this stage of the insect's life cycle will disclose the fact that the wings and legs of the future beetle are distinctly visible in the pupa.

The adult (Plate 82, fig. 4) is a typical weevil possessing a very prominent trunk or proboscis. It is black in colour, measures roughly  $\frac{1}{2}$  inch in length, and, like many weevils, its skeleton or outer shell is extremely hard.

## LIFE HISTORY AND FEEDING HABITS.

The eggs of this beetle are laid singly, the spot chosen for egg-laying being in the plant at or near ground-level. A small curved chamber is formed in the plant tissue by the female beetle, and therein the pearly-white egg is deposited. The incubation period of the egg varies, but according to Froggatt it may be regarded as averaging eight days during the warmer months of the year; in midwinter, however, the incubation period has been prolonged to as many as thirty-six days.

It is worth while mentioning the fact that egg-laying in the case of this weevil occurs right throughout the year but with varying intensity, the maximum activity in egg-laying being displayed in spring and autumn.

On hatching from the egg the grub commences its career of destruction, and if an infested corm is examined it will frequently be found to be tunnelled through and through, this tunnelling being accompanied by the evil effects already referred to in an earlier paragraph, namely, a serious reduction in the quantity and quality of the fruit produced. This honeycombing of the corm would not, of course, be the work of one grub; as many as thirty-five grubs have been found in a single corm.



FIG. 1.

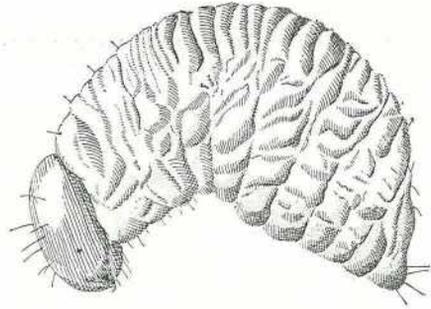


FIG. 2.

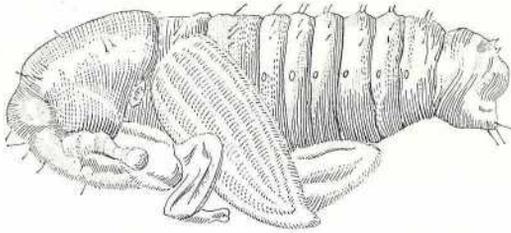


FIG. 3.

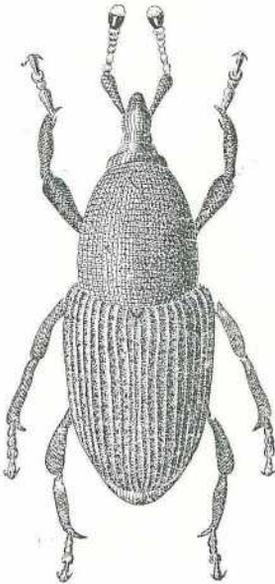


FIG. 4.

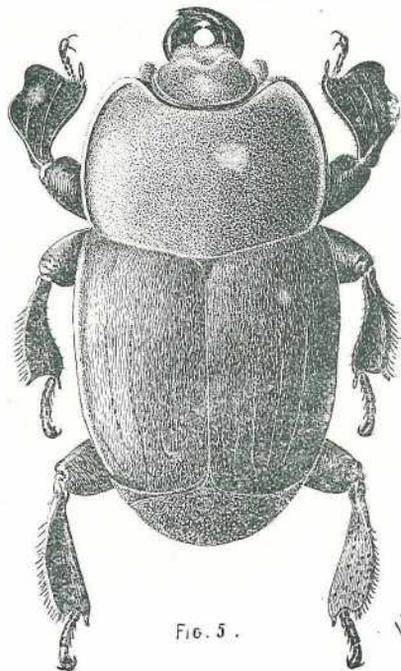


FIG. 5.

W. H. H. M. S. 1928.

PLATE 82.—THE BANANA WEEVIL BORER (*Cosmopolites sordida* Chev.).

Fig. 1, Egg. Fig. 2, Larva or Grub. Fig. 3, Pupa. Fig. 4, Adult Borer. Fig. 5, Adult of *Plesius javanus*, predator on the Borer. Magnified 4 diameters.

It has generally been found that, in the case of banana weevil borer infestation, the attack is confined to the underground portion of the plant and to but a few inches above ground-level; however, in cases where the stem has been left standing after the cutting of the bunch that it has thrown, infestation of the stem may be very extensive, and indeed it may be attacked throughout practically its whole length.

The grub continues feeding within the tissue of the plant for some considerable time, the actual duration of this stage, as indeed is the case in all the others, being influenced very greatly by the prevailing temperature. Froggatt has found that in summer growth may be completed in two weeks, whereas in winter quite twenty-three weeks may be required for the completion of this stage in the insect's development. During its period of growth the grub moults several times, moulting being necessitated by the fact that the skin of insects does not grow but will only stretch to a limited extent. When its growth is on the verge of completion the grub diverts its tunnel towards the outside of the corm, so that there may be but a very slight barrier between the newly formed beetle and the outer world.

The grub then transforms to the pupa at the end of its feeding tunnel, and it does so without forming the fibrous cocoon that is so frequently present in this type of beetle. The usual transformation processes take place, and as a result thereof the beetle or weevil appears in a little over a week. Here again there is some considerable variation, for in winter as many as eleven days have been spent in the pupal stage, whereas in summer it has been as short as four.

The period that elapses between the laying of the egg and the emergence of the beetle is somewhere in the vicinity of seven weeks on an average, but, as already indicated in the discussion of the various stages of the life cycle, that figure fluctuates very considerably with such factors as temperature.

The newly formed beetle does not leave the pupal chamber for a few days but remains resting quietly therein hardening and darkening its skeleton, and having done so it then eats its way out into the soil, feeds, mates, and thus reproduces its species and commences a new life cycle.

#### CONTROL MEASURES.

The life history as outlined above should clearly indicate that there is little hope of successfully employing either sprays or fumigants against this serious pest. All stages in its life cycle, except the weevil itself, are very securely entrenched behind a most effective barrier of plant tissue, and hence in employing artificial control measures attention must be confined to the beetle itself.

In practice it has been found that the beetles are attracted to baits, and it has further been demonstrated that the beetles so attracted will be killed if the baits are dusted with Paris green. If the two operations of trapping and killing are combined in this way, the very laborious business of regularly visiting the baits and killing the beetles that have been attracted thereto will be eliminated.

Suitable baits are supplied by the banana plant itself, and growers wishing to combat this pest by baiting have a choice of several systems.

Portions of the corm may be cut off and placed on the ground either inside or close to the banana stool. The freshly cut surface of

the sliced corm is dusted with Paris green, which has previously been diluted with flour at the rate of one part of Paris green to six parts of flour. The slices of corm treated as described are then placed in position with the dusted surface downwards and are covered with trash. The object in covering the baits with trash is partly to produce the degree of darkness that is so attractive to the beetles and partly to prevent unduly rapid drying out of the baits which would thus become relatively unattractive.

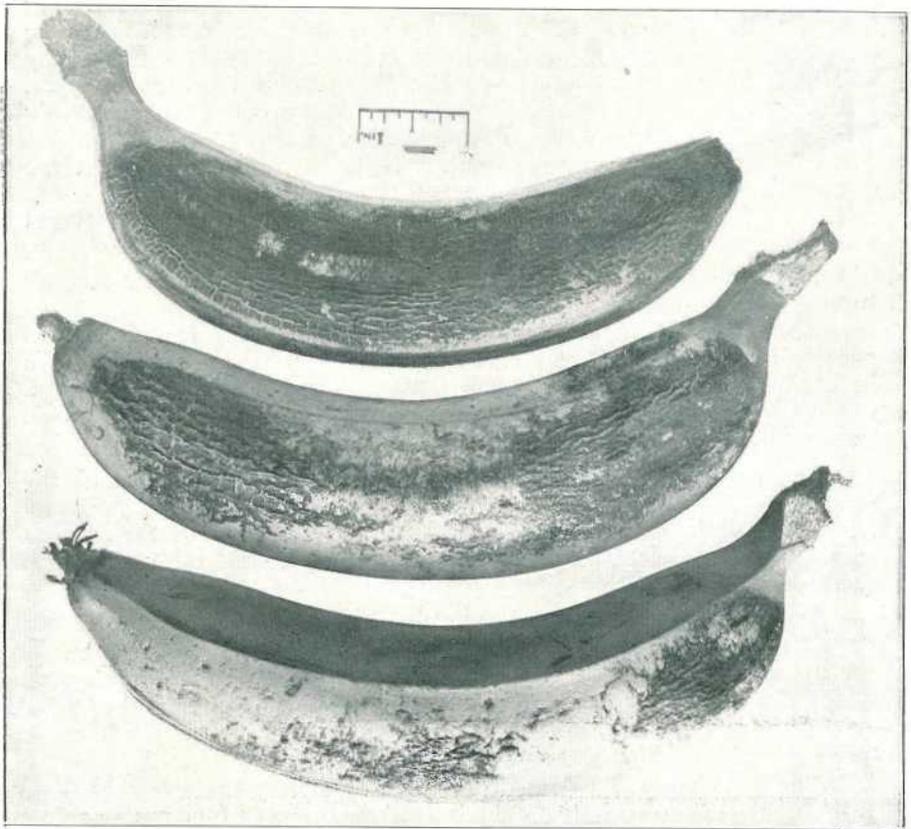


PLATE 83.—BANANA FRUIT SHOWING "RUST" DUE TO THRIPS ATTACK.

A second system that is much in favour consists of cutting out a plug of tissue in old butts by means of the sucker pruning blade. The cavity thus formed is dusted with the poison mixture and the plug is then replaced. The cut surface of the old butt is also dusted.

The third system of baiting is the one that is at present most in favour, and it consists of dusting the freshly cut surface of the old butt after a deep groove has been cut therein by means of a cane-knife. The whole of the cut surface as well as the wedge-shaped piece of tissue removed from the groove is dusted with the poison mixture, and the wedge is then replaced in the groove.

In the experimental work conducted by Froggatt in connection with the control of this pest, numerous poisons were tested out in

conjunction with the baits. Very appreciable kills were obtained with quite a number of the substances employed, but it was found that Paris green was the most satisfactory of those handled, firstly because it gave a very high percentage of mortality and secondly because it was very rapid in its effects. Hence the Department strongly recommends its use as the most suitable poison to employ in conjunction with the baits.

Attention has so far been confined to the prospects of controlling this pest by the use of poisoned baits, but that is by no means the only weapon available in the campaign against the banana weevil borer, for strict observance of plantation hygiene will be productive of decidedly beneficial results.

Plantation hygiene necessitates the digging out of badly infested stools. Such stools are no longer profitable, and as they merely serve to intensify infestation their loss will not be felt by the grower. Where a stool is but slightly infested, the treatment required is not nearly so drastic and it will be sufficient if the old corms are removed. These corms should be carefully sliced up into thin pieces and any stems removed should be chopped in half.

Stems from which the bunches have been cut should be chopped off close to the ground, and then split in halves in order to facilitate the rapid drying out and decay of the tissue, which will thus be rendered unattractive to the borer.

#### PREVENTION OF INFESTATION.

It has been demonstrated that the most frequent means by which new plantations become infested with the banana weevil borer is through the use of infested suckers in planting up such new areas. Infestation may also occur by beetles being carried down in flood waters from higher infested levels to lower uninfested areas, and also by beetles crawling in from an adjacent badly infested plantation. Flight also plays some part in the dispersal of this pest, but it is at present regarded as playing only a very minor part in infestation.

Flight cannot be controlled, and obviously little can be done in dealing with flood waters, hence efforts to prevent infestation or intensification of infestation must be largely confined to dealing with imported suckers and the crawling beetles.

To deal with the possibility of infestation in imported suckers, the following departmental recommendations have been made. Firstly, the digging of suckers or corms should each day be restricted to the quantity that can be planted the following day. Secondly, every corm or bulb that has been dug out should be carefully examined for traces of borer infestation, and it has been found that this is best accomplished by carefully paring off a thin slice of plant tissue. It is desirable that this slice be removed as far up as it is practicable to do so without inflicting injury to the eye. Paring off this thin slice will accomplish a twofold object; firstly it will eliminate any eggs that may have been laid in the corm, and secondly it will expose borer tunnels that may be present. All corms showing the presence of borer tunnels should be destroyed. Finally, having selected the suckers in accordance with the preceding recommendations, these should be placed on a cart or slide and removed to the new area with the least possible delay. If they are allowed to remain overnight in an infested plantation, the precautions of paring

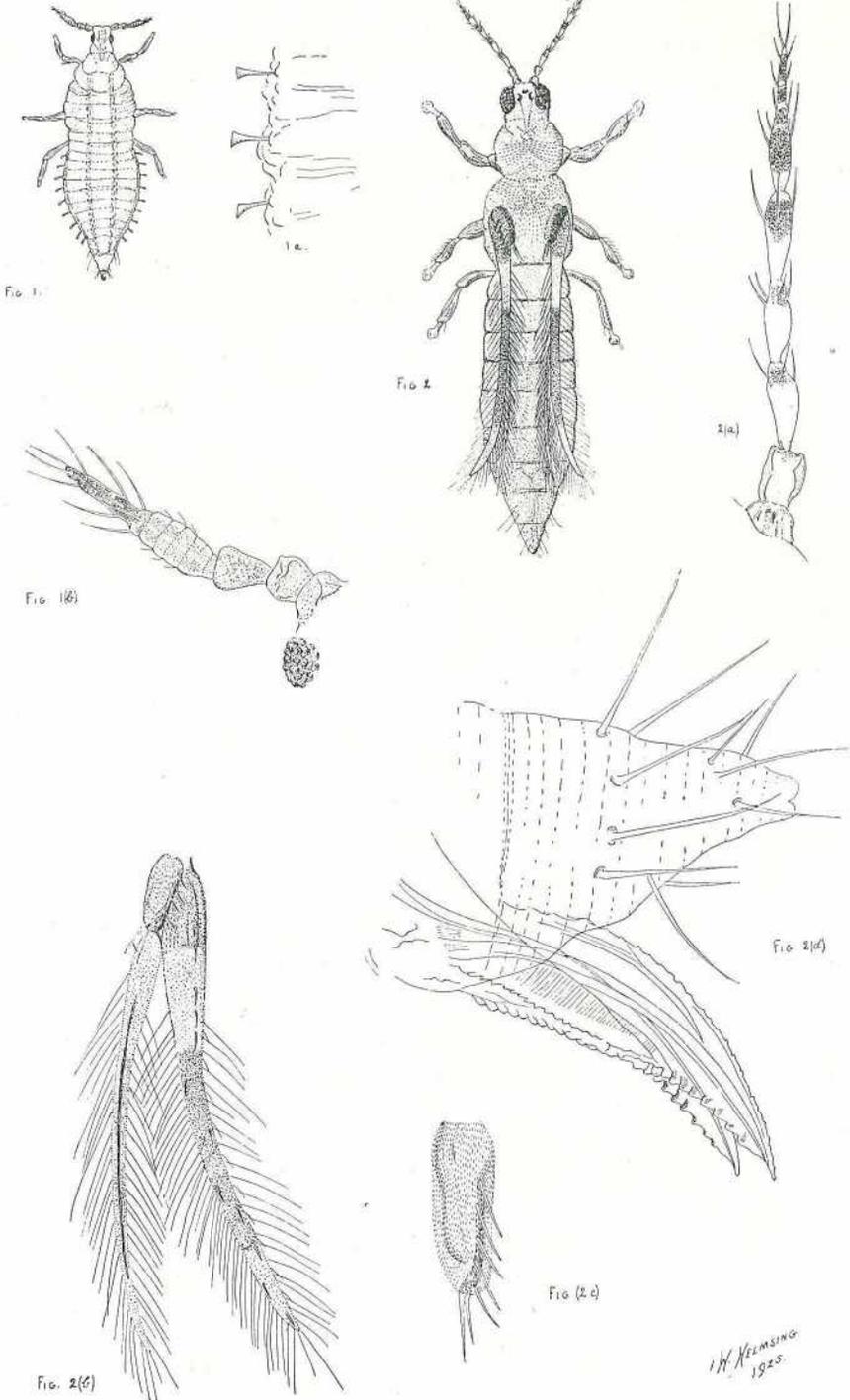


PLATE 84.—THE BANANA THRIPS (*Scirtothrips signipennis* Bagnall).

Fig. 1, Larva,  $\times 45$ . Fig. 1a, Portion of side of abdomen of larva,  $\times 210$ . Fig. 1b, Antenna of larva,  $\times 210$ . Fig. 2, Adult female,  $\times 45$ . Fig. 2a, Antenna of adult female,  $\times 210$ . Fig. 2b, Wings of female,  $\times 90$ . Fig. 2c, Scale over base of wings,  $\times 180$ . Fig. 2d, Apex of abdomen of female, showing saw-toothed ovipositor,  $\times 295$ .

and destroying tunnelled corms will in all probability be rendered of little value by reinfestation of the suckers while waiting overnight for removal.

The danger of heavy infestation of clean new areas adjacent to old infested ones is very appreciable, and if such sites have to be selected for new banana plantations it is desirable to lay rows of baits between the new and the old areas, in order to minimise as far as possible the migration of beetles from the one to the other.

The policy to be adopted in the fight against the banana weevil borer may be summarised by saying that the chief objective is firstly to endeavour to keep new areas clean by adopting the precautions already detailed, and secondly, when infestation has occurred, to endeavour to minimise its effects by baiting the beetles with Paris green.

#### POSSIBILITY OF BIOLOGICAL CONTROL.

The Department of Agriculture and Stock has devoted a considerable amount of attention to the possibility of controlling this pest by the introduction from overseas of some of its natural enemies. Between the years 1921 and 1926 a number of colonies of the predatory Histerid beetle *Plasius javanus* Er. (Plate 82, fig. 5) were introduced from Java and liberated on suitable plantations in Queensland. Definite evidence of the establishment of that beneficial insect has not yet been obtained.

More recently Froggatt visited Java and inquired into the whole question of the control of the banana weevil borer in that country, paying particular attention to its control by natural enemies. Arising out of that visit, further large colonies of *Plasius javanus* were imported to Queensland and are at present being handled in captivity in quarantine. Colonies of a predaceous Leptid fly, *Chrysopila ferruginosa* Wied., were also obtained, and after undergoing the usual quarantine period a colony of this beneficial insect was liberated in the Cooran district.

It should be clearly understood that, in the case of this pest, the biological control work is still in the experimental stage, and, even if the two insects just discussed should become permanently established in this State, some considerable time, extending into several years, must elapse before there is any possibility of their becoming sufficiently numerous and widely distributed to appreciably reduce infestation. Growers are therefore urged to continue to carry out the control measures recommended in earlier paragraphs. They can rest assured that, should the present experimental work in biological control show signs of success, they will be immediately advised to that effect.

#### The Banana Thrips.

The banana thrips (*Scirtothrips signipennis* Bagnall) is a very small and insignificant insect which has for many years been responsible for the serious banana-skin condition known as "rust" or "colour." Centres of infestation occur in various localities in coastal Queensland, from Cairns in the far north to banana-growing districts south of Brisbane. In recent years particularly serious outbreaks have occurred in the Innisfail and Gympie districts.

#### NATURE OF INJURY.

The term "rust" has been applied to attacked bananas because of the characteristic injury produced by the feeding of the larval and

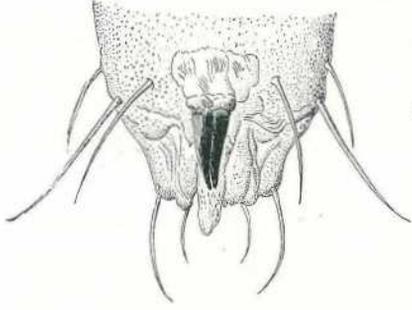


FIG. 1 x 225

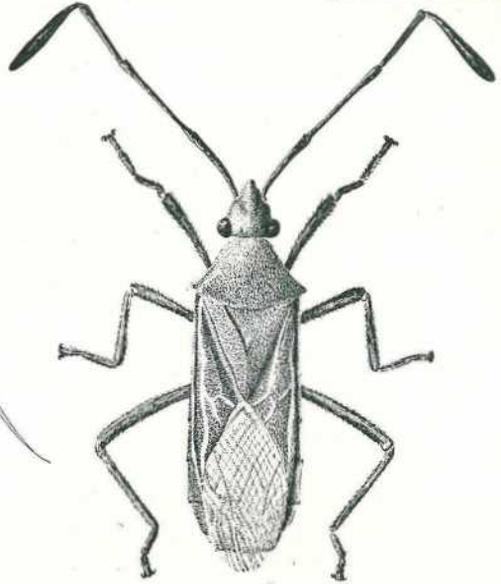


FIG. 2 x 4

FIG. 3 x 12

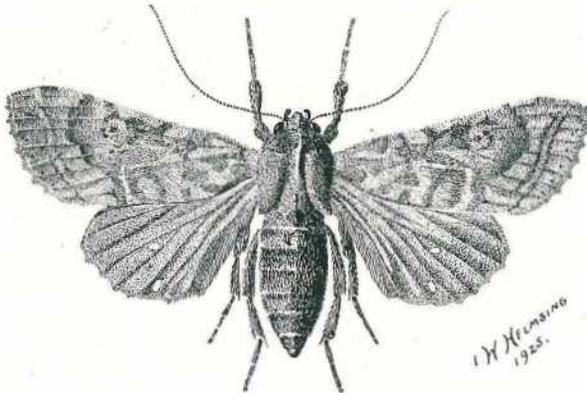
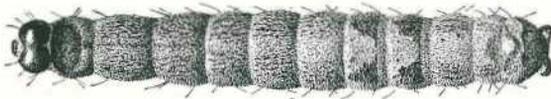


FIG. 4 x 1½

## PLATE 85.

Fig. 1. Anal segments of male of *Scirtothrips signipennis* Bagnall, showing genitalia, x 225. Fig. 2. Imago, *Pendulinus fuscescens* Dist., x 4. Fig. 3. Larva, *Tiracola plagiata* Wlk., x 1½. Fig. 4. Imago, *Tiracola plagiata* Wlk., x 1½.

adult thrips on the skin of the fruit. Infestation commences at points of contact on the fingers, particularly at the base of the hand. The injured fruit then acquires a typical reddish-brown appearance with a somewhat roughened surface (Plate 83). This discoloration and roughening of the skin may be confined to a relatively small area at the base of the hand, but in severe attacks it may involve practically the whole of the skin of the fruit. Furthermore the skin may subsequently become quite extensively cracked. Where infestation has not been unduly severe, thrips attack does not render the fruit less palatable, although it undoubtedly gives it a much less attractive appearance and thereby appreciably reduces its market value. When the whole surface of the fruit or the greater part thereof is involved in severe discoloration and roughening, the quality of the fruit is, however, decidedly impaired, and cracked fruit with exposed pulp is obviously unsuitable for marketing.

#### LIFE CYCLE STAGES AND LIFE HISTORY.

The very small eggs of the thrips are laid in the skin of the fruit, generally in tissue on which colonies of the adults have established themselves where the fruit are touching at the base of the hand. Egg-laying takes place in punctures made by means of the saw-toothed ovipositor with which the female is equipped (Plate 84, fig. 2d.) Eggs are similarly deposited under the leaf-sheaths, where adults also very frequently form colonies. According to the life-history studies carried out by Girault, these eggs hatch after an incubation period of about a fortnight, which is surprisingly long in view of the fact that the duration of the subsequent larval and pupal stages is only about one week in each case.

The larvæ on hatching out feed in colonies in association with the adults, these colonies as already indicated being found beneath the leaf-sheaths and on the fruit at various points of contact. The larvæ become full-grown in about a week and are then about  $\frac{1}{25}$  inch in length and are white in colour. They pass through the usual series of moults; a young larva is illustrated on Plate 84 in figure 1.

The full-fed larva pupates either on the plant or in the soil and a week later the winged adult appears (Plate 84, fig. 2). The adult is a delicate yellow insect bearing two pairs of typically fringed wings; in size it is very slightly larger than the full-grown larva.

Thrips infestation may be observed in every month of the year, but it is at its lowest ebb during the winter months. With the approach of warmer weather in September, numbers increase appreciably, and the peak of infestation is reached in January and February.

#### CONTROL MEASURES.

Before considering the question of the control of this pest when it actually occurs on a plantation, it is perhaps desirable to point out the necessity for taking every precaution to prevent its establishment where that has not already taken place on a plantation. With this object in view, suckers, if they have to be brought in from another plantation, should where possible be obtained from one in which thrips do not occur. Infestation is now, however, so widespread throughout coastal Queensland that it will be difficult indeed to find a "rust"-free plantation from which to draw supplies. Hence most growers will have to obtain their supplies of suckers from infested plantations. When doing so, the soil

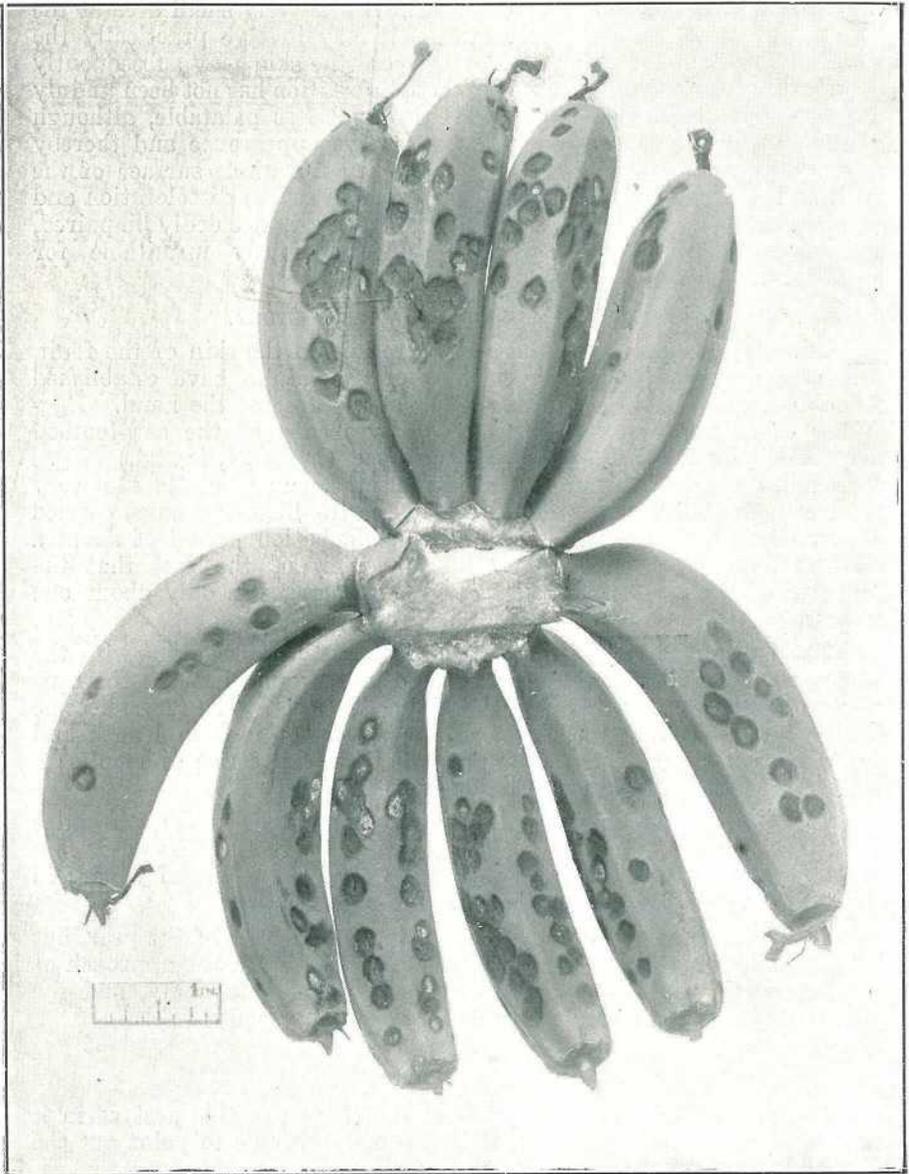


PLATE 86.—DAMAGE CAUSED BY FRUIT-SPOTTING BUGS.

on the bulbs should be removed as thoroughly as possible, and they should then be pared so as to remove a thin slice of tissue. Finally the top should be removed as close down as possible. A question that has frequently been raised is the possibility of dipping suckers in a solution that will kill the thrips and thus ensure a supply of clean suckers. There are, however, a number of difficulties which appear to render such a desirable procedure impracticable, at least in the present state of knowledge.

Where infestation occurs attention should be paid to plantation hygiene, and, as in the case of banana weevil borer infestation, stems from which bunches have been cut should be chopped down close to the ground, and then split open to hasten the drying out of the tissue, which will thus cease to be attractive to the thrips for feeding or breeding. The removal and destruction of tip fruits is also desirable for similar reasons. Hoing in the vicinity of the banana plant will lead to the exposure and destruction of pupæ and newly transformed adult thrips, and will thus be productive of much good.

Finally consideration must be given to the possibility of effectively controlling this pest by the use of insecticides. Pyrethrum powder mixed with sifted wood ashes in equal portions was tested as a dust in the 1924 investigations, 1 lb. of the pyrethrum being sufficient to dust 230 bunches. Girault recommended that the treatment be repeated at least four times at intervals of nine days. In 1926 Froggatt carried out field trials in the Innisfail and the North Coast districts, to test the value of calcium cyanide dust, in the hope of obtaining a more deadly dust with the power of rapidly killing practically the whole thrips population on dusted bunches. A very high percentage of kill was obtained and no damage was done to the treated fruit. Banana-growers in some cases have, however, complained of injury to treated fruit, and accordingly further field trials have recently been instituted to place the insecticidal treatment of this pest on a thoroughly satisfactory basis.

### Fruit-spotting Bugs.

In the Byfield section of the Rockhampton district, considerable losses have been caused by the feeding of two species of bugs, namely, *Pendulinus fuscescens* Dist. (Plate 85, fig. 2) and *Pendulinus lutescens* Dist. These Coreid bugs attack the fruit, and as a result very characteristic dark, circular, depressed areas are formed in the vicinity of the feeding punctures on the skin of the injured fruit (Plate 86). At the centre of these depressed areas there is a pronounced raised spot. Fruit at all stages of maturity may be attacked, but the results of the puncturing vary in their intensity. If the fruit is attacked while it is still very small, the skin will generally split across the centre of the depression surrounding the original puncture (Plate 87), and such fruit is obviously of little or no value for marketing. Splitting does not take place when the attack is confined to more mature fruit, and the infestation consequently is not quite so serious in its effects, although it is without doubt at least a serious blemish that renders the fruit unattractive in appearance.

The injury to fruit is inflicted by both the nymphs and the adult bugs, and is most pronounced in late summer and autumn. *Pendulinus lutescens* Dist. is thought by Froggatt to be the more destructive of the two species. It occurs at many centres throughout coastal Queensland,

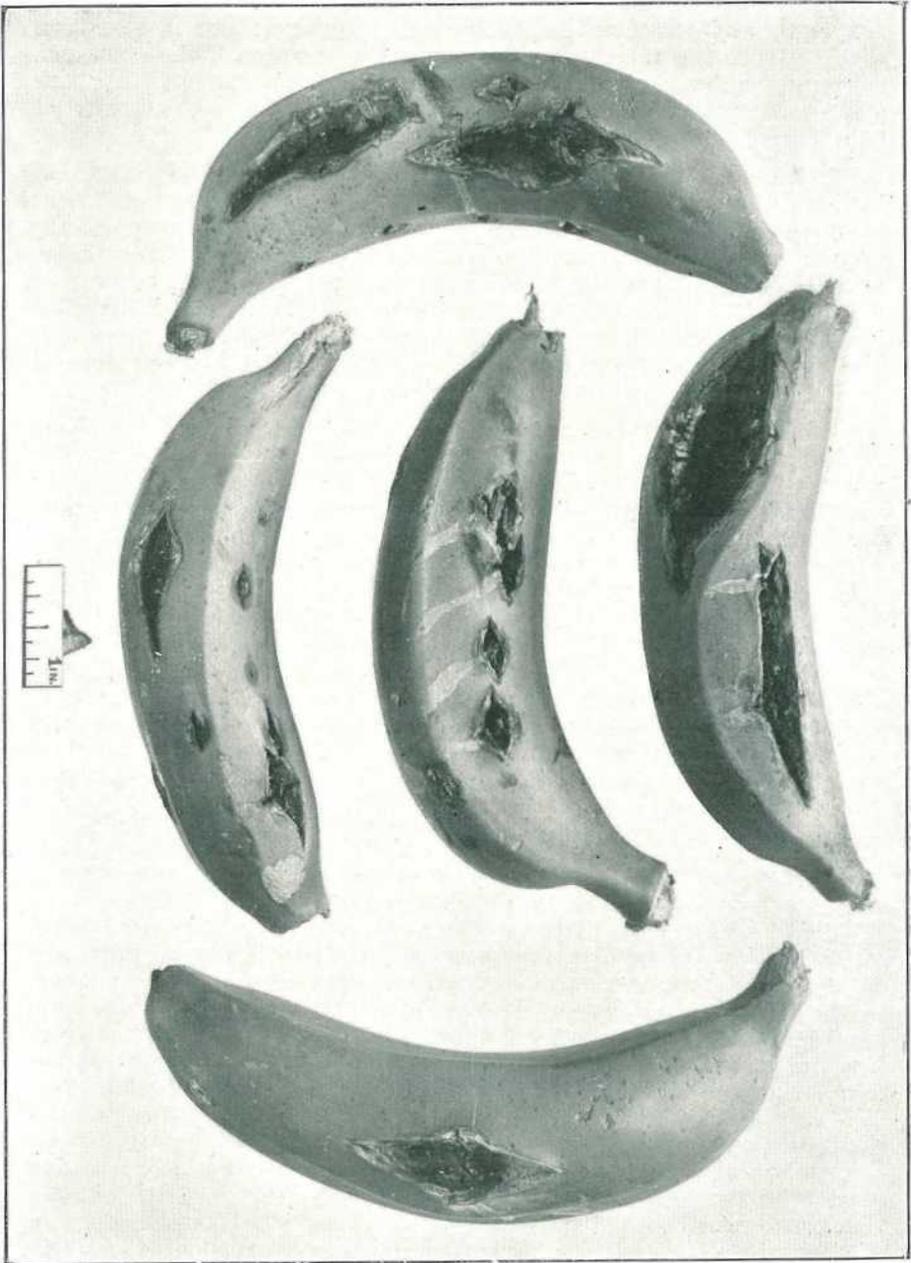


PLATE 87.—DAMAGE CAUSED BY FRUIT-SPOTTING BUGS.

ranging from Cairns in the North to Brisbane in the South. It is therefore rather curious that its destructive activities should have caused concern in only one banana-growing district in the State. Fruit showing apparently identical injury has, however, been seen in small quantities in the Glastonbury section of the Gympie district. It is, of course, impossible to say whether the Glastonbury fruit was attacked by the species now under discussion or by some other bug.

#### CONTROL MEASURES.

Little definite information can at present be given with respect to the control of these pests, and they should accordingly form the subject of an investigation whenever a suitable opportunity occurs for doing so. Sharply jarring the bunch, over the lower portion of which a bag of mosquito netting has been previously slipped, will cause the immature nymphs to fall into the trap thus formed, and also induce the adults to fly downwards into the netting. The bugs collected in this manner can then be subsequently destroyed, and it may be that such a method of attack will prove sufficiently effective to be economically practicable. In the absence of anything better it is at least worthy of a trial on infested plantations. Any field investigation that is carried out should also test the possibility of successfully using stockinet covers to protect the fruit from attack. Preliminary evidence in favour of this procedure has already been obtained.

Some attention has been given to alternative host plants of these bugs, and when their host relationships are more fully known some useful information may be available on which further effective control measures can be based.

#### Fruit-eating Caterpillars.

Several species of fruit-eating caterpillars attack the skin of the fruit, while some feed first on the skin and subsequently penetrate to the pulp, on which they then feed. The skin erosion at best gives an unattractive appearance to the fruit, and if it is followed by cracking the fruit becomes valueless. Where the pulp is attacked the fruit is of course a total loss.

Quite a number of species of caterpillars are responsible for this type of damage, and in some seasons one species at least may be so abundant as to inflict very severe losses. Such an epidemic occurred in 1927, when enormous numbers of the caterpillars (Plate 85, fig. 3) of the Noctuid moth *Tiracola plagiata* Wlk. (Plate 85, fig. 4) migrated from the weeds on which they were feeding on the edges of the banana plantations. They then attacked the foliage and fruit of the bananas, and in the course of a few weeks they inflicted very severe losses on many plantations (Plate 88).

Where there is evidence of the recurrence of such an attack, serious consideration might be given to the use of poison bran baits, which would intercept at least a very large proportion of the caterpillars before they reached the bananas. The migrating caterpillars that fed on the bran baits scattered on the ground would rapidly succumb to the effects of the Paris green contained in the baits. The preparation of these baits is discussed in the chapter dealing with insecticides.



PLATE 88.—DAMAGE CAUSED BY FRUIT-EATING CATERPILLARS (*Tiracola plagiata* Wlk.).

### Banana Fruit Fly.

Several fruit flies attack bananas in this State, the species that is entitled to the unwelcome distinction of being called "the banana fruit fly" being *Chaetodacus musa* Tryon (Plate 89). This fly appears to be responsible for the injury to bananas grown north of Cardwell, and from that district right up to Cairns it may be regarded as a pest of some importance. In Southern Queensland fruit-fly infestation is caused by the Queensland fruit fly (*Chaetodacus tryoni* Froggatt) and the boatman fly (*Rioxa musa* Froggatt), most of the injury being inflicted by the first-mentioned species. Fruit-fly losses in the Southern banana-growing districts are, however, of but very slight importance, largely because the Queensland fruit fly, the chief culprit in Southern areas, generally confines its attacks to mature fruit produced in summer. The banana fruit fly, on the other hand, has frequently been found by Froggatt attacking immature fruit that is only two-thirds developed, and hence it assumes some considerable degree of importance.

#### LIFE HISTORY.

This pest lays its eggs (Plate 89, fig. 1) in the skin of the fruit, and the maggots (Plate 89, fig. 2) hatching therefrom feed in the pulp, thus producing disintegration of the tissue and rendering the fruit valueless. When full-grown the maggots leave the infested fruit and form their brown puparia (Plate 89, fig. 3) in the soil. The reddish-brown flies (Plate 89, fig. 4) subsequently emerge and carry on the work of infestation. Detailed information is not yet available with respect to the duration of the various life-cycle stages of this pest. It has been bred from the native banana (*Musa banksii*), but so far no other host records have been obtained, although efforts have been made to do so.

#### CONTROL.

The banana fruit fly has not been the subject of such detailed study as has been devoted to its relative the Queensland fruit fly, but nevertheless some information of value is available with respect to its control.

Firstly strict attention should be paid to plantation hygiene, and consequently all discarded or infested fruit should be collected and disposed of in such a manner as to preclude its giving rise to a brood of flies. The best means of attaining this object can be most appropriately determined on the plantation itself. Various means whereby infested fruit may be disposed of have already been discussed in an earlier chapter when dealing with the Queensland fruit fly.

A further useful procedure is to eliminate, so far as it is practicable to do so, all wild banana plants growing in or in the immediate vicinity of cultivated banana plantations. Unless these wild banana plants are destroyed they will quite undoubtedly serve to breed up flies to infest the fruit on which the banana-grower depends for his existence.

For many years stockinet has been used in North Queensland to protect the banana bunches from fruit-fly infestation. This procedure is quite effective, and furthermore it is economically practicable. The stockinet is made in a tubular form suitable for covering the bunches, and its use could be enthusiastically recommended but for one factor, namely its apparent tendency to aggravate thrips infestation. Hence, if stockinet is used to prevent fruit-fly infestation, extra precautions

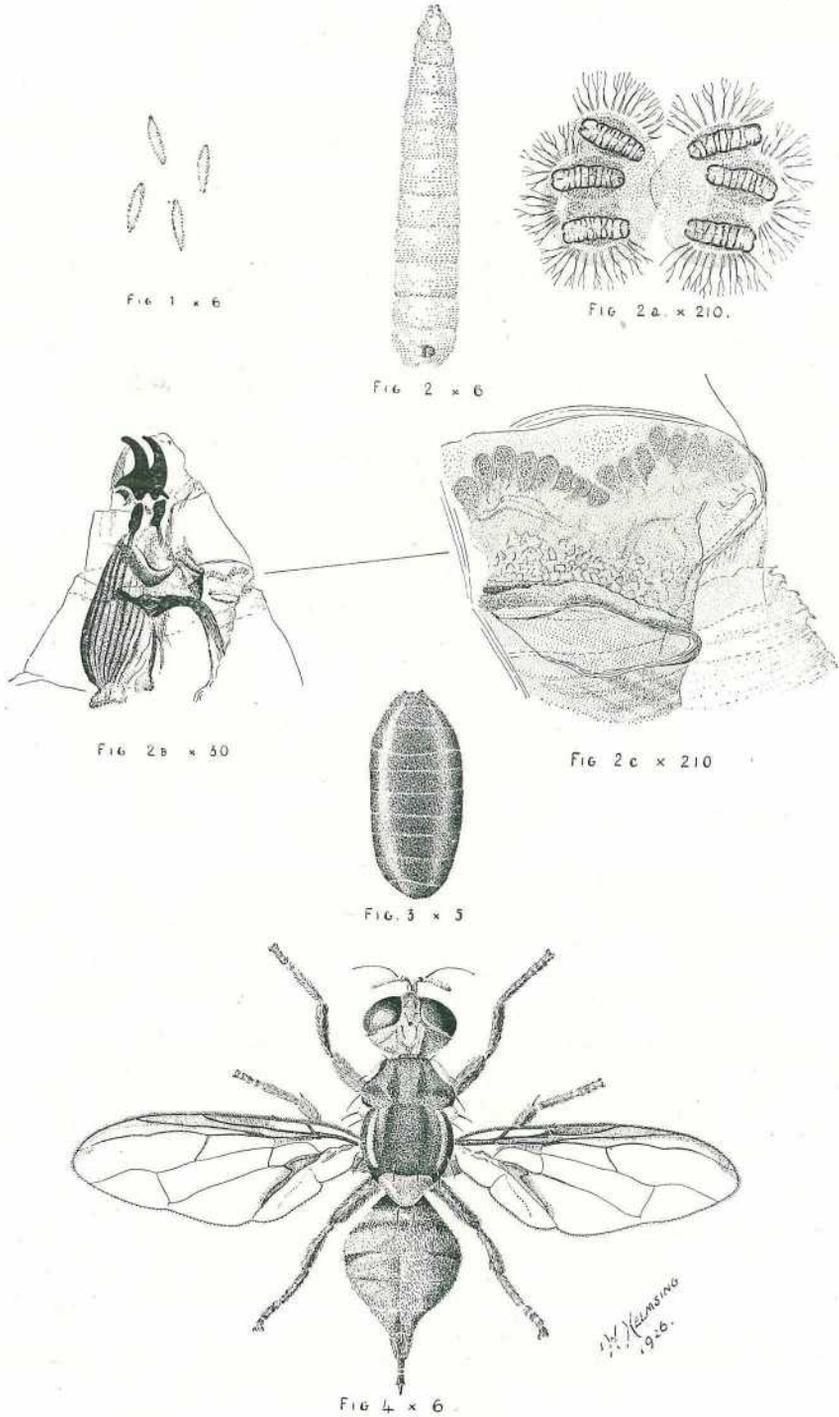


PLATE 89.—THE BANANA FRUIT FLY (*Chetodacus musce* Tryon).  
 Fig. 1, Eggs, x 6. Fig. 2, Larva, x 6. Fig. 2A, Stigmal discs of larva, x 210. Fig. 2B, Jaws of larva, x 30. Fig. 2C, Anterior spiracle of larva, x 210. Fig. 3, Puparium, x 5. Fig. 4, Imago, x 6.

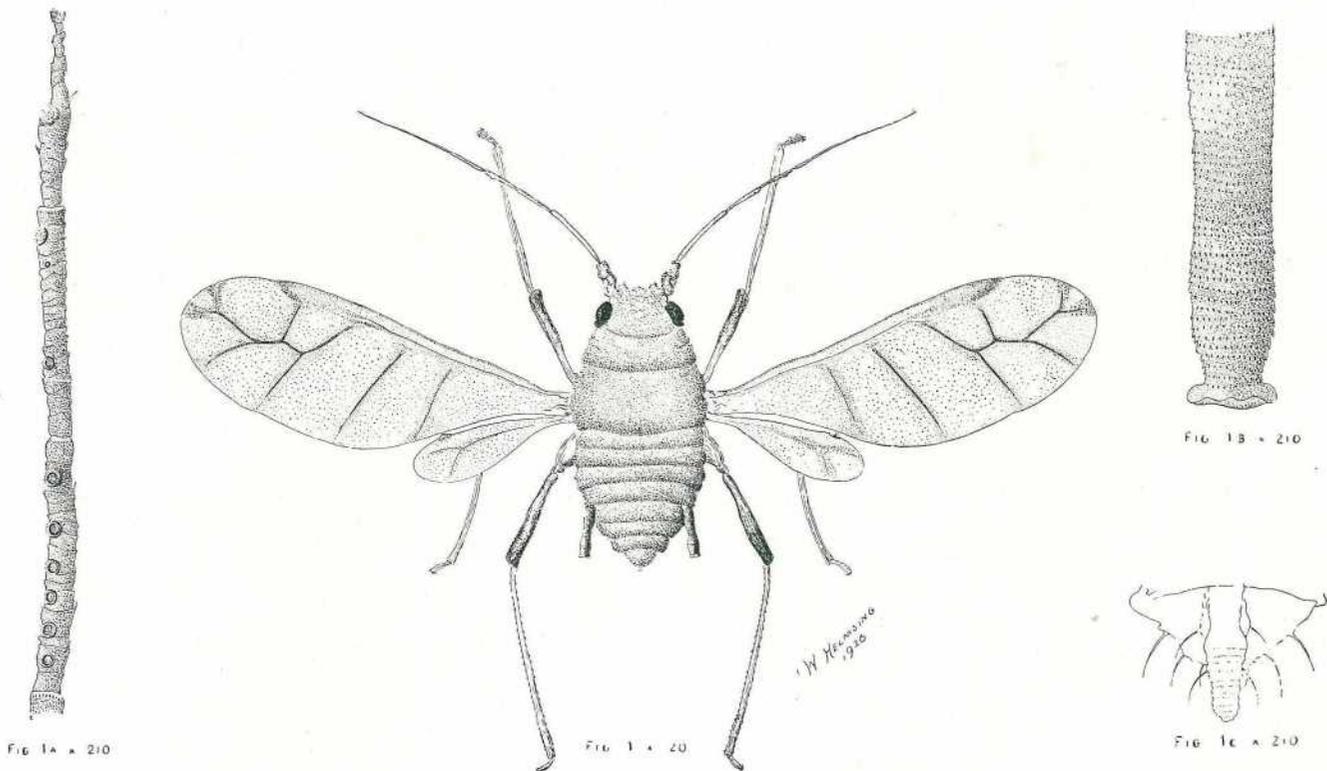


PLATE 90.—THE BANANA APHIS (*Pentalonia nigronervosa* Cog.), THE CARRIER OF THE BUNCHY TOP VIRUS.

Fig. 1, Winged adult,  $\times 20$ . Fig. 1A, Segments 3 and 4 and portion of 5 of antenna of adult, showing sensory organs,  $\times 210$ .  
 Fig. 1B, Cornicle of adult,  $\times 210$ . Fig. 1C, Anal segment of adult,  $\times 210$ .

must be taken to keep the thrips population within reasonable bounds. Once a thoroughly effective thrips insecticide is available which will be safe for use by the ordinary banana-grower under average plantation conditions, and it can be applied in conjunction with the covering of the bunches, then the interdependent problems of thrips and fruit-fly control will have been solved.

### The Banana Aphis.

The species commonly known as the banana aphid, *Pentalonia nigro-nervosa* Coq. (Plate 90, fig. 1), occurs practically wherever bananas are grown in this State. Large colonies of this insect may be seen underneath the leaf-bases and in the throat of the plant, and it may be seen in smaller numbers on the fruit and foliage. Furthermore, it may be found in very considerable numbers at the base of the stool beneath ground-level.

This insect feeds by sucking the plant sap, but it is not considered that its presence is of any practical consequence in districts where bunchy top does not exist. Where that disease occurs, it, however, immediately becomes of first-class importance on account of the part it plays as the insect agency whereby the disease is transmitted from an infected plant to a healthy one. Bunchy top is later discussed in some detail in this chapter.

## KILLING OF WEEDS WITH ARSENICAL SPRAYS.

By J. C. BRUNNICH.

Enquiries are frequently made about the use of arsenical sprays for the killing of weeds. There are several arsenical weed killers on the market, which can be used for this purpose, or anyone can make his own solution by the following method:—

Mix 4 lb. of grey arsenic with 1 lb. of caustic soda in the dry state, and slowly add water to make 4 gallons of a concentrated solution. Sufficient heat is generated in the process to bring the solution almost to boiling point. If washing soda is used instead of caustic soda 4 lb. are required, which are dissolved in about 3 gallons of water, which is brought to the boil and the 4 lb. of arsenic are added, and the solution kept boiling until all the arsenic is dissolved, which generally takes about half an hour, when sufficient water is added to make 4 gallons.

For the spraying dilute 1 pint of this concentrated solution with 4 gallons of water. From 75 to 100 gallons of the spraying solution are required per acre. The spray is only successful for the destruction of succulent weeds in their early stages of growth.

For the destruction of prickly-pear, instead of grey arsenic, at present arsenic pentoxide, supplied by the Prickly-pear Commission at cost price, is largely used, and this may be successfully employed for killing of weeds generally, and has the great advantage that it can be dissolved in water without the use of soda.

The Bureau of Sugar Experiment Stations made experiment with arsenical sprays in the Mackay Sugar Experiment Station in 1915, and found that weeds like pigweed, billy goat weed, asthma weed were practically killed with one spraying; grasses like couch grass and cocksfoot could not be killed even with repeated sprayings at short intervals. The cost of one spraying was about £1 per acre on the headlands, and nearly £2 per acre amongst the cane rows.

When preparing and using arsenical sprays, great care must be taken that the fumes when boiling the solution should not be inhaled, and allowing boots, socks, and clothing generally to become sodden with the arsenical solution will lead to serious illness. Before taking any meal the hands must be carefully washed, and also the whole body should be washed as frequently as possible in intervals between the spraying operations, as the poison is readily absorbed through the open pores of the skin.

The risks of using such poisonous sprays in banana plantations and sugar-cane fields are so great that the Department of Agriculture and Stock does not recommend the general use, and only in a few exceptional cases the use of arsenical sprays is justified and economic.

## THE ROYAL NATIONAL EXHIBITION.

THE BIGGEST EVENT OF QUEENSLAND'S YEAR—A REFLEX OF RURAL DEVELOPMENT AND AN EPITOME OF INDUSTRIAL PROGRESS—A COMPLETE REPRESENTATION OF THE AGRICULTURAL ACTIVITIES OF THE STATE—EVERY EXHIBIT AN EDUCATION AND EVIDENCE OF SKILL, WILL, AND ACHIEVEMENT—A TRIUMPH OF EFFECTIVE ORGANISATION—A LESSON, LASTING IN ITS VALUE, OF THE PRACTICAL CO-OPERATION OF THE PRIMARY PRODUCER WITH THE CRAFTSMAN, THE MANUFACTURER, THE ENGINEER, THE SCIENTIST, AND THE ECONOMIST.

Once again the Brisbane Show, held on 12th August and following days, presented impressive proof of the fecundity of the Commonwealth's richest province. It reflected Queensland's immense resources and the great work of our country people in their development.

Regarding the Exhibition as a microcosm of the whole State, presenting an extraordinary range of rural production and diversity of rural interests within its borders, it is difficult to place a limit on any estimation of future progress. It showed how early promise has already ripened into fulfilment; and revealed a vista of vastly greater achievement in the years to come.

Our major and most of our minor industries, as well as their tributary enterprises, were represented at Bowen Park, where huge daily crowds saw, appraised, and appreciated the extent to which Queensland depends on primary production.

It is said, and very truly, that a visit to the Brisbane Show is one of the best cures for pessimism. This annual event is a breeder of optimism as well as an exemplar of opulence, and anyone who observed, on the opening day, the general air of prosperity of the hundred thousand Queenslanders gathered in the pavilions and around the arena; who studied their work of brain and hand so well displayed; and who realised that only the edge of opportunity, provided by lavish natural endowment, is as yet exploited, could not fail to feel a quickened faith in Queensland's future.

The Show again presented impressive evidence of how town and country are linked in industry; how the application of sound principles work out in modern farming practice; how stock can be improved by selection, breeding, and feeding; of the extent to which the engineer assists the agriculturist; and how essential science is to our daily life and work.

**B**RILLIANTLY fine weather favoured the Royal National Association for its 1929 Exhibition, which was opened officially by His Excellency the Governor, Sir John Goodwin, accompanied by Lady Goodwin, on Wednesday, 14th August, in the presence of nearly a hundred thousand people, including His Excellency the Governor-General (Lord Stonehaven) and Lady Stonehaven, and many more notable visitors from other States.

To describe the Show in a single sentence, it was an exhibition of Australian industry running on ball-bearings. It was also a demonstration of Queensland's prosperity, and of the energy, skill, inventive ability, and organising powers of the people who are doing the real work of the State—whether in production, construction, administration, or social services.



PLATE 91.—THE GRAND STOCK PARADE.

### A Fountain of Progressive Ideas.

The Royal National Association has the good fortune to have big men at the head of its affairs. It is, therefore, a fountain of progressive ideas, and a strong educational force; and no one will deny its importance as a contributor to our national welfare. It stands for better farming, better stock, better business, better public service, and bigger returns for the man on the land. Another thing about the Association is that it is never guilty of taking a narrow view, nor of pessimism in any of its constrictive or depressing forms. With an overwhelming pride in the State and a confidence in its future it goes about its job with zeal and healthy optimism that are most commendable. The story of the Royal National Association was presented in concentrated form at its Fifty-fourth Annual Show.

To what degree its useful purpose to Queensland has been proved can hardly be realised adequately; to what extent it will continue to radiate its influence and how far it will develop its greatness as a factor in the brightening and prospering of country life can be imagined more readily, for is not the Brisbane Exhibition itself extraordinary evidence of the energy, the enterprise, the strength and vigour of rural industry that it is the Association's daily job to develop and upon which rests the soundness and the completeness of our national existence?

### Outstanding Displays.

Among the big pavilion displays was the Court of the Department of Agriculture and Stock. In it was staged a comprehensive and complete representation of all the agricultural activities of the State. Other outstanding indoor displays included the "Valley of the Giants," a realistic replica of a section of a satinay forest on Fraser Island; district exhibits, a class in which this year's competition was very keen; the "One Farm" efforts; the competitive entries in the agricultural produce section; and the rural and technical schools' array of examples of juvenile craftsmanship. Other excellent displays were those in the Meat Industry Hall, and of the Queensland Agricultural High School and College.

The Farm Boys' Camp was again a feature of the Show, and the suggestion has been made that the underlying idea of this successful plan for extending rural education might be adopted in regard to a similar camp at the Sydney Show for young Queensland farmers. The boys, who were chosen from among project club members, were the guests of the Royal National Association. School teachers all over the State are teaching the farmers of the future the value of scientific methods in every branch of husbandry, and are cultivating a genuine agricultural bias in the minds of bright young country people. They are showing, too, that scientific principles apply to grain improvement as well as to stock breeding, that agricultural science points the way to independence, and these fine lads saw object lessons in everything they viewed in their tireless quest for information.

In the Departmental Court the value of science in the paddock and in the dairy, as well as in the laboratory, was demonstrated again by experts who know their job and all its newest developments. The exhibits illustrated what can be done, and the Departmental demonstrators were in attendance to tell the farmer the best, cheapest, and quickest way of doing the work. Research results of official investigations into the many forms of animal and plant diseases were revealed, and to the man on the land it was made plain that, to-day, science is just as essential as the plough and the harrow.

The stock this year well illustrated the advance Queensland has made in animal husbandry, and it is doubtful if livestock of a higher standard could be paraded at any other Australian show. With the dairy cows it was a case of beauty and the bucket, and both were winners—a happy combination of cream-can value and showing shapeliness.

In the machinery section every exhibit was a pointer to industrial prosperity along the modern mechanical road.

Generally, a whole world of activity revolved around the Exhibition ground, and behind it all—behind the artistically arranged galleries and galaxies; behind the attractive trophies of cereal and other crops, and the colorful array of citrus and other fruits; behind the animals in the stalls and in the arena; behind all the marvellous collections of modern mechanism; behind the bustle of the whole business—there was the work of the farmer, the economist, the scientist, and the technician; and at the back of all was our great system of national education that, though by no means perfect, is already producing the fruits of hard-won and well-deserved success.



PLATE 92.—THE VICE-REGAL PARTY INTERESTED IN THE RING EVENTS.

From right to left: Lady Goodwin, Sir John Goodwin, Mr. Ernest Baynes, and Lieut.-Colonel L. E. C. Werthington-Wilmer.

### A Queensland Institution.

There is another side of the Brisbane Show, and that is its social value—the annual gathering of producers from every district in the State's immense territory, from its furthestmost boundaries, and beyond. For them it provides a clearing-house for a year's experiences and a forum for friendly argument.

Thus the Brisbane Exhibition goes on from success to success, breaking yearly every entry and attendance record. This Queensland institution, for it is nothing less, is one of the most impressive signs of our agricultural advance. It gives us something more than encouragement; it gives us the inspiration that comes from the other man's success. We realise, for instance, that the farmer who never tests his herd or conserves a ton of fodder is hopelessly out of date—for there is the evidence before us, the evidence of the Exhibition itself, that better husbandry means better business and bigger cheques; the evidence of co-operation in industry; the evidence of the common sense of mutual aid which when fully applied will lighten our common tasks, ensure our common good, and add immeasurably to our common wealth.

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### THE OPENING CEREMONY.

SIR John Goodwin said that it was a very great pleasure indeed for both himself and Lady Goodwin to be present at the Show. Every year they looked forward to the Brisbane Exhibition, and were always delighted to attend. They met so many friends from the country, and they saw so many magnificent exhibits that it was one round of delight from start to finish. He was particularly pleased with this year's show, for which there was a very large increase of exhibits displaying quality as well as quantity all round. There was a general improvement in the show in every direction—in buildings, exhibits, and what had been carried out to increase the comfort of both exhibitors and public. There were many exhibits which he had not seen, though he had been present each day. This indicated that he had not been altogether idle. As he had not seen every exhibit, he would not make many remarks concerning them generally. He thought that anyone coming from England, or for that matter, from any country in the world, who walked round the show and saw the dairy cattle, the meat, district, and farm exhibits could not be but impressed, and could not but hold the honest opinion that this show could compare more than favourably with any show in the world. It was not merely an exhibition carried on by the Royal National Association but something that fulfilled many other purposes. In his opinion it was one of the most educative factors in the State. The Association was carrying out an immense service to the people of Queensland not only in the present but also for the future. He congratulated the Association most sincerely on what it had accomplished, and for the untiring work all connected with it had put in and for their unceasing efforts to carry out improvements in the interests of the pastoralists, agriculturists, and people generally. He had much pleasure in declaring the show open.

The Vice-Regal visitors were welcomed by Mr. Ernest Baynes (President) on behalf of the Council and members of the Royal National Association.

Included in the gathering besides the Governor of Queensland and Lady Goodwin were the Governor-General of Australia, Lord Stonehaven, Lady Stonehaven; the Premier of Queensland, Hon. A. E. Moore; the Minister of Agriculture and Stock, Hon. Harry F. Walker; the Minister of Mines, Hon. E. A. Atherton; the Minister of Transport, Hon. Godfrey Morgan; the Minister of Labour and Industry, Hon. H. E. Sizer; the Minister of Education and Works, Hon. R. M. King; the Chief Justice, Hon. J. W. Blair; the Leader of the Opposition, Hon. W. Forgan Smith; the Mayor of Brisbane, Alderman W. A. Jolly; the President of the Royal National Association, Mr. Ernest Baynes; the Under Secretary for Agriculture and Stock, Mr. E. Graham; the Assistant Under Secretary, Mr. Robt. Wilson; the Director of Agriculture, Mr. H. C. Quodling; the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby; the Chief Inspector of Stock, Major A. H. Cory; the Director of Fruit Culture, Mr. Geo. Williams; the Chief Supervisor of Dairying, Mr. Chas. McGrath; the Agricultural Chemist, Mr. J. C. Brünnich; the Government Entomologist, Mr. Robert Veitch; Messrs. W. A. Affleck, J. P. Bottomley, and H. S. Cribb; the Secretary of the Royal National Association, Mr. J. Bain; and the Acting Secretary, Mr. H. W. Watson.

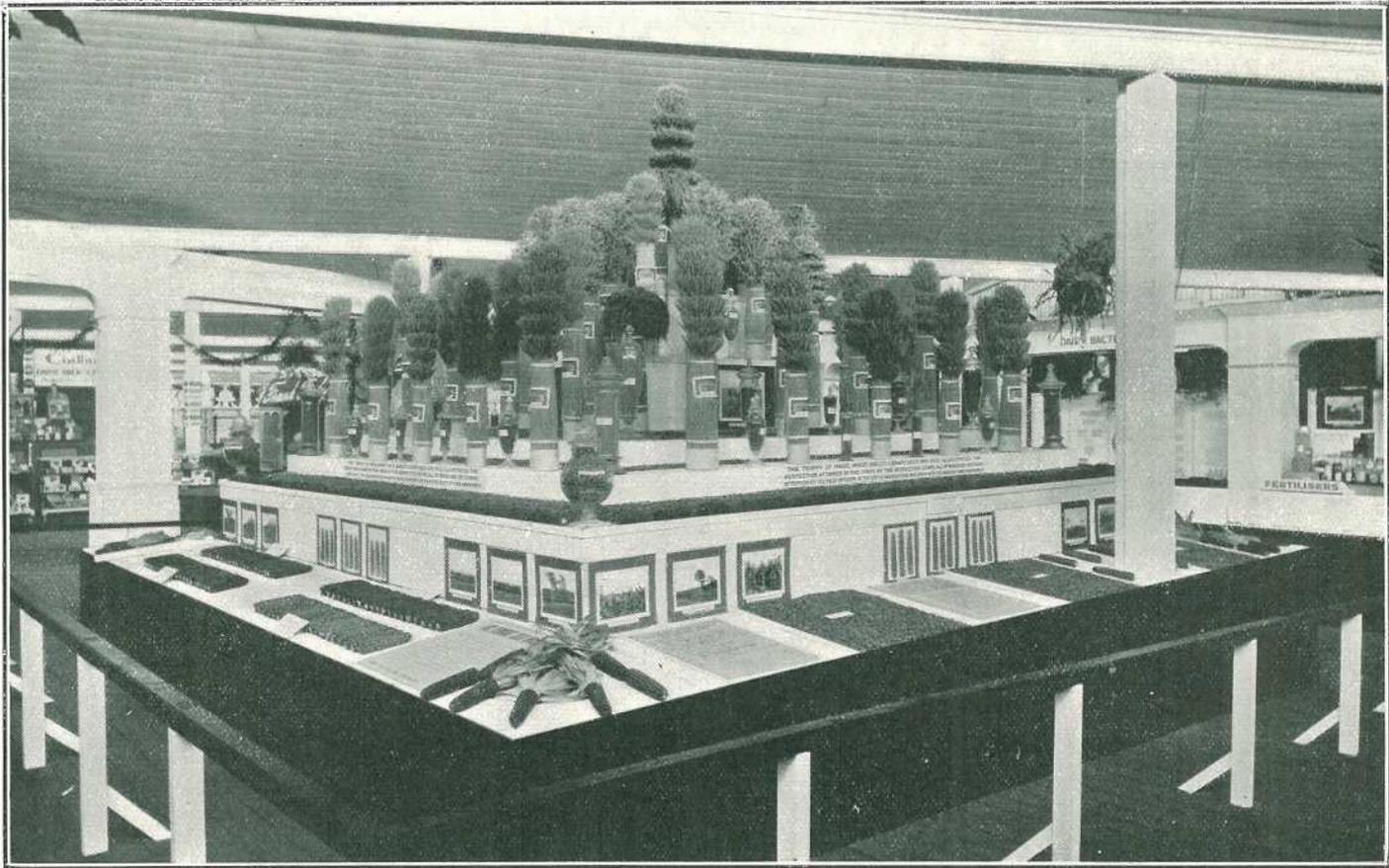


PLATE 93.—THE CENTRAL TROPHY IN THE DEPARTMENTAL COURT.

The practical results in grain improvement achieved by Departmental Plant Breeders were well illustrated in this exhibit, of which wheat and maize were the strongest features.

## THE COURT OF AGRICULTURE.

### REPRESENTATION AND REVIEW OF DEPARTMENTAL ACTIVITIES.

This year the Court of the Department of Agriculture and Stock was, as usual, a centre of great public interest, and the standard of excellence reached in the preparation and in the staging of the exhibits reflected very great credit on the officers responsible for a fine educational effort.

The activities of officers of the Agricultural Branch under the supervision of the Director of Agriculture, Mr. H. C. Quodling, were illustrated by two separate displays, one occupying the full width of the upper part of the court, and the other forming the main central trophy. The former presented a large and varied assortment of wheat, oat, and barley sheaves and grain drawn principally from Departmental experiment plots on the Darling Downs. In the preparation and staging of the sheaves the individual heads of each had been arranged in a series of "steps," giving an artistic effect. A close examination by the more practical-minded observer immediately inspired a feeling of optimism in the future of a country capable of producing cereals of such outstanding quality. The exhibit itself was so arranged that those who had the time to read the descriptive placards were impressed with the fact that the present-day producer of primary products must be a thinker, and one who, to be successful, must possess a knowledge of the underlying principles of cultivation, and with what may be termed the factors of production.

#### CEREAL CROPS—NEW TYPES EVOLVED.

##### Wheat.

In juxtaposition was a display from the Roma State Farm of wheat ears mounted on screens, with relevant descriptions, to illustrate the work of wheat breeding, and of the way in which certain unit characters appear in subsequent plant generations. The significance of this highly technical work which is carried on by Mr. R. E. Soutter lies in the breeding, selection, and development of special varieties of wheat to suit Queensland conditions; the Roma State Farm crossbreds being subsequently passed on to officers of the Field Branch of the Department for further test in different districts, and these are carried out over a series of seasons to determine the better and more dependable varieties for commercial purposes.

##### Maize.

Prominence was given on the central trophy to maize and to the improvement work carried out by the Maize Specialist, Mr. C. J. McKeon, Instructor in Agriculture. Several varieties of maize formed the subject of this improvement work, and the standard of excellence attained was manifest in the quality, type, and uniformity of the grain exhibited. Methods of seed selection and improvement were set out on the trophy in such a way that a more intimate knowledge of this important factor in the improvement in the type and yield of crops might be readily acquired. As the Department makes a practice of raising quantities of seed each year for sale to farmers, every grower has an opportunity of purchasing improved seed equal in quality and productivity to that exhibited.

An attractive assortment of wheat, oats, barley, rice, and canary seed was also included in this array of grain types and classes.

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## QUEENSLAND'S GREAT SUGAR INDUSTRY.

The varieties of cane exhibited by the Bureau of Sugar Experiment Stations included varieties from Hawaii, Java, India, Mauritius, and Queensland. The Queensland canes included new varieties raised from seed at the Sugar Experiment Station at South Johnstone. Up to the present about 34,500 of these seedlings have been raised, but many of them, of course, are weeded out in the process of selection. It is hoped this year to plant out 10,000 new seedlings in the field. Commercial trials of the best of them are now being undertaken, also experiments as to their disease-resisting qualities.

##### Testing Cane Varieties.

Before any cane varieties are allowed to leave the experiment stations they have to pass chemical and commercial trials through plant, first ratoon, and second ratoon crops. Each variety is tested not less than four times in the course of the sugar season, so that records are obtained giving farmers and millowners information

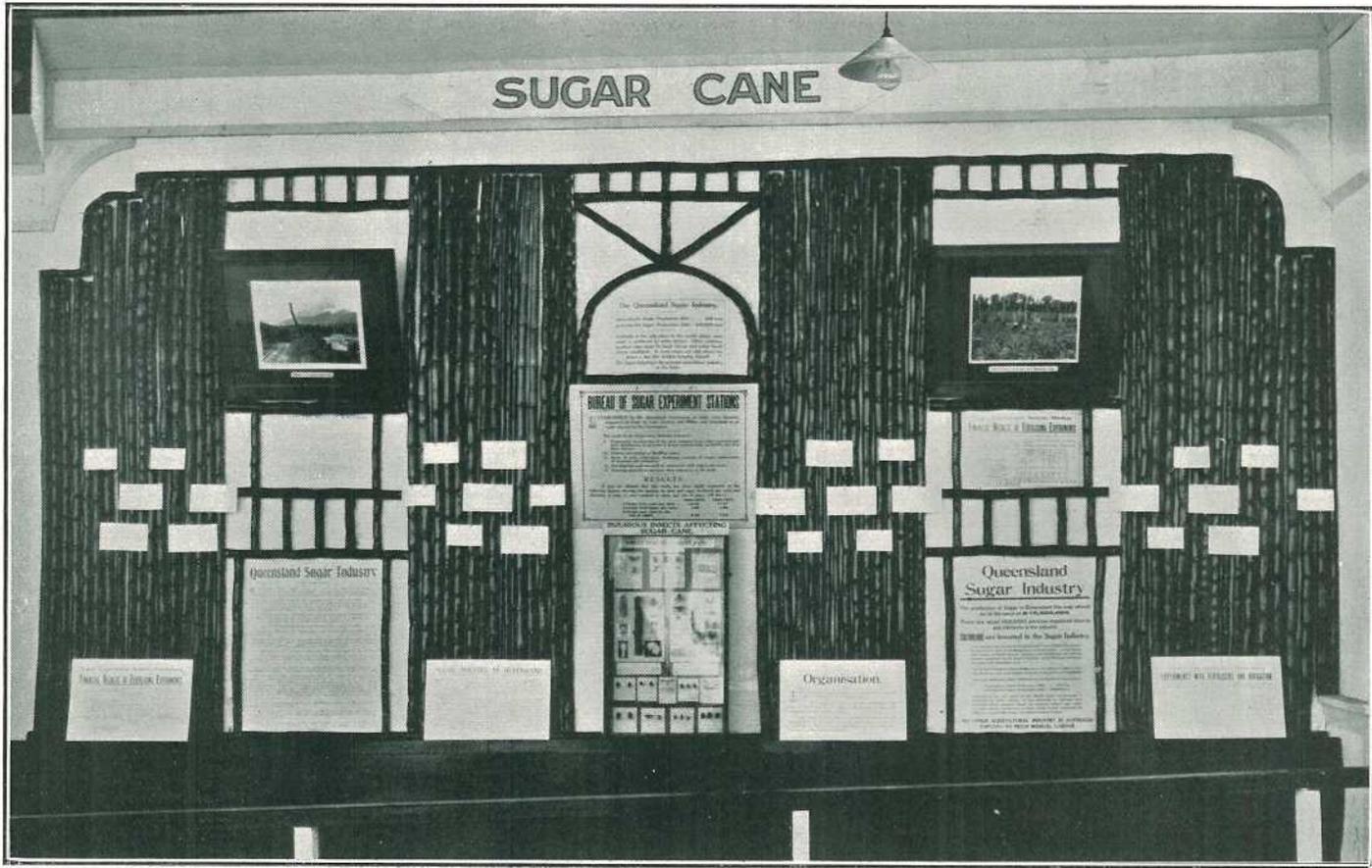


PLATE 94.—A WHITE MAN'S INDUSTRY IN A WHITE MAN'S LAND.

Cane-growing in Queensland is the only sugar industry in the world that is carried on entirely by white workers. It is the State's leading agricultural enterprise. In this bay of the Departmental Court the field and laboratory activities of the Bureau of Sugar Experiment Stations were strongly represented.

as to whether canes are early or late, and as to whether their sugar content is sufficiently high to warrant their adoption. This is combined with agricultural trials in the field, so that it may be determined whether such varieties are good croppers. They are further keenly watched for evidence of disease, and no affected canes are allowed to go into distribution. When varieties have passed these trials they are carefully examined and packed before being sent to growers living at a distance, and all canes are distributed free to growers. The worthless varieties are discarded. Information of this kind could only otherwise be secured by growers and millers at the cost of much time and money, and the rejection of many useless canes by the mills, which would be accompanied by severe loss to the growers.

Full descriptions of the varieties exhibited appeared on the cards attached to the canes, which also gave commercial cane sugar content. Many of these canes are at present undergoing chemical and field tests, while others have passed the probationary period and are being distributed to canegrowers. These varieties, however, comprise a very small part of the number of new and tested canes that have been distributed from the experiment stations during the past twenty years.

### **Sugar-cane Propagation.**

The Sugar Experiment Station at South Johnstone, near Innisfail, has for six years been engaged in the direction of raising cane from the seed. This requires the utmost care, for the seed is very minute and has to be most carefully handled. Specially prepared boxes of soil which have previously been sterilised are used. The cane arrows, when mature, are gently broken off, spread over the soil, watered, and then covered with glass plates. When germination takes place a large number of minute shoots like grass appear. When these have made further growth they are carefully pricked out into pots or boxes, and are ultimately removed to the field.

### **Soils, Cultivation, and Fertilising.**

Work at the experiment stations also comprises the study of soils, cultivation, and fertilising. It is sought to introduce improved methods of cultivation, liming, fertilising, rotation of crops, and conservation of moisture, and growers are taught the principles of cultivation during their visits to the stations, and by lectures and addresses delivered in the several sugar districts; also by the issue of bulletins. This work has been highly successful. The staffs of the stations analyse soils free for canegrowers, and give advice by personal interviews or by letter on the requirements of the soil in the way of application of lime where necessary, green manuring and fertilising, and the treatment of the land by proper soil handling. About 1,800 cane soils have so far been analysed. Cane samples are also tested free of charge, so that growers may know the best time at which to cut their cane. Field officers also move around among farmers, giving advice on cultural operations.

### **Investigation and Research.**

Investigation and research work in connection with the most serious pest of the sugar-cane, viz.—the grub, is now being carried out by the Bureau of Sugar Experiment Stations in a systematic manner, and numerous bulletins on the subject have been issued. The entomological laboratories are situated at Meringa (near Cairns), Bundaberg, and Mackay. Chemical fumigants are being successfully used in the destruction of cane grubs. A pathological staff has also been established to deal with diseases in cane, and travelling pathologists are advising cane farmers on disease questions.

### **Economic Value of Cane Cultivation—Its National Significance.**

The work of the Bureau of Sugar Experiment Stations, in relation to the promotion of the agricultural welfare of Queensland in connection with the sugar industry, cannot be over-estimated. When it is considered that this industry is the greatest agricultural one in Queensland, and will produce about 500,000 tons of sugar this year, estimated to be of the value of about £10,000,000, it will be appreciated how highly necessary it is that it should be assisted and encouraged in every possible way. Apart from its economic value, however, it has a deep national significance, and has already played a very large part in peopling the North.

### **The Sugar Belt.**

On reference to a map of Queensland it will be seen that the land in Queensland used for sugar-growing is included in a long, narrow coastal belt. Parts of this

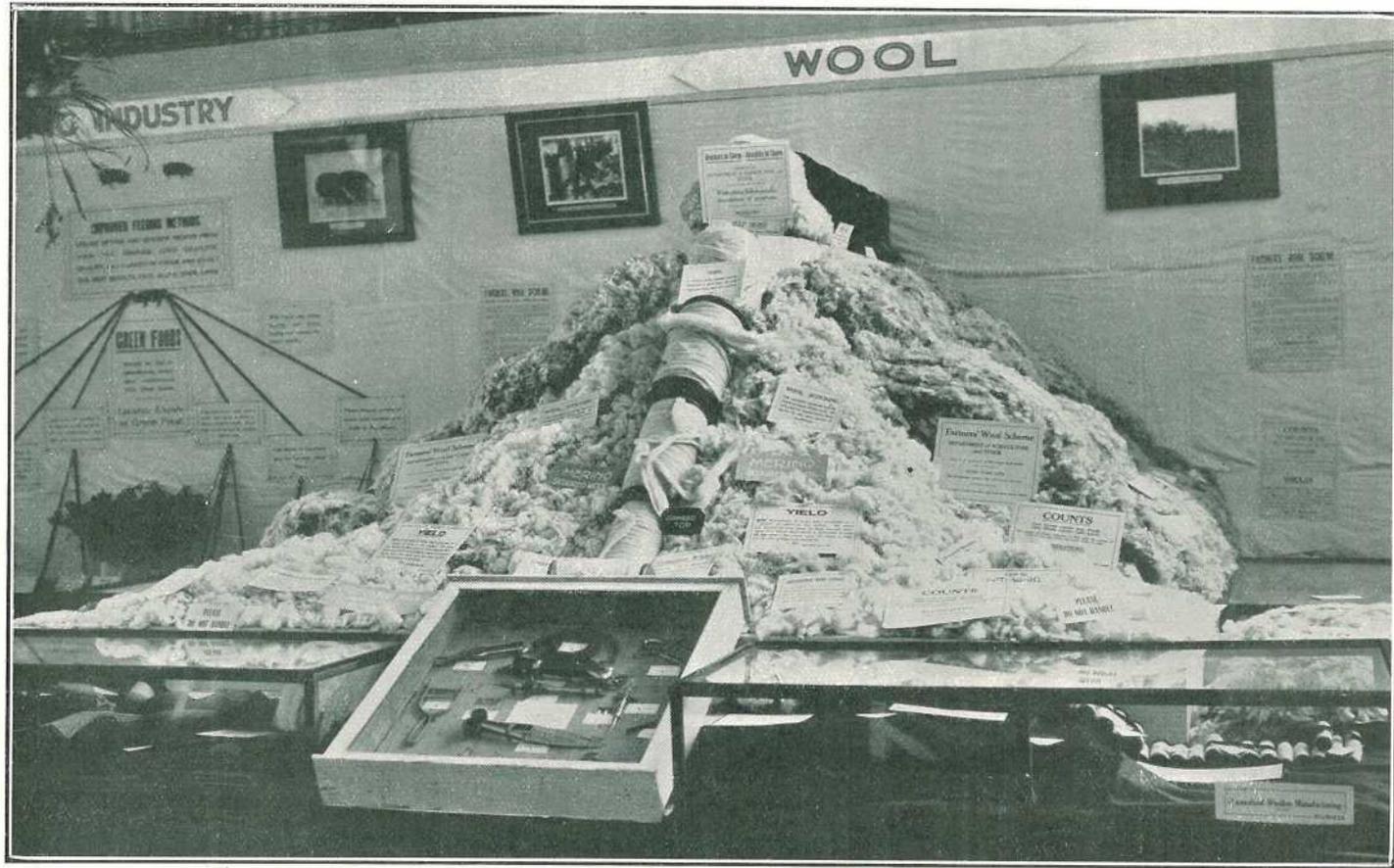


PLATE 95.—FLEECES FROM QUEENSLAND FLOCKS.

A Study of "Counts" and Classes in the Departmental Court.

For the year ending June, 1929, the total value of Queensland's Wool Exports amounted to just under £10,000,000.

belt are separated from each other by considerable tracts of non-sugar country; these latter, owing to a deficient rainfall or poorness of soil, are not suitable for cane. This belt is between latitude 16 deg. and 28 deg. south, and most of the staple is grown within the tropics.

### **Rainfall.**

The Queensland rainfall, fortunately, is highest during summer, when cane makes its greatest growth. The average rainfall in the principal sugar-growing districts is:—Cairns, 92.65; Johnstone River, 160.88; Herbert River, 84.91; Mackay, 66.67; Bundaberg, 44.40. Cane grows best when relative humidity is high, and this is naturally the case during the wet season in Northern Queensland.

Queensland's sugar production in 1867 was 338 tons, and in 1928 reached 520,000 tons, the record crop to date. The yield of cane and sugar per acre is improving, and this is due to better methods of cultivation and breeding and propagation of superior canes. The mills have also largely increased their efficiency. Over £2,000,000 have been spent during the past five years in improving existing milling plants, while, in addition, the Queensland Government has in the Tully River district the most up-to-date sugar plant in Australia.

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## **QUEENSLAND'S WEALTH IN WOOL.**

The chief features of a very fine wool exhibit covered a range of merinos and crossbreds typical of those produced in the Coastal and Western divisions of the State. The exhibit was so arranged by the Senior Instructor in Wool, Mr. J. Carew, and his assistant, Mr. J. C. Hodge, to give instruction regarding respective qualities and types staged.

A special feature was made of scoured wool, which had been treated at the Central Technical College, in order to convey to the observer and the student the importance of this phase of the industry. Wool must be scoured in preparation for manufacture, and if this work is done in Queensland before being exported, sea freight weights would be reduced about one half. The Queensland Woollen Company, Ipswich, lent manufactured materials in order to illustrate the progress of the spinning and weaving side of the industry in this State.

In order to demonstrate the uses of sheep skins in wool, the properly flayed skin, and the treated tanned and dyed skins, were displayed. In the saving and proper treatment of skins much less can be avoided.

A small outfit for drenching and treatment of sheep against parasites was on view in an effort to drive home the necessity of keeping these on hand, in case of necessity, on the farm.

A model sheep lick container, fitted for automatic feeding, was shown in order to illustrate how the lick may be supplied without exposure to the weather, and at the same time protect the lick from contamination.

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## **QUEENSLAND'S RICH NATURAL PASTURES.**

Queensland's natural pastures have always had a reputation for the quality of the grass and herbage plants composing them. The extent and variety of the Queensland grass flora were well illustrated by a comprehensive collection. Most of Australia's wealth comes primarily from her indigenous grasses and pasture plants. For the year ending June, 1929, the total value of Queensland's wool exports amounted to £9,801,129. This was only one item, and to it must be added the value of beef, mutton, and dairy and other products. Reading these figures one was impressed by the immense importance to Australia of good grasses, and the necessity for those engaged in pastoral pursuits to have some knowledge of that section of economic botany covering native pastures. Attention was directed to the fact that the Department is always willing to report on and name any collections of grasses, weeds, or fodder plants sent by farmers, pastoralists, and others. Among the grasses exhibited were the Blue grass, Mitchell grasses (of which four very distinct kinds are shown), Kangaroo grass, Flinders grass, native panicum grasses, love grasses, and native sorghums.



PLATE 96.—GRASS AND GRAIN PRESENTED IN COURT TO WIN A POPULAR VERDICT.

All our immense pastoral wealth is derived primarily from indigenous grasses and edible herbage. By systematic breeding the Department has evolved prolific wheats suitable to Queensland conditions of summer rainfall. This work has been an important factor in quadrupling our grain yield.

## WEEDS AND POISONOUS PLANTS.

A representative collection of weeds which have become a source of trouble to horticulturists, agriculturists, and pastoralists, throughout the State was exhibited. A large percentage of them have been introduced along with seeds of economic plants, which shows the necessity of the Pure Seeds Act now in force in the State. Some of the weeds have been introduced through other channels, such as among straw for packing, and imported fodder. Some were introduced originally as ornamental garden plants and have strayed from cultivation and now become the pests we know. The most notable case among these is the Lantana. Some of the most obnoxious have been introduced for hedge making, the worst example being the prickly-pear. The Khaki weed, another of the most obnoxious, if not perhaps the most obnoxious weed ever introduced into the State, is supposed to have come from South Africa at the time of the Boer War, being introduced to that country in fodder from the Argentine for army horses. In the collection were several plants poisonous to stock; among these were the Heart Leaf Poison Bush, Fuchsia Poison Bush, Poison Ironwood, Poison Peach, and Stramonium. The question of plants poisonous to stock is one of the most difficult problems that confronts the botanist and veterinarian alike in Australia. Each specimen in the collection was labelled with its name and information as to its properties, uses, and so forth. This panel was one of the most interesting in the Agricultural Court and attracted the attention of large numbers of stockowners.

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## COTTON.

The exhibit arranged by the Cotton Section for the Royal National Show illustrated the several factors that enter into the production of a bale of lint.

A comprehensive range of pictures gave an idea of the various stages in the development of the cotton plant from the time of thinning right through to the preparation of its products at the ginnery and the oil mill. Examples of desirable plant types were also on display. There were presented, too, some of the means which the cotton-breeder uses in determining the value of the product. These showed in detail the technical aspects of this work and demonstrated that all cotton is not necessarily good cotton.

In addition were shown examples of the grades for seed cotton used in grading the cotton as it arrives at the ginnery. Likewise, the equivalent grades for lint cotton were exhibited so that one could see the grade of lint to be obtained from each one of the seed cotton grades.

The exhibit also contained samples of the several by-products obtained from cotton seed, thus enabling one to grasp the general outlines of the operations from the selection of the planting seed right through the growth of the plant and the ginning and preparation of its products for commercial usage.

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## TOBACCO.

An attractive and instructive exhibit of bright tobacco leaf, produced in the Northern Division of the State, was well displayed in the Departmental Court. Occupying a central position, in the alcove allotted, was a stick of cured tobacco as it is taken from the flue-curing barn, showing the manner in which the leaf is strung on the stick after harvesting, for easy handling. Samples of different grades of leaf—such as lemon, orange, and bright mahogany—were shown side by side, thus supplying a useful comparison. Hands of the highest priced lemon colour, produced at Chillagoe, Mareeba, Hervey's Range, Charters Towers, and Pentland were shown to advantage.

Sample sections, to a depth of 2 ft. from the surface, of five soils, each characteristic respectively of collectively large areas in the North, were shown in glass containers. These soil types were considered to be most suitable for the production of bright tobacco and have so been proved in the course of the past two seasons.

Interspersed with these exhibits were cards detailing Commonwealth tobacco statistics, information regarding suitable soils, the culture of the crop and factors; while enlarged photographs of tobacco crops, plants in different stages of growth, flue-curing barns and other equipment, besides being informative added to the attractiveness of what was a most interesting display.

In the Commonwealth Year Book, it will be observed that in the totals of tobacco manufactured in this country during the five years instanced, less than

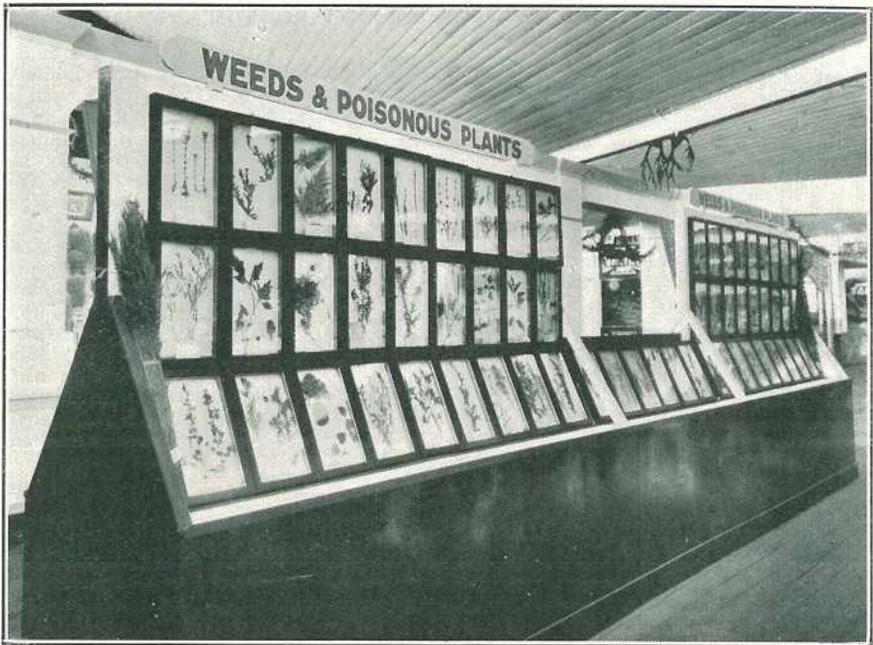


PLATE 97.—A REPRESENTATIVE COLLECTION OF WEEDS AND POISONOUS PLANTS WAS A VERY INTERESTING EXHIBIT IN THE DEPARTMENTAL COURT.



PLATE 98.—CENTRAL QUEENSLAND'S "WHITE HOPE."

This beautiful Trophy in the Court of Agriculture illustrated the fine quality of home-grown Cotton and the wide scope that exists for the further development of the industry.

8 per cent. of Australian-grown leaf was used. Since tobacco leaf has been grown in the temperate zone of Australia for upwards of fifty years, this small proportion used in manufacture denotes at least a lack of appreciation by the home smoker.

Experimental plots have been planted by the Australian Tobacco Investigation Committee in collaboration with the Department of Agriculture in several parts of tropical Queensland. The leaf from these plots on being cured, has proved to be uniformly free of objectionable aroma, while the smoking flavour is agreeable.

The encouraging and uniform results obtained in the 1927-28 season from Chillagoe in the north to Bowen in the south, and as far west as Pentland, which are included in an area of many thousands of square miles, decided the Investigation Executive to concentrate its efforts at Mareeba, where a farm was secured, the necessary buildings erected, and crops of tobacco grown during the past season. In addition small crops were grown by interested people at Chillagoe, the leaf from which was cured at the barn at Mareeba. Leaf from Pentland and the Towers was

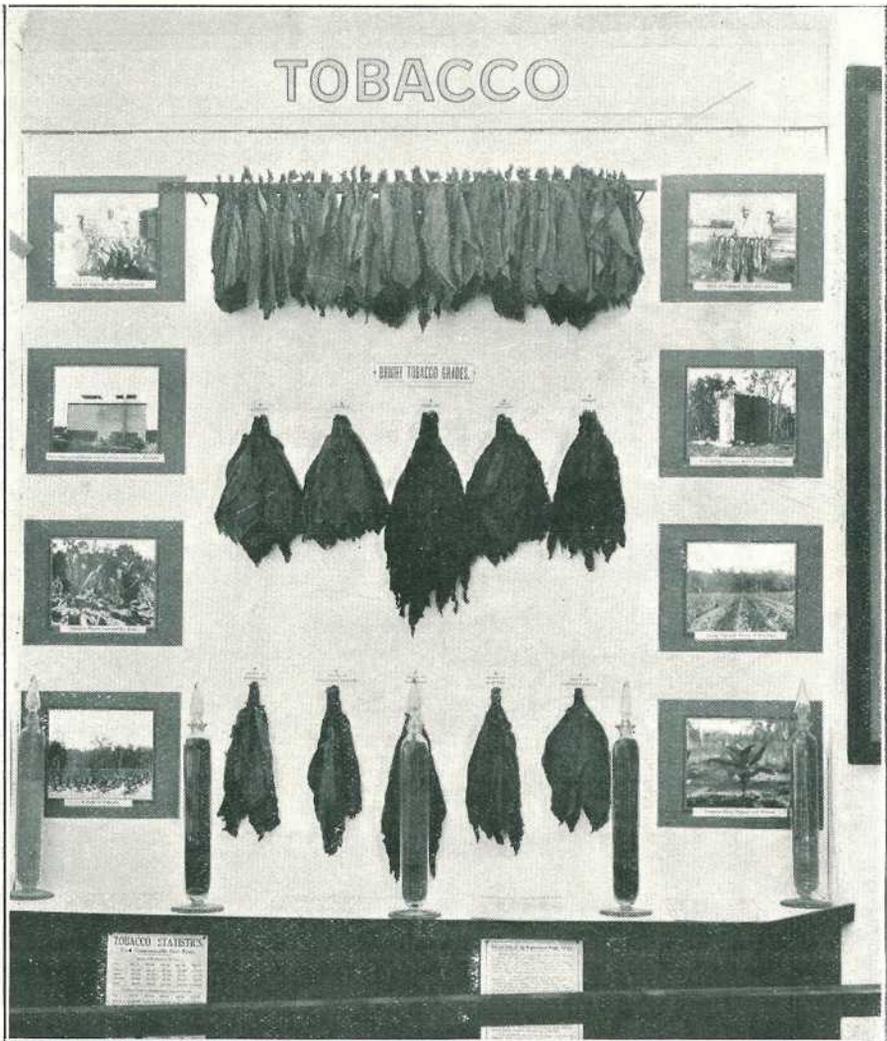


PLATE 99.—QUEENSLAND-GROWN TOBACCO LEAF.

This panel, in the Departmental Court, attracted much attention, for it illustrated the possibilities of what may soon be a thriving Queensland industry.

cured by Departmental officers at a flue-curing barn erected at Charters Towers by the Charters Towers Tobacco Development Association, and at Hervey's Range where a crop was grown by the Townsville Tobacco Development Association. This was also cured by Departmental officers in a full-sized flue-curing barn erected by the syndicate for the purpose. The leaf from these crops, samples of which were shown in the Court, was of an excellent quality, and was stated by a competent authority to be the best yet produced in Australia.

The value of tobacco, both manufactured and untreated, imported into Australia each year, apart from customs charges, amounts to upwards of £3,000,000.

The prospects of North Queensland, should the tobacco produced there meet, as is anticipated, widespread approval, would be extremely bright.



PLATE 100.—A REPRESENTATION OF WHAT THE DAIRY INDUSTRY MEANS TO QUEENSLAND.  
This great enterprise now ranks next to Sugar in aggregate annual value.

**DAIRYING.**

The Dairy Exhibit was again a comprehensive and most instructive one. The principal products of milk were shown in various stages of manufacture.

The chemical constituents of a gallon of milk, a pound of butter, and a pound of cheese were exhibited in their exact quantities as separated by the analyst. Samples of by-products were shown and their value emphasised. Desiccated butter milk, for instance, was on view in its early and finished stage; this by-product is invaluable as a supplement to ordinary poultry foods, and although there is a good demand for the present output there is much room for its expansion in Queensland, which would prove of mutual benefit to the dairyman and poultry breeder alike. Casein is probably the most valuable product of skim milk, and its multiple uses were featured. Coloured graphs effectively showed at a glance the wonderful advance Queensland has made in the production of butter and cheese since 1890.

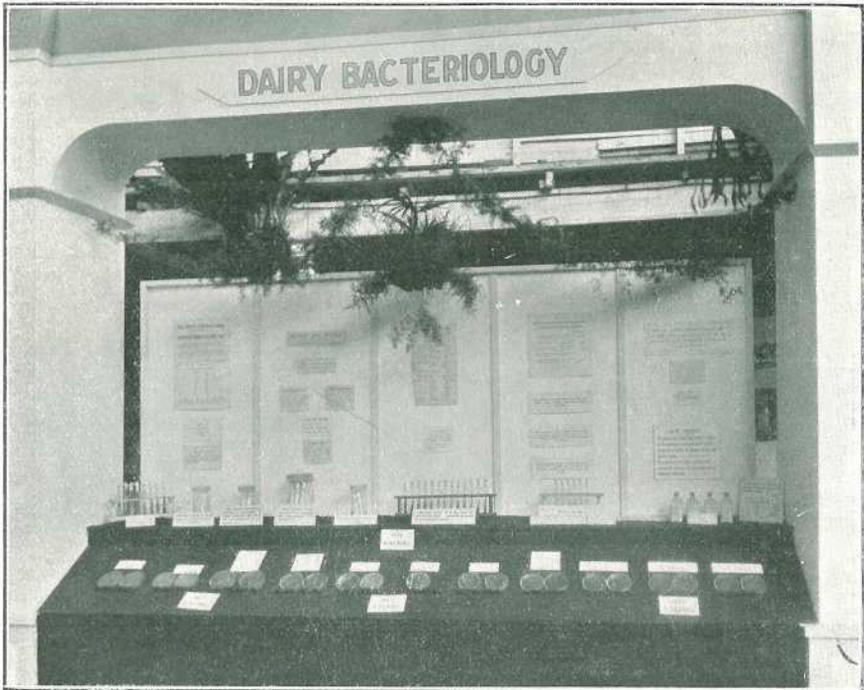


PLATE 101.—MILK AND MICROBES.

The need for scrupulous cleanliness in the milking-shed and dairy was amply and eloquently illustrated in this alcove in the Court.

The space on the right of the Dairy Alcove was devoted mainly to matters relating to herds and herd testing. A full range of scientific instruments in general use were on view. The space on the left was devoted solely to bacteriological specimens as they affect dairy products. As the importance of bacteriological influences in relation to this industry are becoming more generally recognised, a close study of these specimens proved intensely interesting and instructive to farmers and factory operators alike. The exhibit was neatly arranged and is complete in every detail.

**STOCK EXPERIMENT STATION EXHIBIT.**

The exhibit from the Yeerongpilly Stock Experiment Station was devoted largely to the subject of milk hygiene. Cultures of bacteria isolated from milk were shown and included organisms from inside the cow's udder; the hide of the cow; the air; flies; the milker; and milk utensils.

Plate cultures were used to demonstrate that sterilised utensils do not furnish any bacteria to milk. Samples of milk showing that if certain measures of strict cleanliness are adopted, it is possible to procure them from a healthy udder and which would keep indefinitely, were exhibited. Disease-producing germs which

flourish in milk and come largely from human sources, namely typhoid and diphtheria bacilli, were displayed and were used as an object lesson on the necessity of greater care in the handling of milk. Undesirable germs, frequently present in milk, butter and cheese, some of which produce faults in flavour, texture, and colour, were also featured. Explanatory cards dealing with practical methods of prevention of milk contamination accompanied many of the specimens.

The necessity for the proper cleaning and sterilising of dairying utensils on the farm and in the factory was strikingly demonstrated by a series of plate cultures inoculated from rinsings from milk cans and other utensils.

Another section of this exhibit housed near the Meat Industry Hall illustrated the subject of Applied Bacteriology in relation to food preservation. It showed that modern methods of food preservation are processes the success of which depends on the total or partial elimination of bacterial life.

Samples of food preserved by heating, drying, smoking, salting, and otherwise, or by a combination of these processes, were exhibited. These processes were fully explained, and the effects demonstrated by plate cultivations. It was also emphasised by demonstration that all methods of food preservation largely depend on destruction or control of germ life.

The cattle tick problem and methods of control again received strong illustration, and the advantages and practicability of tick eradication were effectively brought under notice by means of official maps showing the progress of the tick eradication campaign in America. The latest return indicates that of the original 740,000 square miles of tick-infested country in 1906 in the United States, nearly 600,000 square miles have been cleared up, and the cattle released from quarantine restrictions.

Specimens illustrating the various prominent lesions of tuberculosis in animals, more especially pigs and bovines, were on view, and these were accompanied by explanatory cards indicating mode of infection and methods of prevention.



PLATE 102.—A CORNER OF THE COURT. THE VALUE OF THE DEPARTMENTAL HERD-TESTING SCHEME ILLUSTRATED.

Every farmer who hopes and works for better returns realises the necessity of increasing production by herd improvement.

### PIG RAISING.

Though the display associated with pig raising in the Court was limited in extent, it was but one of half-a-dozen pig-raising displays in different sections of the Exhibition. In the Livestock and Meat Industry Hall, for instance, three alcoves were allotted to this industry—one, an extensive array of factory products for which there is ready sale both locally and interstate; one a display featuring pork other than the cured article; and one a selection of bacon pig carcasses classed as "Ideal" by the ham and bacon curers of Queensland. At the Pig Section, an instructive display featuring different grades of bacon, ideal and otherwise, was arranged; while the trade displays staged by the several bacon-curing establishments were both extensive and pleasing to the eye.

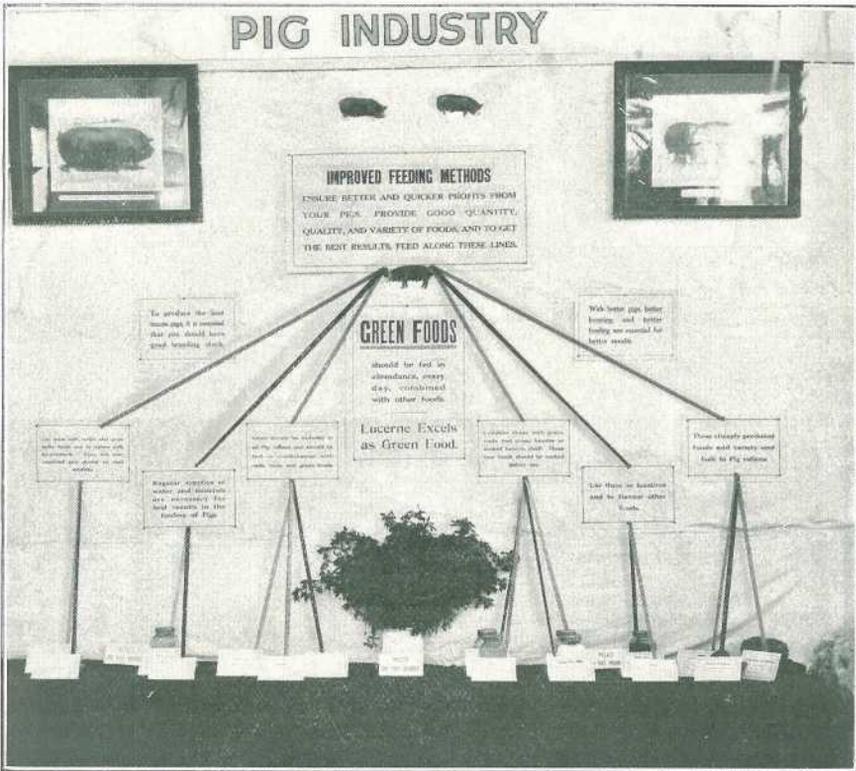


PLATE 103.

The Sound Educational Value of Departmental Work for the Pig-farmer was well Illustrated.

In the Agricultural Court the special points emphasised were Feeds and Feeding, a most necessary and important side of the pig farming business.

From an economic point of view, pig raising in this State is complementary to several other branches of farming, and production is increasing and quality is improving.

It was demonstrated that improved feeding methods ensure better and quicker profits from pigs, and the farmer was urged to provide food in good quantity, of good quality and variety in order to secure the best results. Green foods should be fed with a liberal hand every day, and the combination of these with other more concentrated foods was stressed, as also was the necessity for regular supplies of clean drinking water and mineral matters; while it was suggested that grain should be included in all pig rations and should be fed in combination with milk, roots, and greenstuff.

Samples of the foods were exhibited. Maize was stated to be Queensland's best grain for stock and a most valuable pig food, but only so when fed in conjunction with milk products, lucerne, and other nitrogenous foods.

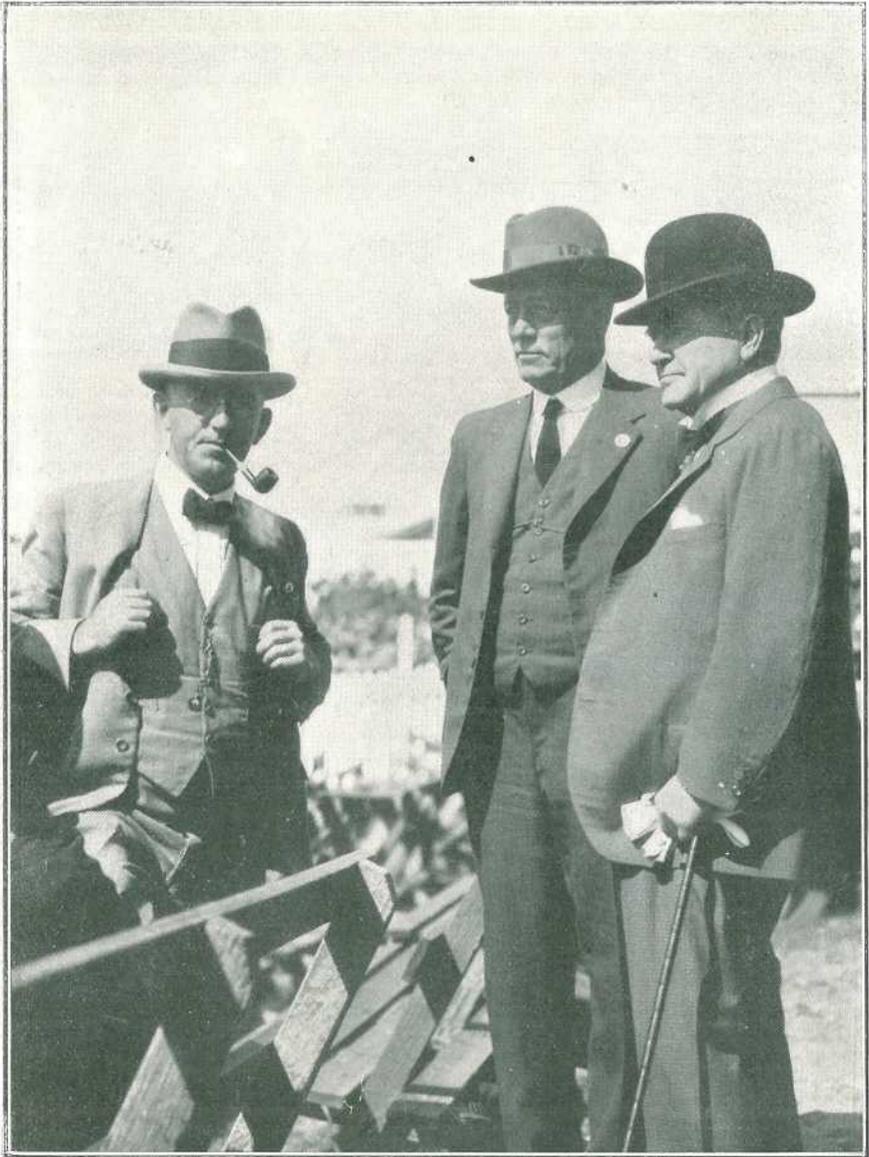


PLATE 104.—AN ENTENTE CORDIALE—QUEENSLAND GETS A UNANIMOUS VERDICT.  
*Right* : Hon. J. W. Blair (Chief Justice of Queensland); *Centre* : Hon. Harry F. Walker  
(Minister for Agriculture and Stock); *Left* : Hon. W. Forgan Smith (Leader of  
State Opposition),



PLATE 105.—THE VICE-REGAL ESCORT. TROOP OF QUEENSLAND MOUNTED POLICE.

The Queensland Mounted Police is noted for the efficiency and all-round smartness of its expert horsemen. The horses are representative of the famous "Waler" type, so popular as cavalry chargers in Imperial and Dominion Armies. They were bred on the Government Remount Station in Central Queensland.



### POULTRY RAISING.

Owing to the extensive development that has taken place in the poultry industry during recent years and the necessity for exporting an increasing number of eggs from year to year, it was thought desirable in planning the Poultry Exhibit to try and bring before the poultryman the necessity of producing a greater percentage of eggs fit for the world's markets.

The expansion that has taken place was indicated by a few statistics relating to the operations of the Queensland Egg Board, which has been in existence for some years. There are only two methods by which this increase may be coped with; one is by an increased consumption and another by export. To obtain either, quality of the produce is essential, and the exhibit was designed with the object of pointing out to producers factors under their control which affect the quality of the product.

Poultrymen were reminded that attention to breeding and feeding, housing, and marketing are most important factors in production. Breeding, it was pointed out, not only has a definite bearing on the number of eggs a bird will produce, but also is largely responsible for the size of the egg. For profitable export it is necessary to have other things as well as size. The yolk of an egg should have a good colour; there should be no evaporation of the natural moisture contents, and the shell should be unsoiled. Cards and photographs indicated the directions in which producers should engage their attention with the object of retaining to the greatest degree possible the natural quality of the egg.

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### ENTOMOLOGY AND PLANT PATHOLOGY.

As in previous years the Division of Entomology and Plant Pathology staged an extensive exhibit dealing with the more important pests and diseases that come within its province.

The Entomological Branch of the Division was represented by an extensive series of thirty-four exhibition cases dealing with the life histories of fruit, vegetable, grain, cotton, and stock pests. Each of these cases contained a comprehensive series of water-colour sketches of the various stages through which the insects pass in their life cycles. In most instances typical specimens of the injuries inflicted by these pests were also illustrated. The value of the display was further enhanced by a large series of plant specimens, fruit, foliage, twigs, and roots, showing the actual insect damage. The water-colour sketches were the work of Messrs. I. W. Helmsing, E. Jarvis, and H. Jarvis. The exhibition cases displayed were in most cases based on original life history studies made by officers of the Branch.

An exhibition case of outstanding interest was that dealing with the sawfly associated with cattle-poisoning fatalities in certain of the pastoral districts. Important fruit pests dealt with were the Queensland fruit fly, the spiny orange bug, the codling moth, and the San José scale. The bean fly, which has been particularly destructive this year, was fully illustrated; and the moth that so frequently injures potato tubers in its larval stage was also adequately dealt with. Grain weevils and pea and bean weevils were important insects exhibited this year. Banana pests were also dealt with in three cases containing a comprehensive range of these insects.

A special panel of cases was used to illustrate matters of general entomological interest, and included therein were two cabinets containing the stomach contents of insectivorous birds, and demonstrated very effectively the economic value of many of our native birds.

The entomological exhibit was arranged by Mr. J. A. Weddell, under the supervision of Mr. Veitch, Chief Entomologist.

The Pathological Branch was again represented by a very extensive series of preserved plant specimens illustrating the commoner diseases of many of our important economic plants. Special attention was given to the diseases of bananas, tomatoes, and citrus; and a representative series of specimens illustrating flag smut of wheat, which has been abnormally prevalent on the Darling Downs during the past season, was also featured. A series of coloured illustrations of diseases was another valuable feature of the display. This section was arranged by Mr. R. B. Morwood, acting under the supervision of Mr. J. H. Simmonds, Plant Pathologist.



PLATE 107.

These panels, in the Departmental Court, were centres of attraction for producers and students



PLATE 108.—HOW QUEENSLAND FARMERS ARE SERVED BY SCIENCE.  
The Valuable Work of the Entomologist and Plant Pathologist was well displayed in the Departmental Court.

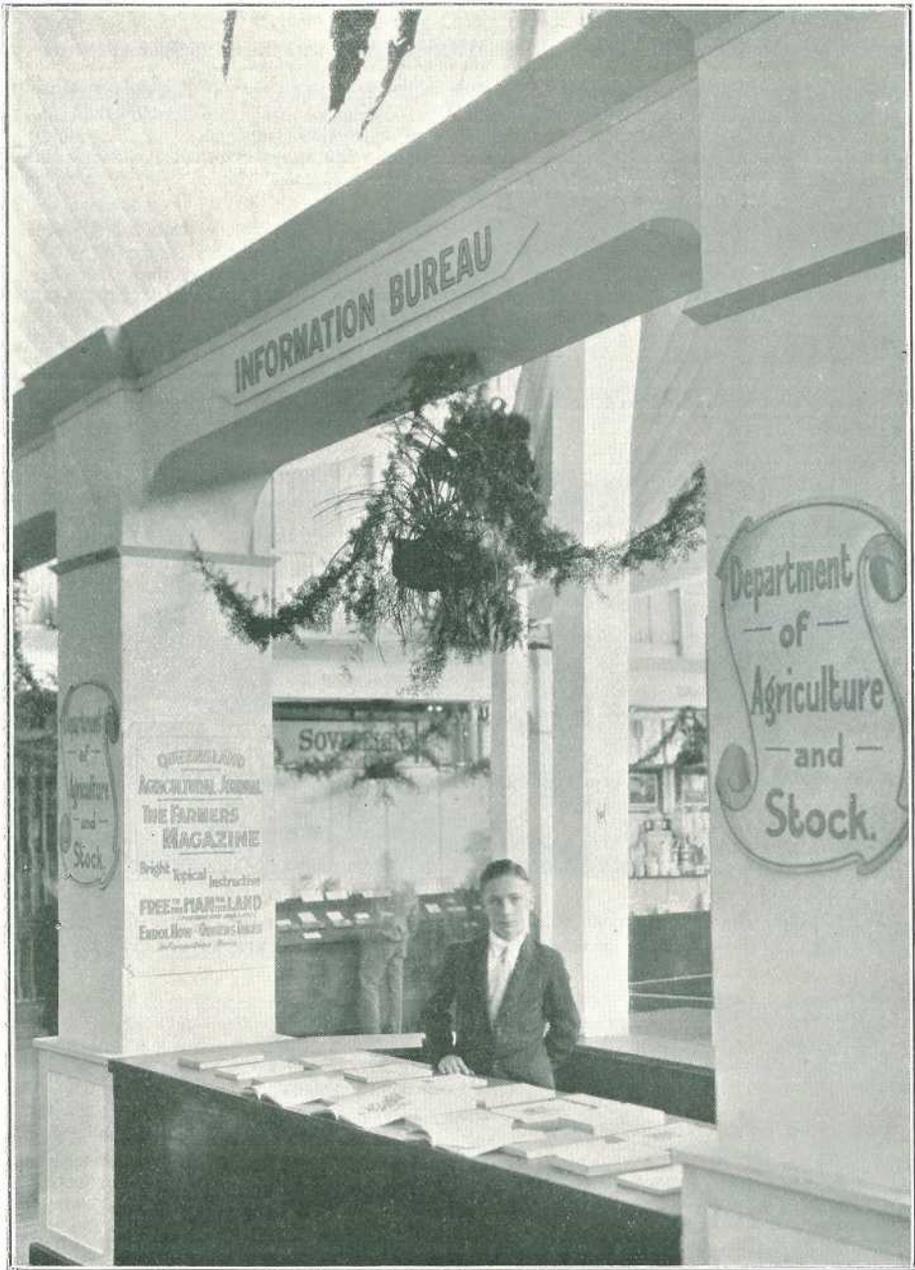


PLATE 109.—THE JOURNAL ALCOVE WAS A CLEARING HOUSE FOR DEPARTMENTAL INFORMATION. (MR. ERIC KEEHN IN ATTENDANCE).

## SEEDS, STOCK FOODS, FERTILISERS, AND PEST DESTROYERS.

A small exhibit by the Seeds, Stock Foods, Fertilisers, and Pest Destroyers Branch of the Department of Agriculture directed attention to the legislation regulating the sale of these materials.

The Exhibition brought merchants and storekeepers from all parts of the State to Brisbane, and those interested in the sale of seeds for sowing, stock foods, stock licks, fertilisers, cattle and sheep dips, were advised to call at the Department of Agriculture and discuss with the Officer in Charge of the Investigation Branch some of the problems that arise in connection with these materials. All persons in any way connected with the sale or purchase of what may be called the farmer's raw materials would do well to apply for a copy of the extract from the Department's Annual Report dealing with this subject.

The impurities of frequent occurrence in stock foods and agricultural seeds were represented in the exhibit by a collection of ninety named weed seeds, from which it was possible for both merchant and farmer to identify some of these far too frequent impurities. The old saying that one year's seeding makes seven years' weeding is far nearer the truth than many think, as weed seeds do not always germinate during the first year. It is also possible to find dodder in lucerne paddocks as the result of dodder seeds carried by flood or by animals that have grazed over dodder-infested land. The one and only way to get rid of weeds that produce seeds is to prevent them from seeding; which is a matter in the hands of those who occupy the land.



PLATE 110.—THE ECONOMICS OF AGRICULTURE IN SOME IMPORTANT PHASES WERE ILLUSTRATED IN THIS INTERESTING EXHIBIT.

From a card headed "Germination Standards for Agricultural Seeds" it was learnt that with the exception of Mauritius beans, Rape, and Mangel, the agricultural seeds used in Queensland are produced in Australia. Mauritius beans used largely in the sugar districts for green manuring are frequently of poor germination. Buyers would, therefore, be well advised to ascertain the percentage of germination before sowing. In the case of canegrowers or farmers buying seeds for their own sowing no charge is made; merchants or others selling seeds are charged the nominal sum of 2s. 6d. per sample.

For the guidance of those interested, printed cards set out both the accepted common and scientific names of many weeds of frequent occurrence, also the names of the materials in which they are usually found.

From the printed matter relating to vegetable seeds it was noted that Queensland's principal supplies are obtained from overseas; and for the information of buyers the minimum germination required for each kind was given.

Under the Stock Foods Acts all meals must be labelled setting out the minimum percentage of crude protein and crude fat, also the maximum percentage of crude fibre. A card in the exhibit gave the nutritive values of meals made from whole grain as compared with wheat by-products—bran and pollard. The Stock Foods Acts now include stock licks and mineral foods. A card entitled "Bone Meal and Rock Phosphates for Feeding Purposes" set out that definite standards have

now been fixed for these materials. Roughly, all sterilised bonemeal must be of such fineness as to permit 95 per cent. by weight passing through an aperture of one twenty-fifth of an inch. Nauru phosphate must also be of such fineness as will permit of at least 95 per cent. by weight passing through an aperture one-hundredth of an inch. Buyers are warned that the ordinary bonemeal and Nauru phosphate prepared for sale as fertilisers are not suitable for feeding purposes. The amount of phosphoric acid contained in these materials must appear on the label. Pastoralists and others interested in the use of stock licks and mineral feeds are strongly advised to consult the Department and at all times refrain from the purchase of material not bearing the seller's guarantee. Particulars of the Acts' requirements were set out on a card in the exhibit.

The new system of grass land management was explained as making the most of young and short grass, which is of much better feeding value than grass that has begun to produce flowering stems. Young grass provides a ration that favours meat, milk, and growth generally, against old grass which, in some cases, barely provides for maintenance. Grass can be kept at its best by intermittent or rotational grazing and, on the coastal areas, by the application of a sufficient quantity of a suitable fertiliser which, in many cases, means sulphate of ammonia. Samples of the various kinds of sulphate of ammonia were exhibited. These included the ordinary quality manufactured by the Southern gasworks, which, unfortunately, is somewhat difficult in storage. The dry-neutral sulphate of ammonia with a nitrogen

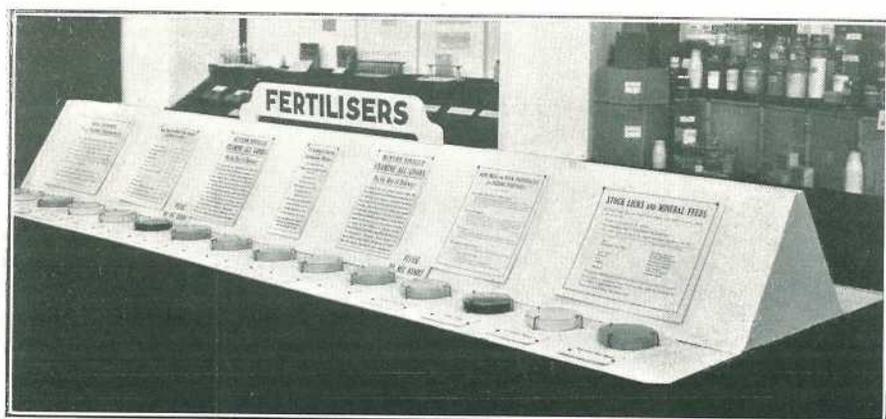


PLATE III.—THE PURE SEEDS, STOCK FOODS, AND FERTILISER BRANCH HAD AN EDUCATIVE DISPLAY THAT ILLUSTRATED A VALUABLE SERVICE TO THE MAN ON THE LAND.

content of not less than 20.6 per cent. is a great advance in physical condition over the ordinary ammonium sulphate, and a sample of the new English product with a minimum nitrogen content of 20.6 per cent. was shown. This was well worth looking at, as the colour and fineness of Billingham sulphate of ammonia never varies. As soon as supplies of this material are available in commercial quantities, it is anticipated that a considerable reduction will be made in the Queensland price of ammonium sulphate. As canegrowers are by far the largest users, this reduction in price will be of material help. From the foregoing it will be seen that nearly every country in the world is drawn on for some of the supplies required by agriculturists.

Fertilisers undoubtedly comprise by far the largest tonnage of prepared chemicals used on the land. They are not, however, the only ones, as both animal and plant life are subject to pests and parasites, causing untold losses to pastoralists, farmers, and others. These pests are fought and controlled by chemicals both inorganic and organic. The growing practice of supplementing feeding stuffs with mineral mixtures in most cases pays. The materials now used for these purposes are not only varied in character but great in quantity.

Until a few years ago the principal cattle dips, sheep dips, and other pest destroyers were imported from overseas. During the last two years an increasingly large quantity has been manufactured in Australia by manufacturers who have established works both in Queensland and in the Southern States for this particular purpose. Altogether this display, illustrating as it did new ideas and new methods, was most interesting to all engaged in land industries.

## THE MEAT INDUSTRY.

### AN EXCELLENT EXHIBIT.

**I**N officially opening the Meat Industry Hall at the Brisbane Exhibition, the Premier (Hon. A. E. Moore) said it as one of the finest exhibits that could be staged. He urged sheep and cattle growers to improve the quality of the stock so as to meet fierce international and interstate competition.

Mr. J. B. Cramsie (chairman of the Meat Industry Board of New South Wales), who recently returned from a world tour in the interests of the meat industry of Australia, said that it was the finest meat exhibit he had ever seen. He urged producers to organise, and he hoped the time would come when Australia would stand in the very forefront as the Argentine of the Pacific.

Mr. Ernest Baynes (president of the Royal Association), in welcoming the Premier, said the primary purpose of the display was to promote the interests of the live stock industry, and, although the association's activities in this direction were only two years old, he was confident that the great primary industries were awakening to the fact that the merits of their finished products would be better understood through exhibits of that nature.



PLATE 112.

The Spirit of Queensland was reflected in the Premier's smile.

### Importance of By-Products.

Mr. Baynes explained that the main portion of the exhibit dealt with live stock as a source of food supply, but as meat production and the production of many other necessities of life went hand-in-hand, prominence also was given to the importance of by-products. Take the bullock, for example: If a 1,000-lb. live-weight bullock could be used for nothing but its food value there would be approximately 440 lb. of waste, and if this were not convertible into usable products, either the producer would receive less for his animal, or the consumer would pay more for his food.

In the by-products exhibits they welcomed the co-operation of several Southern industries, particularly as they absorbed a large percentage of the live stock and of raw by-products produced in Queensland, but they also looked forward to the expansion of similar industries in Queensland, believing that it was an economically sound principle that manufacturing should be performed as nearly as it efficiently could be to the source of its raw material, which suggested that, in course of time, less live stock and less of the raw by-products should be shipped away from this State, and that manufactured products should be substituted. In these days food products could be given a wide distribution without the slightest deterioration in quality or wholesomeness. There were several other means of bettering the status of the live stock industry. One, the branding of carcass meat as a guarantee of quality; another, the attention that might be given to the nutritive value of the cheaper cuts of meat. A little demonstration of each of these subjects was included.

Mr. Baynes added that the finished products in the exhibit were particularly interesting to housewives. Producers of live stock should bear in mind that their final purpose was to produce beef, mutton, lamb, pork, or veal of a quality that would be attractive to the consumer. The exhibit dealt with the live stock industry as one unit rather than with any particular branch of it. Its different branches had different problems, and some very real ones.

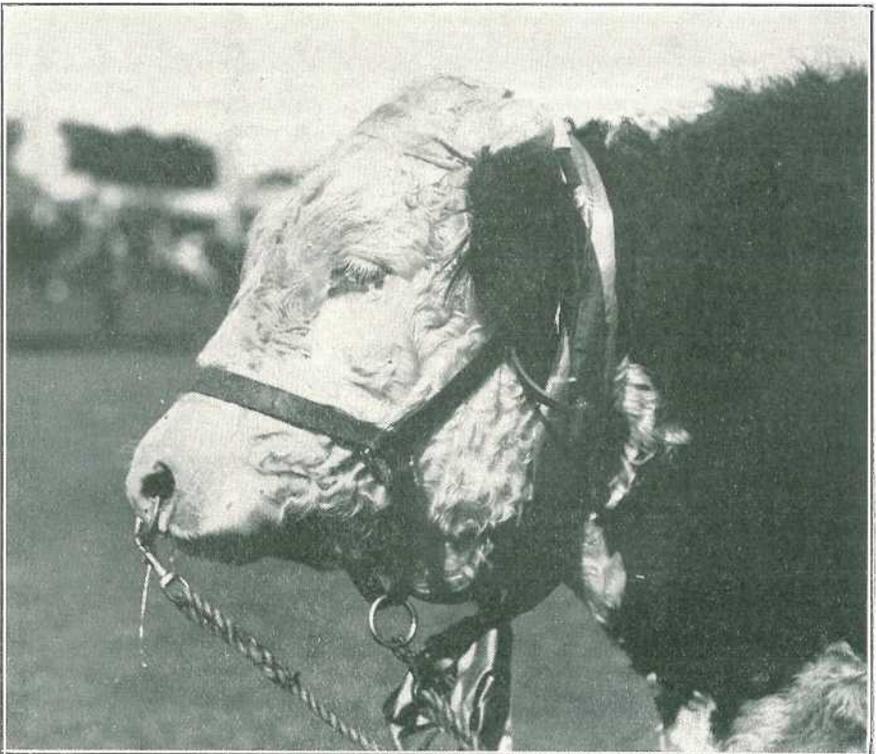


PLATE 113.—A NOBLE PROFILE—HEAD OF THE CHAMPION HEREFORD,  
MR. S. N. INNES' HOBARTVILLE FOREST KING.

## DAIRY CATTLE AT THE SHOW.

### ILLAWARRAS.

THE Illawarra Milking Shorthorn breed was one of the largest on the entry list, and attracted most attention. The judge, Mr. James Young, of Raleigh, New South Wales, was particularly impressed with the aged cows and bulls, and he said the younger stock were certainly impressive.

The aged classes were particularly strong, and were in excellent condition. There was a very strong contest in the aged cows, 5 years old or over, in milk, and culling was rigidly adhered to. It was a most difficult job to make a selection. It was evident that the judge was impressed with Mr. A. T. Water's Favourite 2nd of Railway View, which annexed the blue, and at a latter period was proclaimed champion of the Illawarras. This beast was a rich red, and it may be here mentioned that the reds predominated throughout the section. The cow, 4 years old and under 5 years, in milk, was one of the prettiest classes the writer has seen for years, and speculation was high as to which would secure first honour. It was quite evident that Mr. J. Phillip's Myrtle 4th of Temor Grove caught the eye of a keen judge, and she secured the blue, with Mr. A. Pickels' Lady Kiama of Blocklands a close second. The younger classes began to come in, and great was the excellence. For cow, 3 years old and under 4 years, in milk, the first prize was captured by Mr. A. T. Waters' Fussy 5th of Railway View. The milking qualities of the aged cows was a revelation, and they were all in the pink of condition.

The more youthful females were a feature on their own, and bore striking evidence of care and well-chosen methods on the part of their breeders. The heifers, 2 years old and over 3 years, in milk, were of high class, and Ivo 2nd of Dnalwon, owned by Mr. A. J. Caswell, secured a well-merited blue ribbon with a runner-up of merit in Mr. A. Pickels' Lady Myrtle 2nd of Blacklands. For the cow, 5 years old or over, in calf or dry, competition was keen. Mr. R. A. Scott's Golden of Waverley shone out, and finally secured the first honour. For cow, 4 years old and under 5 years, with calf or dry, a spirited contest took place, and Mr. C. W. Heading's Red Rose of Headlands won. This was one of the most interesting classes of females. The heifer class, of 12 months old and under 18 months, attracted a particularly choice collection of excellent animals, with rich reds prominent, and a few beautiful roans. Mr. A. T. Waters, with his Favourite 8th of Railway, was again successful in annexing the first prize, with Mr. G. W. Reading's Irene 2nd of Headlands a well-earned second. There was a very fine exhibit of heifer calves, 6 months old and under 12 months, and a little picture, named Mona 5th of Oakvale, owned by Mr. B. O'Connor, scored. The children's half class attracted considerable attention, and Miss F. Hickey had no trouble in scoring a first for a pretty little pearl called Primrose of Glendalough.

The showing of groups gave the general public an insight into the class composed of male and females, with their offspring, and probably no class was better suited for exhibition purposes. They were valuable, as well as beautiful to look at. The group of three cows, 3 years old or over, in milk, or dry, provided a rich class, and Mr. A. T. Waters came first, with Mr. A. Pickels second, and Mr. B. O'Connor third. The group of three heifers, under 3 years old, in milk, or dry, bred and owned by the exhibitor, caused a weighty and anxious time. The judge gave Mr. A. Pickels first, B. O'Connor second, and S. Henry third.

Probably no other show in the Commonwealth to-day possesses the splendid type of bulls that was seen here. Every beast possessed quality, and was in the pink of condition, but a few animals on the scraggy side should never have left the farm. There was a very keen contest when the bulls, 4 years old or over, were brought before the judge. The class was one of the largest of the day, and reds again predominated. Culling, it was noticed, was inevitable, and the bulls sent out looked as though they had no right to be there, for they certainly chewed their euds. "Wonderful," was the comment of the judge regarding those which were left, and indeed they were more than wonderful, for they bore the stamp of quality, combined with stamina. All eyes were on Lord Kitchener of Werona, owned and bred by Mr. J. W. Johnston. This beast bore the aristocratic element of the great war general, being a massive, well-built animal, with a wonderful constitution. He not only secured the blue, but carried the championship of all the Illawarras at the show. Another well-ribbed sire, owned by J. H. Weber, Radiant of Greyleigh, a rich red, came a good second. For the bull, 3 years old and under 4 years, Mr. Charles Francis, with his Limestone of Culvallis, secured first; and a young and well-proportioned bull, owned by Mr. J. Phillip, called Jellicoe of Headland, of 2 years old and under 3 years, also annexed first place.

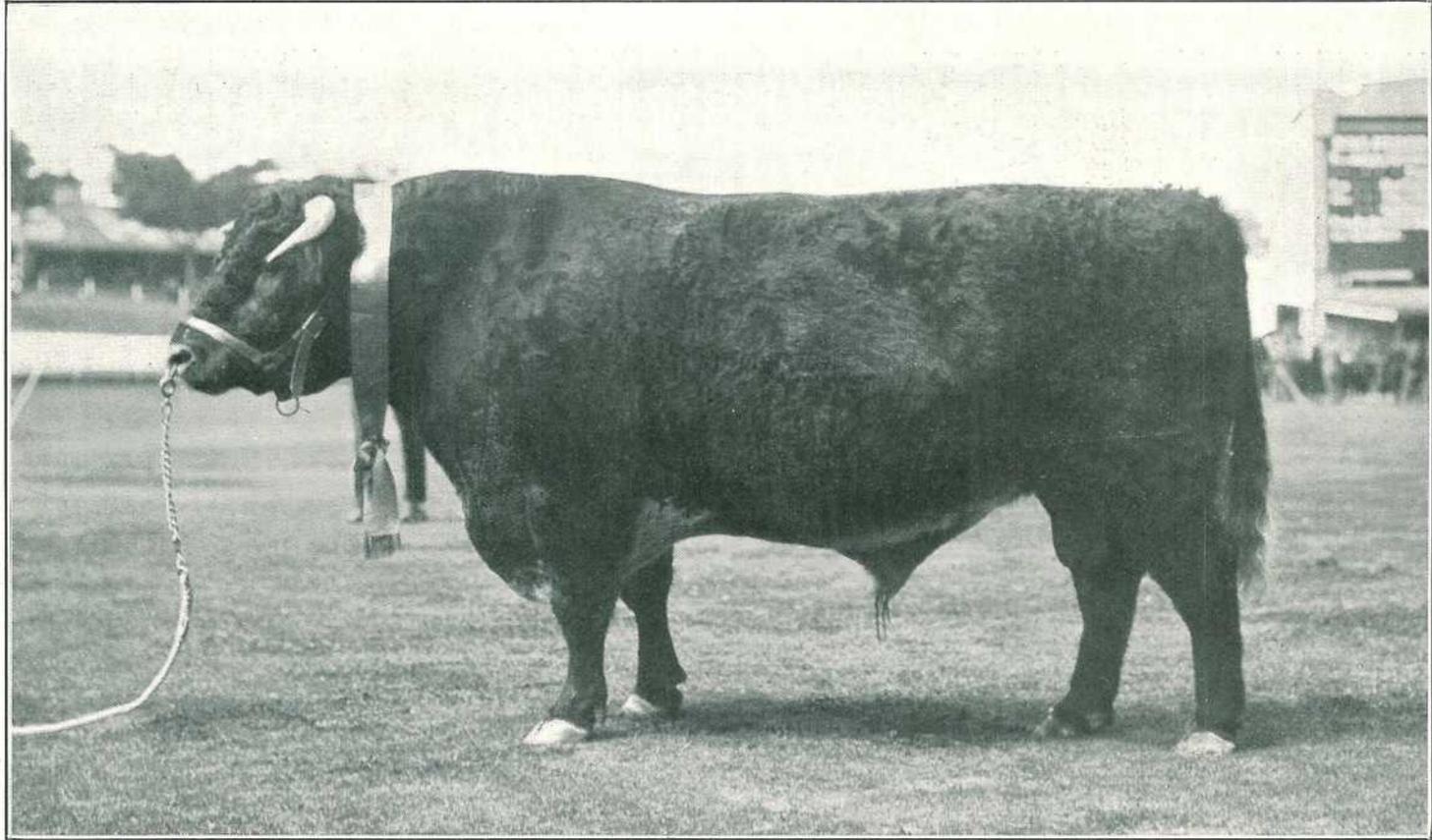


PLATE 114.

Milton's Tribesman 3rd, by Masterkey (imp.); dam, Milton's Elaine; Champion Beef Shorthorn Bull, Royal National Show, 1929. Bred by Mr. Anthony Hordern at his Milton Park Stud, Bowral, New South Wales, and exhibited by the Gindie State Farm (Mr. E. R. Ashburn, Manager).

One of the prettiest of the younger bulls on the ground was Mr. J. A. Montgomery's Renown of Mountain Home, in the class for 12 months old and under 18 months, and he won easily. It would not be surprising to find this splendid animal coming rapidly to the front in the coming years. The groups of the Illawarras were a special feature, and the sire and his progeny were a particularly handsome lot. Mr. James Farquharson came first; and in the breeders' group Mr. A. Pickels' exhibit showed up well. The sire's progeny stakes group had a hearty reception. Mr. B. O'Connor came first, and in the exhibitors' group Mr. A. Pickels was again successful.

#### THE JERSEYS.

Jerseys were well representative of the wonderful strides the breed has made in Queensland. The attendance was most marked during the judging period, and the awards were watched with keen interest. The judge was Mr. R. R. Kerr, of Yan Yean, Victoria, a very keen and observant man, and the general opinion was that his decisions were on the whole satisfactory. A general improvement in the preparation was noticeable. Mr. Kerr was particularly well pleased with the Jersey bulls, and, as he remarked, "this is the animal we are all looking for." There were quite a number of cattle in the ring of outstanding merit, but, on the other hand, remarked the judge, there were a few animals that should never have been led into a show ring. The Brisbane show of Jerseys promises to be one of the best in Australia, and it is well for breeders to adhere to that type of cattle which will command respect and add to the wealth of the farm.

The aged cows of 5 years old or over, in milk, were a particularly choice lot, and the judging was carried out with marked ability. It was evident that Messrs. E. Burton and Sons (Wanora), with their Oxford Golden Butter Cup, attracted the attention of the judge, for she secured not only the coveted blue, but was crowned champion Jersey cow for the day, with Mr. Joseph Sinnamon's Oxford Hazel second, and also reserve champion. There was a keen contest in the class of cow of 4 years old and under 5 years, in milk, and Mr. Joseph Sinnamon scored the coveted blue ribbon with his Trinity Gentle Lady. For cow, 3 years old and under 4 years, in milk, E. Burton and Sons, of Wanora, with their beautiful Oxford Ginger, came a good first. In the younger class of heifer, 2 years old and under 3 years, in milk, there was a fairly keen contest, and the result favoured Mr. Joseph Sinnamon, with his Trinity Columbine for first place, with W. Spresser and Son's Carnation Daisy a good second. For the heifer, 2 years old and under 3 years, in calf, the blue ribbon went to a smart little animal owned by E. P. Fowler and Son, in their Carlyle Larkspur. In the heifer, 18 months old and under 2 years, dry, Mr. T. A. Petherick won first place with his Treearne Locket. For the heifer, 12 months old and under 18 months, dry, E. Burton and Sons again were first with their Oxford Gloria. The groups of Jerseys were particularly pleasing, and formed one of the best staged exhibits at the show. The groups of three heifers, under 3 years old, in milk, or dry, were a feature, and W. Spresser and Son came first, E. Burton and Sons (Wanora) second, and Joseph Sinnamon third. The bull, 3 years old and under 4 years, was won by Messrs. W. E. O. Meier's Cyclone of Woodstock, with a smart runner up in Mr. T. A. Petherick's Treearne Sultan. For the aged bulls a very keen contest was waged, and Mr. W. W. Mallet's Trinity Darby secured first honour, and finally secured the championship of all the Jerseys. For the reserve champion, Mr. T. A. Treearne's Golden King was selected.

The younger classes came in for a severe test, and for bull calf, 12 months old and under 18 months, the first prize went to Mr. B. J. Jensen's Kelvinside Noble's Chieftain. As in other dairy breeds, the groups attracted attention, and for the sire and his progeny the positions were: E. Burton and Sons first, W. Spresser and Son second, and W. W. Mallet third. The breeders' group proved an interesting event, and was one of the most attractive in the ring. The placings were as follow:—E. Burton and Sons first, Joseph Sinnamon second, and W. Spresser and Son third. The positions were the same in the exhibitors' group. The sires' progeny stakes were a feature of the section. E. Burton and Sons secured first with progeny of Oxford Golden Noble, Joseph Sinnamon second, and E. Burton and Sons third with the progeny of Oxford Renown.

#### THE AYRSHIRES.

Next to the Illawarras as a utility class of dairy breed, the Ayrshires have a place, and it is something to be proud of for Queensland to have such a magnificent class of dairy stock to draw upon. Each year their grace and their spotted beauty add to the attractiveness of the show. All day long there was an interested and what may be termed an anxious expression on the faces of well-known breeders. The judge was Mr. John Buchanan, of Flinders, Victoria, a well-known Ayrshire man, quiet in demeanour, and with no frills. He went through his task in a manner most commendable. "They are a great lot," said Mr. Buchanan, "with a style hard to beat. The young stock were very good, although a tail was observable."

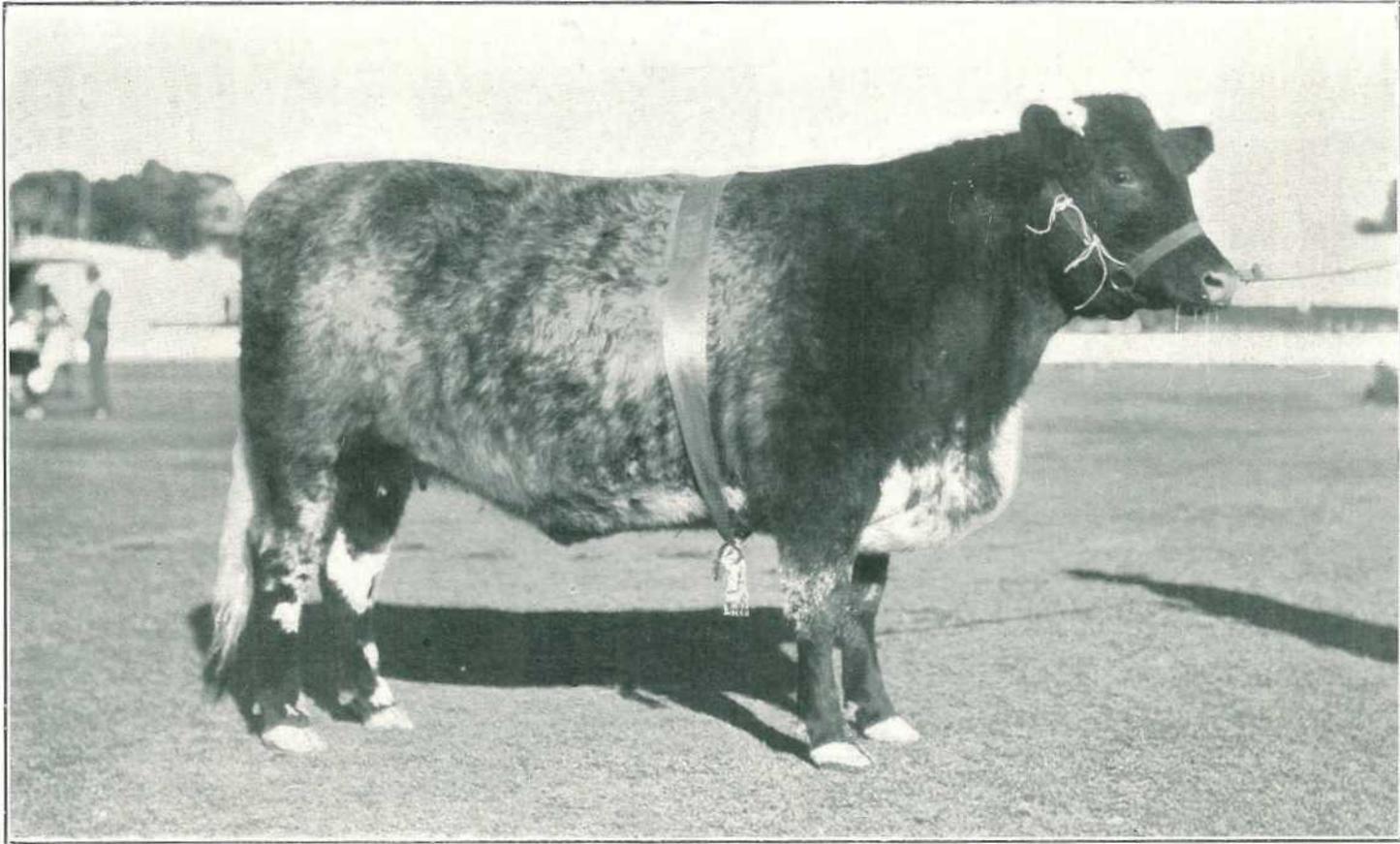


PLATE 115.

Actress 3rd of Milton, by Doone Monarch (imp.); dam Milton's Actress 2nd, Champion Beef Shorthorn female, Royal National Show, 1929. Bred by Mr. Anthony Hordern at his Milton Park Stud, Bowral, New South Wales, and exhibited by Gindie State Farm (Mr. E. R. Ashburn, Manager).

The females of the Ayrshires shone out in splendour, and their well-groomed coats and pretty spots were a relief. The contests as the day wore on were marked by a degree of keenness. The aged cow class, 5 years old or over, in milk, was a veritable picture. Mr. J. C. Mann's Beryl's Pride of Crescent Farm, was awarded first place, and also secured a well-merited championship. For the cow, 4 years old and under 5 years, in milk, Thomas Holmes' Longlands Tulip gained first place, with the same breeder's Longlands Isabel second. For the younger set of cows of 3 years old and under 4 years, in milk, Stimpsons Limited won easily with a very classy beast known as Benbeeula Bellona. In the younger classes of females the stock shone out, and were in clean and well-kept condition. In the class heifers, 2 years old and under 3 years, Mr. Thomas Holmes won first place with his pretty little Longlands Marguerite. In the heifers, 18 months old and under 2 years, the first award went to Stimpsons Limited with a neat little animal known as Eleresley Mabel. The groups were very attractive, and gave the impression that the breed was being well looked after, and, as prominent Ayrshire breeders expressed it, they were a marvel of quality and beauty. The group of three heifers was particularly attractive, and the positions were as follow:—Thomas Holmes first, J. H. and R. M. Anderson second, and Stimpsons Limited third.

The aged bulls were a special feature of the show. For the bull, 4 years old or over, Stimpsons Limited came first with their Longlands Titus, and it will be remembered that this bull won the championship at the 1928 show. It was in the younger class of bulls that the keenest interest was manifested. For the bull, 3 years old and under 4 years, Thomas Holmes' Claredale Bonnie Billy not only secured first place, but obtained the championship. The younger bulls were a fine lot, although a "tail" was noticeable in some classes. The competition for the bull, 2 years old and under 3 years, was interesting, and J. T. Knowles' Titus secured a first. In the class for bulls, 1 year old and under 2 years, Stimpsons Limited scored with Eleresley Grand. The sire and his progeny stakes group was an excellent example of breeding, and Stimpsons Limited were successful with their Longlands Titus. The breeders' group was highly interesting, and once again Stimpsons Limited secured the honours.

#### THE FRIESIANS.

The Friesian classes created more interest this year than hitherto. The American records for milk probably added to the prestige, and it would not be surprising to see them becoming one of the most popular breeds of the State. They are big, upstanding cattle, with massive formation and great flank depth. They also possess plenty of bone, and when in prime condition would weigh well. The judge, Mr. V. J. Lamond, of Nowra, New South Wales, was one of the youngest judges yet seen on the Brisbane Show Ground, but his method of classification and his diligent research for quality were outstanding. The class was not one of the largest, and the judge soon got through with his work. He expressed pleasure at the quality presented, and he liked the dry cows. The aged cows were of a fine type, and Hickey and Son's College Princess Pontiac secured first position, and was also awarded championship. In the cow, 3 years old and under 4 years, in milk, Hickey and Son again scored a win. For the heifer, 2 years old and under 3 years, in milk, Mr. G. Newman's St. Athan Gypsy came first. For the younger set of females Hickey and Son scored again with their Stoneybrae Duchess. For cow, 3 years old and under 4 years, in calf, Mr. W. Richter's Oakland Hollyhock scored a first. The younger females were an attractive lot, although lacking in condition. In the heifer, 12 months old and under 18 months, the first prize went to C. Behrendorf's Inavale Maud.

The bulls were massive in construction, and looked well. The class for bull, 4 years old and over, was won by Messrs. D. Young and Son's Colossus of Stathan. It was in a younger class, however, that a champion was discovered, Mr. W. H. Grams' St. Athan Actuary carrying the championship. The groups were well contested, and the sires' progeny stakes group was won by Hickey and Sons with the progeny of Burnbrae Dumark Echo.

#### THE GUERNSEYS.

The yellow class of dairy stock Guernseys was the smallest section among the dairy breeds, but there appeared to be more interest shown this year than formerly. The judge was Dr. R. M. Kinross, of Ryde, New South Wales, who exercised great care in his determination. He said he was very pleased with the class presented, and stated that the class generally was true to type. The young females, he said, showed great promise.

Cows.—Four years or over, in milk: A. Cooke's Inglewood Butter Girl 1, A. Cooke's Minnamurra Eclipse 2, A. E. Gillespie's Caramana Polly 3. Three and under 4 years: A. Cooke's Inglewood Primrose 1, A. C. K. Cooke's Lynwood Beauty 2. Four years or over, in calf or dry: A. Cooke's Minnamurra Cherubine 1, A. E. Gillespie's Caramana Dolly 2, A. C. K. Cooke's Minnamurra 3. Three and under 4

years: A. E. Gillespie's Caramana Golden Lustre 2nd. Champion (cow or heifer): A. Cooke's Minnamurra Cherubine. Reserve champion: A. Cooke's Inglewood Primrose. Heifers: Two and under 3 years, in milk: A. Cooke's Belmont Bells. One and under 2 years: A. C. K. Cooke's Moongi Prairie Flower 1, A. Cooke's Lynwood Bracelet 2, A. J. Cranney's Lynwood Mignonette 3. Two years and under 3, dry: A. Cooke's Lynwood Generous 1, A. C. K. Cooke's Laureldale Fussy 2, A. C. K. Cooke's Laureldale Lucky 3. One and under 2 years: A. J. Cranney's Belmont Jasmine 1, A. C. K. Cooke's Moongi Sylph's Showgirl 2, A. E. Gillespie's Tanto Golden Lustre 3. Six and under 12 months: A. E. Gillespie's Tanto Pretty Polly 1, A. E. Gillespie's Tanto Dolly 2, A. C. K. Cooke's Laureldale Pixie 3.

Bulls.—Three years or over: A. E. Gillespie's Victor of Wollongbar 1, R. Mackie's Gatton Lochinvar 2, A. Cooke's Lynwood Royal 3. Two and under 3 years: A. E. Gillespie's Monarch 1, A. C. K. Cooke's Lynwood Flavour 2, A. Cooke's Caraman Barrister 3. Six and under 12 months: A. J. Cranney's Lynwood Royal's Laddie 1, A. E. Gillespie's Tanto Golden Langwater 2, A. Cooke's Lynwood Bounty 3. Sire and his progeny: A. Gillespie 1, A. Cooke 2. Exhibitor's group: A. Cooke 1, A. C. Cooke and A. E. Gillespie 2. One bull and two heifers: A. C. Cooke 1, A. Cooke 2, A. E. Gillespie 3. Champion of Queensland: A. E. Gillespie's Wollongbar Monarch. Reserve: R. Mackie's Gatton Lochinvar.

## QUEENSLAND AGRICULTURAL COLLEGE. WORK OF STUDENT FARMERS.

In the midst of the great display of the agricultural resources of the State at the Royal National Show was the exhibit of the Queensland Agricultural High School and College, which takes such an important part in their development. As usual it was highly instructive, and contained several new features, showing the work being done at Gatton, not only to teach scientific farming but in experiments of much value to agriculture.

This year the central feature dealt with poultry, an industry which returned £598,467 to Queensland in 1928. A brooder house, in which one hen can mother 150 chicks with the aid of a simple brooder made from two kerosene tins and four maize sacks, was shown. In a display of incubators the importance of heredity in the production of good producers was emphasised. As in the cattle industry, testing is of considerable value in poultry, and in single testing pens hens similar in conformation and appearance were shown with the great difference in annual egg production. In a model of a hygienic poultry house the whole structure is bolted so that it can be taken to pieces and cleaned in case of infestation by mites or ticks. The floor is made of concrete to facilitate cleaning and sanitation, and the perches are pivotted and grooved to aid in the destruction of ticks. Simple nests made of kerosene tins are easily accessible from the front of the house.

A cotton section was exhibited in conjunction with the Department of Agriculture and Stock. A pure strain of Acala cotton is being developed, and it already appears to be the most promising competitor of Durango cotton.

The horticultural section featured dehydration, with the assistance of a model of the stack type of dehydrator and forced draught recirculating dehydrator. The value of preserved fruit and vegetables imported into Australia annually is £436,000, and dehydration, it is pointed out, can help to keep much of this money in here and conserve surplus products. Banana flour manufacture is mentioned as an industry which should be practicable in Queensland to assist in stabilising the market for the fruit.

An illustration of the maize variety trial conducted by the college in 1929 showed experiments based on the system of randomised blocks arranged on a Latin square. It gives experimental results which overcome difficulties due to soil variation.

Experiments to determine whether top-dressing of pastures to increase the carrying capacity and correct mineral deficiency diseases in stock is advisable were illustrated.

In the dairy section attention was directed to the production of clean milk, and modern types of buckets, cans, filters, and other utensils and appliances were shown. As was the case last year, the desirability of fodder conservation for drought periods was stressed. A display of farm implements used by students at the college and a collection of photographs showing various activities there were on view, and the whole display was a very effective object lesson in the value of scientific farming and animal husbandry.

## THE AWARDS.

### "A" GRADE DISTRICT EXHIBITS—A KEEN CONTEST.

**A**FTER endeavouring to wrest the honours from competing districts in the "A" grade exhibits for the past eight years, Wide Bay and Burnett came into its own by triumphing over the North Coast and Tablelands of New South Wales. The margin was not great, only 12½ points separating these districts. The South Coast of Queensland was third.

An analysis of the points awarded to the respective districts reveals that the judging was evidently conducted on a conservative basis compared with previous years. For instance, Wide Bay and Burnett secured 170½ points for dairy produce last year, whereas the award on this occasion was only 145, despite the fact that its organisers were under the impression that they had made an improvement in this class. North Coast and Tablelands suffered a corresponding reduction, falling back from 189½ points to 149. In foods this district also showed a decided decline in points compared with last year, its 148 on that occasion dwindling to 127. Wide Bay held its own under this section, a result which applied to both districts in regard to fruits and vegetables. Wide Bay added 10 points for grains, while its rival slightly lost ground. Again in manufactures and trades the winning district made substantial headway, and both appreciably advanced in points for minerals and building materials. In other sections the figures fluctuated in some small degree, but, whereas North Coast lost ground for effective arrangement, Wide Bay progressed, and in the aggregate points reached 1,239 compared with 1,232 last year against North Coast's 1,226½ compared with 1,269 in 1928. The South Coast of Queensland made a brave showing and slightly improved its figures of last year by gaining 1,141½ points against 1,129. The win carries with it the coveted Chelmsford Shield, and the organiser of Wide Bay and Burnett (Mr. H. Bashford) and his co-workers were heartily congratulated upon their success. Theirs:—

	Possible Points.	North Coast and Tablelands of N.S.W.	Wide Bay and Burnett District	South Coast of Queensland.
<b>DAIRY PRODUCE—</b>				
Butter .. .. .	90	83	80	83½
Milk and by-products .. .. .	40	20	5	10
Cheese .. .. .	60	30	45	40
Eggs .. .. .	20	16	15	12
<b>Totals .. .. .</b>	<b>210</b>	<b>149</b>	<b>145</b>	<b>145½</b>
<b>FOODS—</b>				
Hams and bacon .. .. .	50	35	45	43
Rolled and smoked beef and mutton .. .. .	20	12	18	18
Small goods and sausages .. .. .	10	6	9	10
Fish, smoked, preserved, or canned .. .. .	10	7	8	5
Canned meats .. .. .	25	18	23	20
Lard, tallow, and animal oils .. .. .	20	10	18	18
All butchers' by-products .. .. .	10	6	8	9
Honey and by-products .. .. .	20	19	18	15
Confectionery .. .. .	10	8	6	6
Bread, biscuits, scones, and cakes .. .. .	10	6	5	7
<b>Totals .. .. .</b>	<b>185</b>	<b>127</b>	<b>158</b>	<b>151</b>
<b>FRUITS, VEGETABLES, AND ROOTS—FRESH AND PRESERVED—</b>				
Fresh fruit .. .. .	60	50	54	54
Preserved fruits, jams, and jellies .. .. .	30	28	26	30
Crystallised and dried fruits .. .. .	20	17	15	18
Preserved and dried vegetables .. .. .	10	9	8	9
Fresh vegetables .. .. .	20	18	14	18
Table pumpkins .. .. .	6	6	4	5
Potatoes, English and sweet .. .. .	40	29	30	32
Roots (including meals) .. .. .	14	6	12	12
Cocoanuts, peanuts, &c. .. .. .	10	7	7	3
<b>Totals .. .. .</b>	<b>210</b>	<b>170</b>	<b>170</b>	<b>181</b>

DISTRICT EXHIBITS ("A" GRADE)—*continued.*

	Possible points.	North Coast and Tablelands of N.S.W.	Wide Bay and Burnett District	South Coast of Queensland.
<b>GRAIN, &amp;c.—</b>				
Wheat .. .. .	50	44	30	22
Flour, bran, pollard, macaroni, and meals ..	10	5	8	5
Maize .. .. .	50	44	37	32
Maizena, meals, starch, glucose, and corn-flour .. .. .	10	2	7	4
Oats, rye, rice, barley, malt, pearl barley, and their meals .. .. .	30	22	18	14
Totals .. .. .	150	117	100	77
<b>MANUFACTURES AND TRADES—</b>				
All woodwork .. .. .	30	25	30	30
All metal and ironwork .. .. .	30	25	30	30
Leather and all leather work and tanning ..	20	18	19	19
Manufactured woollen and cotton fibre ..	30	27	24	25
Sheet metal work .. .. .	10	8	10	8
Artificial manures .. .. .	10	4	8	7
Brooms and brushes .. .. .	10	6	5	8
Manufactures not otherwise enumerated ..	15	12	13	15
Totals .. .. .	155	125	139	142
<b>MINERALS AND BUILDING MATERIALS—</b>				
Gold, silver, copper, and precious stones ..	25	22	20	..
Coal, iron, other minerals, and salt ..	30	20	26	12
Stone, bricks, cement, marble, terra cotta ..	20	18	20	20
Woods, dressed, undressed, and polished ..	25	20	25	20
Totals .. .. .	100	80	91	52
<b>TROPICAL PRODUCTS—</b>				
Sugar cane .. .. .	60	57	50	57
Sugar, raw and refined .. .. .	20	13	18	9
Rum, other spirits, and by-products ..	10	..	8	8
Coffee, raw and manufactured, tea and spices .. .. .	10	6	9	7
Cotton (raw) and by-products .. .. .	30	23	28	25
Rubber .. .. .	10	..	8	..
Oils (vegetable) .. .. .	10	8	7	6
Totals .. .. .	150	107	128	112
<b>WINES, &amp;c.—</b>				
Wines .. .. .	15	12	3	4
Aerated and mineral spa water, vinegar, and cordials .. .. .	10	7½	7	7
Ales and stout .. .. .	10	..	7	..
Totals .. .. .	35	19½	17	11

DISTRICT EXHIBITS ("A" GRADE)—*continued.*

	Possible Points.	North Coast and Tablelands of N.S.W.	Wide Bay and Burnett District	South Coast of Queensland.
<b>TOBACCO—</b>				
Tobacco (cigar and pipe) in leaf .. ..	20	14	15	16
<b>HAY, CHAFF, &amp;C.—</b>				
Hay—Oaten, wheaten, lucerne, &c. ..	30	28	18	20
Hay in sheaf .. .. .	5	2	3	4
Grasses and their seeds .. .. .	10	9	6	8
Chaff—Oaten, wheaten, lucerne, &c. ..	50	44	32	40
Ensilage and cattle fodder .. .. .	20	14	15	9
Sorghums and millets .. .. .	10	8	7	6
Commercial fibres .. .. .	15	12	12	12
Pumpkins and green fodder .. .. .	12	9	7	10
Broom millet .. .. .	10	7	8	7
Farm seeds .. .. .	13	8	10	9
Totals .. .. .	175	141	118	125
<b>WOOL, &amp;C.—</b>				
Scoured wool .. .. .	40	40	33	30
Greasy wool .. .. .	60	60	45	30
Mohair .. .. .	10	8	10	5
Totals .. .. .	110	108	88	65
ENLARGED PHOTOGRAPHS .. .. .	5	5	3	1
<b>EFFECTIVE ARRANGEMENT—</b>				
Comprehensiveness of view .. .. .	20	14	19	16
Arrangement of sectional stands .. ..	25	19	20	21
Effective ticketing .. .. .	10	8	7	8
General finish .. .. .	25	23	21	18
Totals .. .. .	80	64	67	63
Grand Totals .. .. .	1,585	1,226½	1,239	1,141½

## SUMMARY OF POINTS.

Dairy produce .. .. .	210	149	145	145
Foods .. .. .	185	127	158	151
Fruits, culinary vegetables, roots .. ..	210	170	170	181
Cereals and by-products .. .. .	150	117	100	77
Manufactures and trades .. .. .	155	125	139	142
Minerals and building materials .. ..	100	80	91	52
Tropical products .. .. .	150	107	128	112
Wines, &c. .. .. .	35	19½	17	11
Tobacco .. .. .	20	14	15	16
Hay, chaff, fodder, &c. .. .. .	175	141	118	125
Wool, &c. .. .. .	110	108	88	65
Enlarged photographs .. .. .	5	5	3	1
Effective arrangement .. .. .	80	64	67	63
Totals .. .. .	1,585	1,226½	1,239	1,141½

**"B" GRADE DISTRICT CONTEST.**

The points awarded in the "B" grade district competition left no doubt as to the superiority of the Brisbane Valley, its keenest rival being Northern Darling Downs, which was 171½ points behind. Then followed Nanango, Kingaroy, Mount Larcom, and Oakey in the order named. Brisbane Valley's win is its fourth in succession, and the wide and varied nature of its resources has prompted the suggestion that it should be transferred to the "A" grade. A notable advance was made by Nanango, which moved up from fifth place last year to third position on this occasion. Details:—

	Possible Points.	Oakey.	Brisbane Valley.	Nanango.	Northern Darling Downs.	Mount Larcom.	Kingaroy
<b>DAIRY PRODUCE—</b>							
Butter .. .. .	90	83	82	82	83½	80	83
Cheese .. .. .	60	55	57	50	58	..	53
Eggs .. .. .	20	9	18	16	15	6	12
Totals .. .. .	170	147	157	148	156½	86	148
<b>FOODS—</b>							
Hams, bacon, rolled and smoked beef and mutton .. ..	50	35	40	37	38	36	40
Fish—Smoked .. .. .	10	2	7	3	3	9	..
Lard, tallow, and animal oils	20	15	18	15	17	15	18
Honey and by-products ..	20	8	18	13	14	12	16
Confectionery (home made) ..	10	4	8	6	7	8	6
Bread, scones, cakes, and bis- cuits (home made) .. ..	10	6	7	5	6	6	6
Totals .. .. .	120	70	98	79	85	86	86
<b>FRUITS, VEGETABLES, AND ROOTS (Fresh and Preserved)—</b>							
Fresh fruits .. .. .	60	30	52	32	32	40	30
Preserved fruits, jams, and jellies (home made) .. ..	30	19	27	26	24	26	21
Crystallised and dried fruits (home made or dried) .. ..	20	12	18	15	16	15	14
Preserved and dried vegetables	10	7	9	7	8	9	8
Fresh vegetables .. .. .	20	14	18	12	14	16	10
Table pumpkins, squashes, and marrows .. .. .	6	6	5	5	4	4	4
Potatoes, English and sweet ..	40	16	38	30	18	24	28
Roots and their products .. ..	14	6	11	8	10	7	6
Cocoanuts, peanuts, and other nuts .. .. .	10	5	8	6	7	3	8
Vegetable seeds .. .. .	10	5	6	8	5	4	7
Totals .. .. .	220	120	192	149	138	148	136
<b>GRAIN, &amp;C.—</b>							
Wheat .. .. .	50	45	30	28	33	28	35
Flour, bran, pollard, macaroni, and meals .. .. .	10	3	2	6	6	5	4
Maize .. .. .	50	41	39	37	35	30	48
Maizena, meals, starch, glucose, and cornflour .. .. .	10	2	4	4	7	6	8
Oats, rye, rice, barley, malt, pearl barley, and meals .. ..	30	19	27	21	25	25	23
Totals .. .. .	150	110	102	96	106	94	118

DISTRICT EXHIBITS ("B" GRADE)—*continued.*

	Possible points.	Oakey.	Brisbane Valley.	Nanango.	Northern Darling Downs.	Mount Larcom.	Kingaroy.
<b>WOODS—</b>							
Woods, dressed, undressed, and polished .. .. .	25	7	25	21	14	12	10
Wattle bark .. .. .	15	3	15	6	4	3	12
Totals .. .. .	40	10	40	27	18	15	22
<b>HIDES (1) AND HOME PRESERVES—</b>							
Skins for domestic use ..	15	14	14	14	15	15	15
<b>TROPICAL PRODUCTS—</b>							
Sugar-cane .. .. .	60	4	25	12	6	11	8
Coffee, tea, and spices ..	10	..	8	4	5	7	6
Cotton (raw) and by-products	30	20	27	25	23	26	24
Totals .. .. .	100	24	60	41	34	44	38
<b>MINERALS—</b>							
Gold, silver, copper, and precious stones .. .. .	25	..	15	12	12	22	14
Coal, iron, and other minerals, and salt .. .. .	30	15	20	15	15	16	15
Totals .. .. .	55	15	35	27	27	38	29
<b>TOBACCO—</b>							
Tobacco (cigar and pipe) in leaf	20	14	17	15	14	13	16
<b>HAY, CHAFF, &amp;C.—</b>							
Hay—Oaten, wheaten, lucerne, &c. .. .. .	30	18	28	17	18	21	21
Hay in sheaf .. .. .	5	3	3½	3	2½	4	2½
Grasses and their seeds ..	10	5	9	7	6	9	7
Chaff—Oaten, wheaten, lucerne, &c. .. .. .	50	32	47	28	30	28	30
Ensilage and cattle fodder ..	20	..	16	10	15	14	15
Sorghums and millets in stalks	10	5	8	9	6	6	6
Commercial fibres, hemp, and flax .. .. .	15	3	12	8	5	6	6
Pumpkins and green fodder ..	12	7	10	8	6	11	6
Broom millet .. .. .	10	6	8½	6½	6½	6	7
Farm seeds .. .. .	13	11	11	11	7	10	6
Totals .. .. .	175	90	153	107½	102	115	106½

DISTRICT EXHIBITS ("B" GRADE)—*continued.*

	Possible points.	Oakey.	Brisbane Valley.	Nanango.	Northern Darling Downs.	Mount Larcom.	Kingaroy.
<b>WOOL, &amp;c.—</b>							
Scoured wool .. .. .	40	20	25	20	20	30	20
Greasy wool .. .. .	60	50	30	40	60	45	40
Mohair .. .. .	10	4	9	7	9	7	6
Totals .. .. .	110	74	64	67	89	82	66
<b>ENLARGED PHOTOGRAPHS .. .. .</b>							
	5	3	5	2	3	1	2
<b>LADIES' AND SCHOOLS WORK AND FINE ARTS—</b>							
Needlework and knitting ..	25	9	25	12	14	14	8
School needlework .. .. .	5	1½	4½	3	3	1	1
Fine arts .. .. .	5	3	3	3	5	5	5
School work—Maps, writing, &c. .. .. .	10	8½	7½	9½	8	7	5
Totals .. .. .	45	22	40	27½	30	27	19
<b>EFFECTIVE ARRANGEMENT—</b>							
Comprehensiveness of view ..	20	14	18	16	18	18	16
Arrangement of sectional stands	25	19	21	16	15	16	15
Effective ticketing .. .. .	10	6	8	7	6	7	6
General finish .. .. .	25	18	23	19	19	19	16
Totals .. .. .	80	57	70	58	58	60	53
Grand Totals .. .. .	1,305	770	1,047	858	875½	824	854½

## SUMMARY.

Dairy produce .. .. .	170	147	157	148	156½	86	148
Foods .. .. .	120	70	98	79	85	86	86
Fruits, vegetables, roots .. .. .	220	120	192	149	138	148	136
Cereals and by-products .. .. .	150	110	102	96	106	94	118
Woods .. .. .	40	10	40	27	18	15	22
Hides and home preserved skins ..	15	14	14	14	15	15	15
Tropical products .. .. .	100	24	60	41	34	44	38
Minerals .. .. .	55	15	35	27	27	38	29
Tobacco .. .. .	20	14	17	15	14	13	16
Hay, chaff, fodder, &c. .. .. .	175	90	153	107½	102	115	106½
Wool, &c. .. .. .	110	74	64	67	89	82	66
Enlarged photographs .. .. .	5	3	5	2	3	1	2
Ladies' and school work and fine arts	45	22	40	27½	30	27	19
Effective arrangement .. .. .	80	57	70	58	58	60	53
Totals .. .. .	1,305	770	1,047	858	875½	824	854½

## ONE FARM.

## THREE EXCELLENT ENTRIES.

Giving the dweller of crowded suburban streets a comprehensive insight into the manifold activities of the farmer's daily life and the wealth he wrests from furrow and field, the one-farm exhibits were one of the most instructive features of Brisbane's annual festival. Three magnificent exhibits were displayed in the pavilion this year, and fourteen judges were engaged in the arduous task of adjudication.

The winner was found in W. D. Ponton (Tuggerah) with 467 points; J. T. Whiteway (Buderim) was placed second with 427½ points, and J. Beck (Stanwell) third with 421 points. Details:—

	Possible Points.	J. T. Whiteway.	J. Beck.	W. T. Ponton.
<b>PRODUCE—</b>				
Butter .. .. .	25	21	20	20
Eggs .. .. .	5	1½	3	5
Totals .. .. .	30	22½	23	25
<b>GOODS—</b>				
Hams, bacon .. .. .	20	16	17	18
Corned, other meats .. .. .	10	5	4	4
Honey and by-products .. .. .	15	11	8	9
Beeswax .. .. .	5	3	3	3
Bread, scones .. .. .	5	4	3	3
Confectionery and sweets .. .. .	5	4	..	4
Home cookery .. .. .	7	6	4	4
Lard, tallow, &c. .. .. .	5	4	3	4
Totals .. .. .	72	53	42	49
<b>FRUITS, VEGETABLES, AND ROOTS—</b>				
Fresh fruits .. .. .	25	22	15	20
Preserved fruits, jam, and jellies .. .. .	15	13	12	14
Crystalised and dried fruits .. .. .	10	8	7	9
Preserved and dried vegetables .. .. .	15	12	9	14
Fresh vegetables .. .. .	15	12	11	13
Table pumpkins .. .. .	10	7	5	9
Potatoes, English and sweet .. .. .	20	7	13	16
Cocoanuts and nuts .. .. .	7	6	3	2
Vegetable seeds .. .. .	5	3	2	5
Roots, all kinds .. .. .	15	8	5	12
Home made meals .. .. .	3	3	3	½
Totals .. .. .	140	101	85	114½
<b>GRAIN, &amp;C.—</b>				
Wheat .. .. .	25	4	7	15
Maize .. .. .	25	19	14	23
Barley, oats, &c. .. .. .	20	4	9	19
Home made meals .. .. .	10	7	7	7
Totals .. .. .	80	34	37	64
<b>TROPICAL PRODUCTS—</b>				
Sugar-cane .. .. .	30	15	14	8
Cotton in seed .. .. .	20	14	19	16
Coffee .. .. .	6	3	4	5
Totals .. .. .	56	32	37	29

ONE FARM—*continued.*

	Possible Points.	J. T. Whiteway.	J. Beck.	W. D. Ponton.
<b>TOBACCO—</b>				
Tobacco leaf .. .. .	10	6	8	7
<b>HAY, CHAFF, &amp;C.—</b>				
Hay .. .. .	20	7	13	17
Hay in sheaf .. .. .	5	3	4	5
Grasses and seeds .. .. .	10	6	8	7
Chaff .. .. .	20	12	17	10
Ensilage .. .. .	15	3	13	3
Cattle fodder .. .. .	15	11	12	12
Sorghum and millet .. .. .	10	6	6	9
Broom millet .. .. .	10	6	9	6
Farm seeds .. .. .	7	6	5	6
Flax and hemp .. .. .	10	10	6	7
Totals .. .. .	122	70	93	82
<b>WOOL—</b>				
Greasy .. .. .	20	15	16	14
Mohair .. .. .	5	3	5	5
Totals .. .. .	25	18	21	19
<b>DRINKS, &amp;C.—</b>				
Home-made beverages .. .. .	15	13	10	7½
<b>WOMEN'S AND CHILDREN'S WORK—</b>				
Needlework and knitting .. .. .	10	9	4	4½
Fine arts .. .. .	5	3	2	5
Fancy work .. .. .	15	7	10	4
School work, maps, writing, &c. .. .. .	5	4	3	2
School needlework .. .. .	5	1½	4	3
Totals .. .. .	40	24½	23	18½
<b>MISCELLANEOUS ARTICLES OF COMMERCIAL VALUE .. .. .</b>				
	10	10	8	8
<b>PLANTS AND FLOWERS, IN POTS, AND GARDEN SEEDS .. .. .</b>				
	6	6	1	2½
<b>TIME AND LABOUR-SAVING ARTICLES .. .. .</b>				
	10	10	2	4
<b>EFFECTIVE ARRANGEMENT—</b>				
Comprehensiveness of view .. .. .	10	7	8	9
Arrangement of stands .. .. .	10	8	7	9½
Effective ticketing .. .. .	5	2½	3	4½
General finish .. .. .	15	10	13	14
Totals .. .. .	40	27½	31	37
Grand Totals .. .. .	656	427½	421	467

ONE FARM—*continued.*

	Possible Points.	J. T. Whiteway.	J. Beck.	W. D. Ponton.
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## SUMMARY.

Dairy produce .. .. .	30	22½	23	25
Foods .. .. .	72	53	42	49
Fruit, vegetables, roots .. .. .	140	101	85	114½
Cereals and by-products .. .. .	80	34	37	64
Tropical products .. .. .	56	32	37	29
Tobacco .. .. .	10	6	8	7
Hay, chaff, fodder, &c. .. .. .	122	70	93	82
Wool .. .. .	25	18	21	19
Drinks, &c. .. .. .	15	13	10	7½
Women's and children's work .. .. .	40	24½	23	18½
Miscellaneous articles of commercial value .. .. .	10	10	8	8
Plants and flowers, in pots, garden seeds .. .. .	6	6	1	2½
Time and labour-saving articles .. .. .	10	10	2	4
Effective arrangement .. .. .	40	27½	31	37
Totals .. .. .	656	427½	421	467

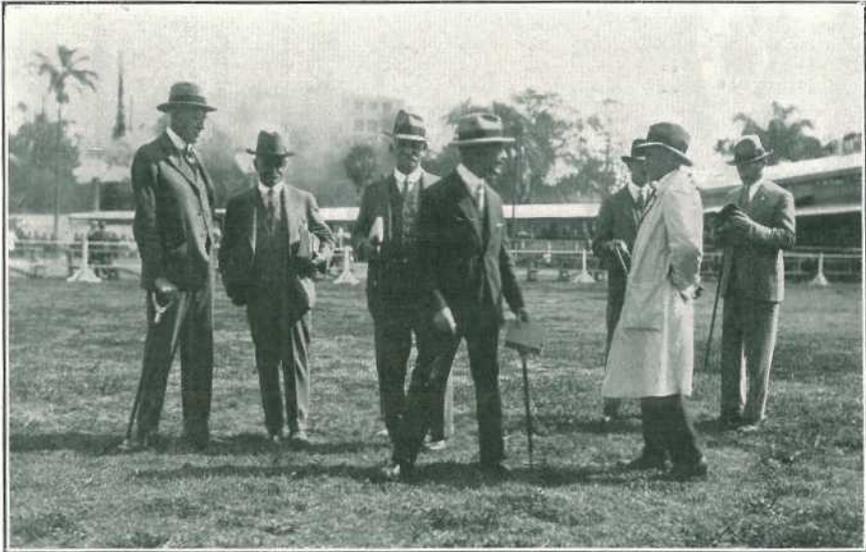


PLATE 116.—THE VICE-REGAL VISITORS WERE KEENLY INTERESTED IN THE JUDGING.  
In the picture are Lord Stonehaven (congratulating a successful exhibitor); Sir John Goodwin, Mr. H. S. Cribb, and Mr. Ernest Baynes.

**MILKING TESTS.****RECORD ENTRIES FOR AUSTRALASIA.**

Certainly an Australasian record for entries was created this year in the big milking contests at the showgrounds.

Messrs. L. F. Anderson (senior herd tester) and A. Hossack (herd testing officer) of the Department of Agriculture and Stock said that tremendous interest had been taken in the contests by all the breeders. Although no records in production had resulted, the standards generally had been well maintained.

In the heavyweight milk class the highest yield was produced by Mr. A. J. Caswell's Rosie IV. of Greyleigh, the amount for the twenty-four hours being 76.9 lb. of milk. Although this is not a record for the Brisbane showgrounds, the figures were specially good, as the cow was above the standard.

The same cow also gained the championship for butter production on the ground, providing 2.774 lb. of butter fat for the twenty-four hours. This fine cow is well known on many showgrounds in the State, and her big victories are all the more meritorious in view of her age.

Messrs. E. Burton and Sons' Jerseys put up some fine performances and scored several successes.

Cow, four years old or over, averaging the greatest daily yield of butter fat for 48 hours. Points for lactation period being conceded.

	Total Yield Milk, lbs.	Total Yield Butter Fat 48 hours.	Average Yield Butter Fat 24 hours.	Points.	Lact. Points.	Total Points.
A. J. Caswell's Rosie IV. of Greyleigh (I.M.S.) ..	153.8	5.5481	2.7740	44.38	Nil	44.38
A. T. Waters' Favourite II. of Railway View (I.M.S.) ..	147.1	5.0782	2.5391	40.63	2.7	43.33
W. M. Krause's Jennie IV. of Greyleigh (I.M.S.) ..	102.8	4.3602	2.1801	34.88	5.0	39.88

Cow, four years or over, averaging the greatest yield of butter fat for 48 hours.

A. J. Caswell's Rosie IV. of Greyleigh (I.M.S.) ..	155.8	5.5481	2.7740	..	..	..
A. T. Waters' Favourite II. of Railway View (I.M.S.) ..	147.1	5.0782	2.5391	..	..	..
A. J. Bryce's Jewell II. of Rosemount (I.M.S.) ..	123.2	4.9271	2.4635	..	..	..

Cow, three years and under four, averaging the greatest daily yield of butter fat for 48 hours. Points for lactation period being conceded.

J. Phillip's Evelyn of Sunnyview (I.M.S.) ..	149.0	4.9209	2.4604	39.7	Nil	39.37
T. G. O'Mears' Belle III. of Royston (I.M.S.) ..	83.5	3.6075	1.8037	28.86	10.0	38.86
A. J. Caswell's Model of Dnalwon (I.M.S.) ..	118.7	4.5038	2.2519	36.03	Nil	36.03

Cow, three years and under four years, averaging the greatest daily yield of butter fat for 48 hours.

J. Phillips' Evelyn of Sunnyview (I.M.S.) ..	149.0	4.9209	2.4604	..	..	..
A. J. Caswell's Model of Dnalwon (I.M.S.) ..	118.7	4.5038	2.2519	..	..	..
Hickey and Son's Bella VI. of Thornleigh (I.M.S.) ..	114.0	4.0048	2.0024	..	..	..

Heifer, under three years, averaging the greatest daily yield of butter fat for 48 hours. Points for lactation period being conceded.

A. J. Caswell's Ivo II. of Dnalwon, (I.M.S.) ..	93.5	3.6728	1.8364	29.38	6.8	36.18
E. Burton and Son's Oxford Daffodil (Jersey) ..	82.7	4.3963	2.1981	35.17	Nil	35.17
E. Burton and Son's Oxford Model (Jersey) ..	68.7	4.1803	2.0901	33.44	Nil	33.44

MILKING TESTS—*continued.*

Heifer under three years old, averaging the greatest average of butter fat for 48 hours.

	Total Yield Milk, lbs.	Total Yield Butter Fat 48 hours.	Average Yield Butter Fat 24 hours.	Points.	Lact. Points.	Total Points.
E. Burton and Son's Oxford Daffodil (Jersey) .. ..	82.7	4.3963	2.1981	..	..	..
E. Burton and Son's Oxford Model (Jersey) .. ..	68.7	4.1803	2.0901	..	..	..
R. Mears' Sadie II. of Morden (I.M.S.) .. ..	106.7	3.9399	1.9699	..	..	..

Jersey cow or heifer, any age, averaging the greatest daily yield of butter fat for 24 hours.

	Total Yield Milk, lbs.	Total Yield Butter Fat 48 hours.	Average Yield Butter Fat 24 hours.	Points.	Lact. Points.	Total Points.
E. Burton and Son's Oxford Daffodil .. ..	82.7	4.3963	2.1981	..	..	..
J. F. Burnett's Fanny of Rosehill .. ..	88.7	4.3367	2.1683	..	..	..
E. Burton and Son's Oxford Model .. ..	68.7	4.1803	2.0901	..	..	..

Martin Snelling prize for the dairy cow producing the greatest quantity of butter fat in 273 days.

J. Phillips' Evelyn of Sunnyview, 567.62.

Hickey and Son's College Princess Pontiac, 534.24.

W. Spesser and Son's Carnation Lucy's Locket, 503.92.

Cow yielding the largest supply of milk in 48 hours under Babcock test.

A. J. Caswell's Rosie VI. of Greyleigh, 153.8 lb.

J. Phillips' Evelyn of Sunnyview, 149.0 lb.

A. T. Waters' Favourite II. of Railway View, 147.1 lb.

Royal National Champion butter fat test for purebred cow or heifer averaging the greatest daily yield of butter fat for 48 hours.

A. J. Caswell's Rosie VI. of Greyleigh (I.M.S.), 44.38 points.

A. T. Waters' Favourite II. of Railway View (I.M.S.), 43.33 points.

## DISTRICT FRUIT CONTEST.

The Palmwoods fruitgrowers were jubilant on winning the prize for district fruit competitions, for which there were seven entries. Montville secured second position, and Woombye the third prize. Details:—

	Possible Points.	Buderim.	Cooran.	Gayndah.	Montville.	Palmwoods.	Redlands.	Woombye.
Bananas .. ..	35	29	34	..	27	31	24	29 $\frac{1}{2}$
Pineapples .. ..	35	32	23	..	30	35	33	35
Citrus .. ..	35	22	15	31	32	31 $\frac{1}{2}$	28	27
Custard apples .. ..	10	8	6	..	8	8	10	5
Papaws .. ..	10	7	7	3	9	8	10	8
Strawberries .. ..	10	7	6	..	7	9	8	6
Other fruits .. ..	10	7	6	3	7	8	8	8
Grading and packing in export classes .. ..	35	28 $\frac{1}{3}$	21 $\frac{1}{3}$	11	29 $\frac{1}{6}$	31	29 $\frac{2}{3}$	29 $\frac{2}{3}$
General display .. ..	20	16 $\frac{1}{2}$	14 $\frac{1}{2}$	17	17	18	13 $\frac{1}{2}$	16 $\frac{1}{2}$
Totals .. ..	200	156 $\frac{5}{8}$	133	65	166 $\frac{1}{6}$	179 $\frac{1}{2}$	163 $\frac{5}{8}$	164 $\frac{2}{3}$

## PINEAPPLE AND BANANA SHIELDS.

The Woombye fruitgrowers secured the shield offered for the display of pineapples, and Cooran again secured that for bananas. Particulars of the awards are as follows:—

### PINEAPPLES.

					Canned for Export.	Quality.	Grading.	Packing.	Total.
Possible points	..	..	..	..	30	42	14	14	100
Buderim	..	..	..	..	25½	24	10½	11	71
Cooran	..	..	..	..	23	20	6	7	56
Montville	..	..	..	..	25½	12½	9	8½	55½
Palmwoods	..	..	..	..	30	32	11	11	84
Redlands	..	..	..	..	26½	32	13	13	84½
Woombye	..	..	..	..	30	33	13	13	89

### BANANAS.

					Quality.	Grading.	Packing.	Total.
Possible points	..	..	..	..	50	25	25	100
Cooran	..	..	..	..	40	22	23	85
Palmwoods	..	..	..	..	37	22	21	80
Woombye	..	..	..	..	37½	20	20	77½
Buderim	..	..	..	..	33	22	22	77
Montville	..	..	..	..	34	19	17	70
Redlands	..	..	..	..	32	20	15	67

## FRUIT PACKING.

### CHILDREN'S COMPETITION.

A class in the district fruit exhibition of paramount interest to the school children concerned was the children's fruit-packing competition, which carried with it the McDonald Shield, awarded each year for the highest average points. The competitors must be past or present pupils of the fruit-packing classes conducted by the Department of Public Instruction. Out of nine entries received this year there were only four State schools competing—viz., Buderim Mountain, Flaxton, Montville, and Palmwoods. These competitors were children who are now attending the packing classes, and are not more than 14 years old. There was also another class for past and present pupils of packing classes over 14 years and not exceeding 17 years old. In this class there were three State schools competing—two entries from Buderim Mountain, two from Flaxton, and one from Palmwoods. In connection with the latter competition, only one competitor (Palmwoods) had complied with clause 4 of the regulations, which reads:—"Packing to be diagonal plan; one case to be packed with wrapped, the other with unwrapped oranges." In the other class, for pupils at present attending the fruit-packing classes, not one of the four competitors had complied with clause 4, and the fact should be noted by those concerned that each school loses 100 points through not complying with the conditions laid down. The neglect in this regard is unfortunate, as the organisers of this important class consider that the packing this year was, on the whole, the best packing so far seen in connection with this competition, and the task of the judge in deciding which school should be entitled to retain the much-coveted McDonald Shield for the next twelve months was a difficult one. The cases of oranges were certainly admirably packed, notwithstanding that they were not packed diagonally, as laid down in the regulations, and the juvenile competitors are bidding fair to become useful members of the fruit distribution and packing associations in their respective districts later on.

## PIONEER DROVERS.

Mr. S. E. Pearson, of Camberly, Greenmount, Queensland, writing to the Editor of the "Pastoral Review" (July) on the subject of the article on Pioneer Drovers—reprinted in the Journal from "The Review" in the last issue—adds these interesting notes:—

I have read with much appreciation Mr. Wilfred Steele's article on Pioneer Drovers in the current issue of "The Review." All that he says is true. We still have many good drovers in Queensland, such as Dick Haynes, of Longreach, and Charlie Gallagher, of Hughenden—men who have spent all their lives on the road with stock—but the day of those long-distance trips is over.

Alfred Giles, who was so well known in the Northern Territory, and who might justly claim the honour of having accomplished the longest and most successful journey with stock in Australia, was a brother of Ernest, the explorer. Splendid men those Giles brothers!

The writer was among those who left the Victoria River with the exodus of cattle that took place in 1904. The season was good throughout the interior during that year, and close upon 40,000 head of cattle must have left the Territory. Alexandria, Brunette, and other tablelands runs also sent cattle south that year.

Blake Miller and "Jumbo" Smith, each with 1,000 Victoria River Downs cows, bound for Queensland, broke the trail for the long column of cattle marching east. Following them came J. R. Skuthorpe with 3,000 Wave Hill bullocks, and behind him Charlie Phillott with 3,000 Wave Hill cows, all bound for Killarney Station, Narrabri, New South Wales. Steve Lewis followed with another 1,000 bullocks from Buchanan's Wave Hill Station, bound for Adelaide, via Newcastle Waters and Alice Springs.

Blake Miller led the way across the Murranji Desert to Newcastle Waters and Anthony's Lagoon, and a great bushman and unerring pilot he proved to be. Each morning at daybreak he spared his cattle into the eye of the rising sun, and we followed on his track across the waste for 400 miles.

The cattle that Smith and Miller brought from Victoria River Downs were destined for Austral Downs, and Blake Miller managed that property for Sir Sidney Kidman up till the time that it was purchased by C. J. Brabazon.

The writer left Skuthorpe's cattle at Austral Downs and pushed on to Adelaide via the Birdsville-Hergott track, reaching Hergott Springs on the same date that Steve Lewis arrived with his 1,000 bullocks from Wave Hill, via Alice Springs. Two thousand bullocks—1,000 each from Augustus Downs and Lorraine Stations, on the Leichhardt River—reached Hergott from Queensland—at the same time, and were offered for sale there along with the Wave Hills.

What a muster of well-known cattlemen there was that day on the saltbush plain that spreads between the township and the Frome River! The late John Barker (of Barker Bros., Adelaide) auctioned the cattle from the vantage point of a buckboard drawn up on the plain. All around grazed 3,000 bullocks, dappling the sunlit landscape with their many-coloured hides. W. F. Buchanan (brother of Nathaniel, the grand pioneer who had done so much for Northern Australia) was there to see his cattle sold; and Sidney Kidman, who bought most of them, had fewer grey hairs in his beard then than he has now.

Wilfred Steele, who was with Steve Lewis, mentions that 95 miles was the longest dry stage that their cattle had on their march across the continent; but Steve (a brother of the Hon. John, M.L.C., who at that time owned Newcastle Waters Station) told the writer that he considered his cattle had accomplished one stage of 108 miles without water. It was in June of that year, and cool weather, else they must have perished. Nevertheless, 60 per cent. of Lewis's cattle were fit for the butcher when he delivered them at Hergott Springs.

The following year Walter Rose went out to lift 4,000 head of Lumley Hill's Lissadell cattle, and he had a terrible time getting back to Queensland. The writer was in Camooweal the day that Rose's plant passed through on its way to Western Australia. In the interim drought had closed the Murranji track, and Rose was forced northward through the Delamere country to the Roper River. He was two and a-half years on the road back to Queensland.

During recent times the indomitable old Walter has been keeping a hotel at Cloneurry. Jack Skuthorpe took up a skelp of country in the Northern Territory, off the head of the Nicholson River, in 1907, and died there of Gulf fever shortly after. Charlie Phillott (brother of Edward, of Colane, Winton) settled in the Charleville district, and has done well.

## THE CULT OF THE COLT.

By "U9L."<sup>20</sup>

### THE PERFECT HACK.

**B**EFORE leaving the matter of breaking and handling it mightn't be out of place to devote a minute or two to what constitutes the perfect hack.

Exception might be taken to the use of the word "hack." Almost it is right that fault should be found. A hack is usually associated with the show ring, and these fellows to which I refer may never see a ring in their lives. They're the boys, though, that take us there and bring us back, that carry us long miles under the baking sun and on moonless nights, when not a glimmer of light is to be seen. They carry us over country that would break the show-ring champion's heart and our neck, and they take us through scrub at a gallop through which the other fellow couldn't see daylight. These are the horses on which we do our daily work, who wheel cattle and slug after sheep. In fact, and in short, they're just ordinary station horses who prop up the country from behind without ever getting the cheers of multitudes or sharing the limelight. You know them, and I know them, and we both love 'em.

### A Good Horse must be Easy to Catch and Lead.

The first point to consider is the catching. The perfect horse must be easy to catch anywhere at all—in the yard among others, in the open among his mob, and anywhere at all. He should present his head for capture and stand still while the bridle is being slipped on him. Of course, I know that many jewels of horses are rogues to catch. A perfect camp horse, when the cattle are on camp, may take more wheeling than a good intention. But that's only a form of perverted humour on the part of the old fellow. He knows what's on, and I honestly believe he's laughing to himself all the time while he evades our clumsy efforts to get him. For mine own part I make rather a hobby of catching my horses by putting my hand on their rumps first. I know it's silly, but I do it, and I've ridden some peerless gems of horses. It's a spirit of camaraderie, I think, which prompts an approach in that fashion. Anyway, it's wrong, and the fault is mine, not the horse's.

A horse that lugs on the bridle when being led is not, and cannot be, perfect. It should step free behind you—abreast of you for choice—and it should come willingly wherever you elect to go.

### "Morally Tied."

It should stay put wherever and whenever you decide to leave it. If it's only tied by a string, that bit of twine should be sufficient to hold it in its place. If it does break away, then it should take but the few steps which the shock has prompted and then halt and stay still. By the way, when breaking in it's a good plan to use a bridle with a long pair of reins. At every opportunity drop those reins on the ground and go and leave your charge. He won't take many strides after his fancied release before he treads on those reins and snags his mouth. The first few lessons may achieve little, but in a remarkably short time that colt understands with the reins lying on the ground virtually he's tied to a post. And it has the same moral effect, too! I've seen a mob of bush horses race by a little mare of mine who was standing with the reins dangling. All she did was to call to them as they passed and pivot on the spot to which she was morally tied.

### Play the Game Fair.

In the exercise of saddling and mounting I want you to understand that when I say a horse should stand still I mean it only within reasonable limits. A little bit of a step, or an impatient stride or two, shouldn't condemn a horse. Hang it all, put yourself in that fellow's place and imagine his keenness. Think to yourself how you sometimes want to get to a job and irk at the delay. That fellow doesn't mean any harm when he wants to move before you're ready, and instead of swearing at him for his impatience just curse your own dilatory actions. Play the game fair, even if it is only with a horse. A bit of a stride while you're mounting, though it's not in the lexicon of perfection, isn't any harm so long as that stride swings towards and under you. It's when the horse swings away from you that you want to check him, and mind your own P's and Q's as you mount.

<sup>20</sup>In the "Pastoral Review" for July, 1929. Previous notes by the same interesting and well-informed writer were reprinted in the March, August, October (1928), January, February, March, April, May, and June (1929) Journals from the February, April, May, July, September, October, December, (1928), January, February, and May (1929) numbers of the "Pastoral Review."

Having mounted, and without worrying about with which foot the horse leads, let us consider paces. Some people run away with the idea that hacks are born. Some believe in heredity. Others give the balance of power to environment. We're not going to argue now, but I firmly believe that, while heredity has its influence to a certain extent, hacks are made by the man who rides them. Let me quote the following in support of my statement. I've broken mobs, and I've ridden multitudes off the breaker's hands. Absolutely without exception every horse I rode exclusively from the breaking was a good and fast walker. And let me whisper my shame, almost without exception they cantered like unto a three-legged frestle in action! I don't know how it was done, and I don't know what means I employed to that end. I did it unconsciously, therefore I can take no credit to myself, and neither should I shoulder the blame.

### **Paces Aren't Everything.**

If you'll accept that lot we'll proceed. But paces aren't everything, though many people run away with that idea. Keep your perfect pacer, and give to me a horse that's responsive in the mouth, that reads your lightest whim and interprets your wishes with accuracy. A pacer may carry you in comfort, but the other fellow is with you in spirit and body, and at the end of the day that twain are better physically than the former disunited units.

And level with that paragon I'd place the horse that goes straight! There's a charm about this, a delight and a pleasure that many men miss. You'll see a horse, otherwise perfect in all his paces, that wants the whole road to himself. He'll waddle and shuffle and lug to this side and that, and he can't go straight. That's an abomination and a curse. I can't tell you how to cure a horse so afflicted, and I doubt there is a remedy. But I can tell you a preventive, or, rather, the cause of the trouble. It is brought about by the rider hanging on to the horse's head when he's a colt. He won't give the thing a free rein and let it go easy, and the colt learns to chafe against the leaden hold by waddling. That's the cause. You may sense the preventive for yourselves.

### **A Straight Goer.**

A horse that goes straight is one of the first considerations of perfection. Many people run away with the idea they want a twister and a dodger for scrub riding. That's an erroneous myth. If you get a horse that props and doubles, that isn't game to go straight, then you and that horse are going to part company—you'll be impaled on one bough and the horse will be lying at the bottom of the tree. Above everything else, a scrub horse must be able and game to go straight. He's got to swing and swerve, of course, and often he's got to be so nippy that his shadow's got to move lively not to be left behind. But he must be able to go straight. That twisting business is learned later; the ability to go straight is the keystone of the job.

Now let us have a look at this horse's paces. It goes without saying that a horse should have easy paces, springy, and with a movement that denotes a joy of life. That's a pleasure for both parties—the mount and the rider. But an essential for perfection is that the horse must be able to hold that pace whatever it is. For instance, you're riding along, the reins hanging free, and your horse is walking. He knows, and you know, the peculiar little action by which you urge him to another pace, be it trot or canter. But while that horse is walking he mustn't break. Force him as much as you will, that horse retains that particular pace until the magic signal is given which indicates a trot or canter. That sort of thing shows training on the part of the man and an ability to assimilate that training on the part of the horse. Though it's only a little thing, a horse shouldn't break when crossing a gully or creek. Yet how many times will you see it hold its pace? Please don't forget the ability to go straight—that's particularly an essential if you head your mount across the downs and ride at ease.

### **The Intelligent Mount.**

The next thing necessary, and please understand I'm placing these objects at random and without any given order of precedence, is that the mount must take an intelligent interest in where it's going and what it's doing. Often you'll find horse and rider in perfect communion one with the other. The man knows the point at which he's aiming, and by a dozen and some more indications does the horse express a similar knowledge. That's a pleasure to the rider, and anything which adds to his ease and comfort helps to form perfection in his mount. Such a horse takes note of where it's going. It doesn't put its feet in holes and blunder over tussocks. It may deviate round a rough place, and when past that obstruction it'll shake its head,

prick its ears, and pick up the line again. Doesn't that make a man feel a pride in his mount? Doesn't that let him know he's not riding a slave? And doesn't that, or shouldn't it, give him pleasure?

Some horses are born turners, some acquire the art, and some come a crash. We must have a horse capable of turning in a flick of time and a dash of space. He must keep his legs under him and have perfect command of himself while he does it, too. There's only one way—he must turn on his hind legs. He must gather his hind legs under him, sit on his hocks, as it were, and wheel as if on an axle. When he's done that he's in a position to spring off his tail and not lose a speck of pace. Horses that prop and wheel on their front legs seem to have a notion that they're ideal turners, and won't learn any other way if they're set at all in that forward turn. They take a pride in it, and there's a fall following that pride in the near future. A horse may be taught to turn properly by pulling him back on his haunches and swinging him round. That requires a strong hand on the rein and a herculean grip with the thighs. But it can be done, and it's worth while.

Tripping, shying, stumbling, and other abominations are disqualifying points. Though most men attempt corrective measures, as well it is to blow against thunder as try and cure those faults.

### A Horse Among Horses.

And last, though by no means least, our horse must be able to carry us. When the sweat's caked about his ears, and his breath comes in panting sobs, when his nerves and sinews are shivering from exhaustion, and his throbbing heart pounds against the calves of your legs, then must our mount hold his head high, prick his ears, take a fresh hold of the bit, and see you damned before he'll submit to the weariness which envelops him. Yea, then you have a horse among horses, and truly you're accursed for ever if you don't dismount, throw your arm round the little fellow's neck, and walk beside him for a mile or two to ease his tired muscles and aching body.

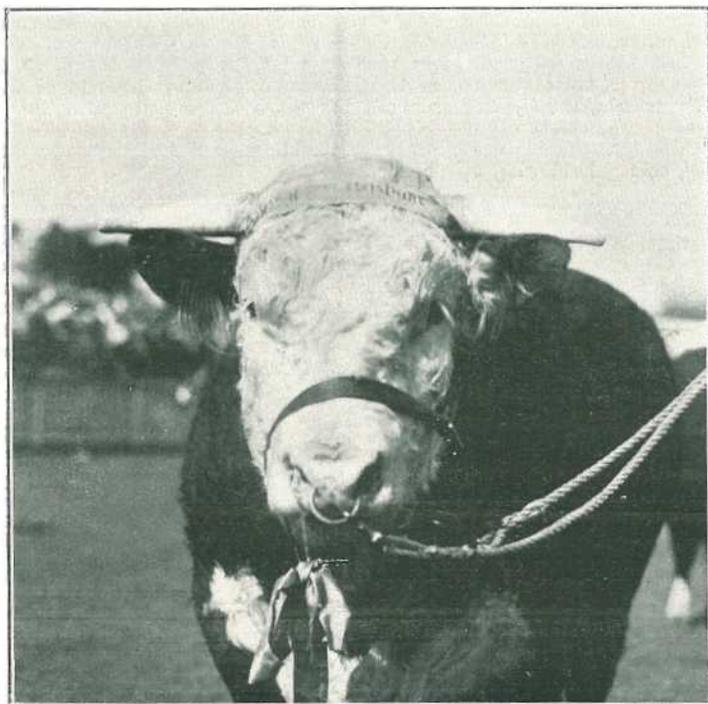


PLATE 117.—THE KING OF THE RING.

## RURAL LIFE IN OTHER LANDS—IV.

By the EDITOR.\*

### A JOURNEY TO GERMANY.

In this series it is proposed to confine our consideration more to national customs and to the economics of agriculture, rather than to cultural methods, for systems of husbandry in Europe, except as regards general principles, are more or less governed by local conditions and traditions—consequently much of what one was able to observe, in the course of a visit to Germany, after the war, in the way of field practice would be, I think, quite inapplicable to Queensland. With us, generally speaking, the conditions of country life are so different that there would be nothing gained by a dissertation on German methods of farming, but on the economic side the German farmer has made much noteworthy progress, and in view of the closer attention that is being given to agricultural economics in Queensland to-day, it is thought that a brief review of several points in rural economy that impressed rather forcibly an ordinary observer, preceded by a fleeting impression of a post-war journey from London to Germany by way of the old A.I.F. road, may be of some small interest.

#### The Charm of London.

There is a magic and charm about London that one realises fully the moment he is leaving after some months of residence—a residence long enough to enable one to become fully conscious of the fascination of the Empire's centre.

The scene at Victoria Station was in marked contrast to those to which one had become accustomed at the end of his periodical ten days' leave during the years of war. There were no pathetic little family groups gathered round returning "Tommies," no kiddies saying good-bye to fighting fathers, perhaps for the last time, and no wives and no mothers smiling through their tears and demonstrating so quietly, and with such dignity, the wonderful bravery of the women of wartime England. There were no groups of casual Australian "Diggers" with ready though judicious retort to their natural enemies, the military police. Instead one found himself with a delicious sense of freedom in his "civvy" clothes, with not a uniform in sight except those of the policemen and railwaymen on duty. Then, on that sunlit summer morning came the journey by comfortable Pullman down through Kent, the garden of England, to Folkestone. How different from that first rail ride to Folkestone—the midnight rush by troop train from Amesbury through a driving snow storm across the south of England, then in the grip of the 1916 winter; the marshalling by leather-lunged but very efficient sergeant-majors on the ocean front parade of the old town that led down to the cross-channel boat, berthed at the breakwater. Outside was a steel-grey tumbling sea misted by showers of sleet, and a raw, cold gale blowing up Channel.

#### A Contrast.

This time, in all the glory of a bright summer day, the Channel was as smooth as the Boat Passage leading from the river to Moreton Bay, and the crossing to France as pleasurable as the journey from Brisbane to Bribie on a windless spring morning. The coast of France was soon in sight, and then came into view the old familiar column of Napoleon's monument on the heights above Wimmereux, and shortly afterwards we glided quietly past the old breakwater and to the well-remembered Boulogne Quay. Here again one felt the contrast of the new order of peace. After passing through the Customs one could do what he liked. There was no yarding up by irritable transport officers, no military police to demand a pass, no toiling up the old *via dolorosa*—the way of sorrows and backaches—to the hungry camp on One Blanket Hill. After looking around on the old familiar sights, all one had to do (with no one to tell him how to do it and when to do it) was to board the tourist train for Paris. How luxurious its first-class compartments when compared with the old cattle trucks, "Chevaux 8, hommes 40"—that is to say, their capacity was eight horses or forty men—on which we used to make the journey back to the line; trucks on which every bolt had rattled loose and which seemed to travel on square wheels over a track that apparently had a bottom step at every rail joint. Veritably peace hath its victories!

#### From Piccadilly to Picardy.

From Boulogne to Amiens the way was through very familiar country. The sea was in sight again at Etaples, the rails running along the shore on the border of the great war cemetery among the fir-forested sand dunes that are lapped lazily

\*In a Radio Talk through 4QG.

by the never ending wave wash of tidal waters. Across tide-bared flats could be seen again the towers and gables, and the flaming red roof of the Casino of Paris Plage—the mecca of many “Diggers” when Etaples was the great training ground—or “bull-ring” as they called it. Abbeville, the old-world shell-shocked city, so well remembered by Australians, was the next halt; and from there on the way led up through the elm-shaded, wonderfully green valley of the Somme, past our old back-area resting places, on to Amiens, the old battered city on the gates of which the invaders knocked in vain in the wonderful and strenuous spring and summer of 1918, and now regaining some of its former prosperity. Here we elected to stay awhile, to renew old memories (and what memories!) and old acquaintances. It was a happy reunion.

From Amiens it was decided to continue our journey to Germany in a round-about way by car, over the old Somme battlefields to Mons, and thence by train to Charleroi, to Liege, and on to Rhineland, crossing the Belgian border near Aix-la-Chapelle. Over the roads as familiar to us as the road to Redcliffe, through country filled with haunting memories—a country now of blue, green, and scarlet enamel, splashed with red poppies and blue cornflowers, now scarred and desolate, showing deep wounds that even Nature, in all her wonderful artistry, could not camouflage successfully; through Villers-Bocage to Contay, and thence down the Hallue Valley through Behencourt, Frechencourt, to Querrieux, and thence once more on the cobbled road to Albert. How every detour in our route was welcomed!—to Blangy-Tronville, Daours, Corbie, Villers-Brettonneux, Mericourt, along the Somme through Bray to Peronne, and back again through Lagnicourt, Bullecourt, Noreuil Gully, Vaulx, and down to Bapaume. It was an old, old journey from Piccadilly to Picardy.

We must hasten on, though one is tempted strongly to linger by the way. When one passes an old tumble-down sandbag stronghold which one had helped to build in the days when sandbags seemed to be the most precious things on earth, the temptation to talk of old times and present contrasts becomes almost irresistible.

### The Road to the Rhine.

By easy stages, over old fighting areas, past old front-line “possies” and camping grounds, through Bapaume and Arras, Mons was reached, and from there our journey to Germany through Charleroi, Huy, and Liege, country already very familiar, was continued by rail. After crossing the frontier the way led through Aix-la-Chapelle over level plain lands on to Cologne, our temporary destination. The country, in some respects, reminded one of the Darling Downs, though, beyond its more or less featureless, level expanse, it was difficult to define the points of resemblance it vaguely suggested.

Germany is a very interesting country geographically. South Germany consists of the Alpine foreland from Lake Constance to the Valley of the Inn, a tributary of the Danube. In the west the frontier follows the crest of a mountain range, and along the Valley of the Moselle for some distance, and then runs roughly north. In the east it is more definitely physical, and is determined by the Bohmer Wald and other ranges, and the mountains beyond the Oder. Then it crosses a featureless plain in an irregular line trending somewhat to the north-east. South Germany thus consists of the Central Highlands, and North Germany of the plain to which they slope. In the east the winter is severe, while in the west it is comparatively mild. The Rhine basin has mild winters and early springs. The summer climate of North Germany is very much that of the Thames basin, both have an average July temperature of just over 62 degrees Fahrenheit. South Germany is warmer.

Magnificent forests cover the mountains of South Germany and parts of the northern plain, in all about one quarter of the surface of the country. About one half is under cultivation, the most fertile being the Upper Rhine country, the garden of Germany. Here the vine comes to perfection, yielding famous wines.

Much wheat is grown on this great plain, but in most other parts rye is the chief cereal. Potatoes are grown in enormous quantities in Northern and Central Germany. The sugar beet is an important staple in some districts. Hops are grown chiefly in Bavaria.

We may have spent overmuch time along the road, but as the way led through country that will be ever sacred to Australians, perhaps an apology for lingering so long is unnecessary. In the next lecture of this series we will continue a hurried journey from the Belgian border to Cologne, down the Rhine to Dusseldorf and up that famous river to Mayence, and then lead on to a consideration of some aspects of agricultural economy that have interested the German farmer who, in this phase of farming, has accomplished some sound and striking results.

## SOILS.

*Summary of a lecture by Mr. G. J. Saunders, M.Sc., B.E., A.A.I.C., Principal of the Ipswich Technical College, at the June Pig Farmers' School, at the Queensland Agricultural High School and College, Gatton.*

The name "soil" is applied to the soft portions of the earth's crust produced by the weathering of rocks. Soils fall into one of two classes—(a) Derived from the solid rock immediately underneath, or (b) transported from one place to another by agencies such as the wind, running water, or even glaciers.

A soil of the first class passes gradually through the subsoil and rotten rock to the solid rock, and its composition is directly related to the parent rock, whereas the composition of a transported soil shows no such relation.

All rocks are divided into three main classes—(a) Igneous, (b) sedimentary, (c) metamorphic. Igneous rocks are those which have been formed by the solidification of molten masses derived from within the earth—e.g., granite at Stanthorpe, basalt on the Darling Downs.

Sedimentary rocks have been formed by the weathering of pre-existent rocks and the consolidation of the weathered material—e.g., sandstone around the College, and the shales of the Ipswich district. Metamorphic rocks are those that were originally igneous or sedimentary, but have been changed so that their original characteristics have been altered or even entirely effaced—e.g., the Brisbane schist in and around Brisbane.

Igneous rocks are subdivided into—(a) Plutonic, (b) volcanic, (c) hypabyssal. Plutonic rocks are those which have been formed by the cooling and solidification of the molten mass or magma within the earth's crust; such rocks cool slowly, and their mineral constituents are coarsely crystalline—e.g., granite (Stanthorpe).

Volcanic rocks have been formed by the solidification of the magma upon the earth's surface. These rocks are not always connected with volcanoes—e.g., at Vesuvius—but may be formed from the magma which has poured out quietly through cracks on to the earth's surface—e.g., the Deccan in India. Rocks of this type are finely crystalline to glassy—e.g., basalt (Darling Downs) trachyte (Fassifern district and the Glass House Mountains), rhyolite (Esk).

Hypabyssal rocks have been formed from the magma which has cooled very close to the earth's surface in cracks (dikes), &c.

The agencies by which the rocks are converted into soil are rain, frost, changes in temperature, wind, running water, and glaciers. Rain falling through the air dissolves from it small amounts of oxygen and carbon dioxide. When it falls on the rocks, it not only softens clayey portions and washes them away, but it attacks chemically the hard solid parts converting them into new compounds, some of which may dissolve in the water.

Water in changing to ice increases in volume and exerts a very great pressure. When a rock, the upper surfaces of which is saturated with water or which contains water in cracks or joints, is subjected to very low temperature, the water freezes to ice and exerts a powerful wedge-like action. This breaks the surface down into finer parts and widens the cracks and joints, enabling air and water to penetrate to greater depths. By repeated action the solid rock ultimately crumbles away and will eventually form soil.

Where a rock is exposed to great extremes in temperature, we find that they crack and fall to pieces. This is due to the fact that the different minerals of the rock expand unequally when heated by the sun's rays during the day and contract at different rates when they become cooled during the night.

Wind by itself has very little action on rocks, but, when it picks up particles of sand, it becomes a very abrasive agent. The wind also transports the light materials to other localities.

Running water, especially fast-flowing water, wears away all kinds of rocks and transports the material down the stream, forming alluvial flats and deltas. Fast-flowing rivers, especially in flood time, carry a large amount of matter in suspension, and they use this material to wear away the rocks along their sides and bottoms. The Nile carries in suspension 54,000,000 tons of solid matter per year, and in solution 17,000,000 tons per year. The Mississippi carries in suspension 406,000,000 tons, and in solution 120,000,000 tons per year. All this vast quantity of material has been derived from the weathering of rocks.

Glaciers, only known in very cold countries, are slow-moving streams of ice. Not only do they transport rock fragments on their surface, but, by means of similar fragments frozen in their lower layers, they wear away the solid rocks over which they pass. All this transported material becomes deposited where the glacier ends, and much of it is then carried away by the flowing water derived from the melting ice over large areas. We have evidence of soils formed by such action in Victoria, United States of America, Canada, and Europe.

All the above agents are Nature's chisels and planes, and they are continuously at work, acting slowly but surely. They convert the solid rocks into soil, unlocking from them the essential constituents so necessary for plant growth.

The physical nature and chemical character of a soil depend largely on the nature of the rocks from which it has been derived.

Granite alters considerably when weathered. The quartz grains are unaltered, but the other minerals pass into clay, iron oxides, &c. A residual soil derived from granite contains the quartz grains as sand, with more or less clay, and it is often stained yellowish or reddish by the iron compounds formed. It contains a very valuable plant food (potash) in a soluble form; such a soil is good for fruit-growing. Basalts pass to a clayey soil, without any quartz sand, coloured brownish or reddish owing to the abundance of iron compounds. With much organic matter, such a soil is coloured black. Such soils are usually poor in potash but relatively rich in phosphorus and lime. Trachyte and rhyolite give light-coloured soils, the former often clayey, comparatively poor, unless they are formed from the rarer varieties, such as in the Fassifern district, which contain potash and soda minerals.

Sandstones lose their cementing material and pass into sandy soils; shale into clayey soils, sometimes coloured dark by presence of organic matter.

Limestone rocks, formed from ancient accumulation of marine organisms such as corals and foraminifera, form light-coloured calcareous soils rich in carbonate of lime.

Plants and animals play a great part in the formation of soil—e.g., roots of trees split rocks, old stump holes and rabbit burrows permit freer access of air and rain, earth worms bring up the lower layers of soil on to the surface. Decaying vegetation adds organic matter to the soil and so increases the percentage of carbon dioxide in the soil, air, and water, and thus promotes more rapid decomposition of the minerals in the soil.

Man also changes the physical nature and composition of the soil by tillage, irrigation, drainage, rotation of crops, ploughing in of crops, addition of fertilisers, &c.

The lecture was well illustrated with lantern slides, photographs, and specimens of rocks and soils.

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## THE PAPAWE.

By G. WILLIAMS, Instructor in Fruit Culture.

The Papaw or Papaya (*Carica papaya*), originally reported as being indigenous to Central America and West Indies, is freely distributed throughout coastal Queensland. The small herbaceous tree is practically branchless and surmounted by a crown of large palmate leaves, at the base of which the fruit is produced, this usually maturing after the fall of the foliage from that part of the stem where it is situated. The branchless habit of the tree can be varied by the removal in the early stages of terminal buds, whereby branching is induced and several fruiting heads developed.

### The Plant and its Properties.

The succulent flesh is very agreeable to the taste, though preferred by many with the addition of sugar, lemon, or orange juice, the fruit being cut transversely, the seeds removed, and such additions as preferred applied in its capacious cavity. The fruit is credited with containing properties which materially aid digestion, as also are the seeds, which resemble watercress in flavour. The foliage applied as a wrapper is said to have the effect of rendering meat tender—a feature that exists mainly in imagination. From incisions made with a bone or ivory knife in the unripe fruit, the milky juice exudes freely and is collected, dried, and exported from the West Indies and Ceylon to other countries where it is sometimes used as a substitute for pepsin. The demand is said to be limited and irregular.

Under favourable conditions, the first fruit are matured within twelve months from planting; location and rainfall are responsible for variations. The term of productiveness is short, seldom exceeding four years, but this to some extent is compensated by its unbroken continuity.

#### Cultivation.

Fertile and well-drained soils are essential to successful cultivation. The most vigorous growth is evidenced and the finest fruit produced on volcanic scrub soils. The quality of the fruit varies under different conditions of soil, location, and humidity. Essentially a purely tropical product, the finest fruit are those matured without an excessive moisture. In some of the Northern scrubs Papaws are widely distributed, but under the influence of shade the trees are spindly and the fruit undersized and lacking in flavour. Fruit produced under semi-tropical conditions is admittedly inferior to the purely tropical product.

#### Varieties.

Various types or varieties have from time to time been introduced into Queensland, but the typical features have by cross-fertilisation been almost eliminated. Two types introduced to the North worthy of mention are the New Guinea or "Long Tom" and the Cowleyii or "New Era" (said to have originated in the Philippines), both being bisexual. The elongated fruit of the former is not quite equal to the latter, but a heavier weight per tree is returned. Earlier introductions were confined to the original unisexual variety, which from a batch of seedlings frequently developed an excess of male and consequently practically unproductive plants, though occasionally the panicles of male flowers are interspersed with those capable of fruit production; the fruit of such are invariably small and inferior. Various suggestions, more or less absurd, have from time to time been published as infallible tests for determining the sex of the young plant, but experience does not favour the acceptance of any of them. Among a batch of seedling plants a wide variation in vigour will be noted, and a reversion of the usual practice of selecting the strongest plants should be applied, for it is found that the most vigorous plants almost invariably turn out to be males.

#### Planting.

Seeds are planted in boxes or seed-beds under partial shade in early spring, and the young plants are put out when from 8 to 12 inches high, the foliage, except the young undeveloped crowns, being removed, allowing part of the petiole or leaf stalk to remain. Where plants are grown subject to the influences of shade, this should be removed several days prior to transplanting, also water should be withheld, but applied liberally just prior to removing, so that the roots may be mutilated as little as possible. In addition to fertility and good drainage, a soil containing a liberal proportion of humus favours development. No applications of fertilisers to light soils can maintain equal results. Liability or otherwise to frost should be considered in respect to location, for there are few cultivated plants more susceptible to frost injury than the Papaw. In planting the possibility of numerous male plants is present. The effect to a great extent may be minimised by including in place of one plant two in close proximity, and subsequently removing one when the sex is determinable. If both are males they should be discarded, male trees being entirely superfluous. Six feet apart has been given as a reasonable distance for planting, but to this at least 2 feet can be added, with 9 or 10 feet between rows to allow for reasonable development and room for the necessary cultural operations.

Fertility being absolutely necessary, applications of fertilisers should be made in accordance with directions contained in the pamphlet "Complete Fertilisers for Farm and Orchard," issued by the Department of Agriculture and Stock, and obtainable on application to the Under Secretary, Brisbane.

#### Diseases and Pests Affecting the Plant.

Under fair conditions the Papaw is reasonably free from disease; fungus in Southern districts is sometimes evident on the fruit by discoloured areas of varying extent, causing decay in their vicinity and occasionally affecting the whole fruit. This is preventable by the application of Bordeaux mixture or Bordeaux powder. In some seasons the larva of a moth is persistent in its attacks upon the stem, which it usually enters close to the leaf bases, and may completely destroy the tree; against this it is questionable whether treatment is warranted. Red Spider amongst the young foliage and nematodes on roots are to a great extent attributable to placing plants in

unsuitable soils, particularly those of a light sandy nature, though weather conditions adverse to growth are congenial to both pests. Dusting with fine sulphur will have some influence against the former, but remedial measures cannot be profitably applied against the latter.

Being a comparatively shallow rooter, weed growth should be eliminated from plantations and cultivation confined to a shallow depth, varying slightly according to the nature of the soil, 3 to 4 inches being quite sufficient in that of a close texture.

### Marketing.

For marketing, sufficient care must be exercised so that the fruit is not bruised when handling, and packing is preferable in shallow trays or cases, so that there will not be undue pressure of fruit. Just at what stage of development the fruit should be gathered will vary according to distance from market and transport facilities, but the nearer the fruit approaches maturity at the time of taking from the tree the more pronounced will be its flavour, and when the market is readily accessible colouring should be evidenced at its apex.

In addition to its place as a dessert and entering into the composition of various condiments, the flesh of moderately mature fruit may be cut into strips be satisfactorily dried by exposure. It is unlikely that the dried fruit will find a market where fresh supplies are available. The green fruit is utilised as a vegetable, treated and served in the same manner as a vegetable marrow.

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## THE FARM TRACTOR.

### LUBRICATION—CRANKCASE DILUTION.

With the many improvements which have lately been effected in tractor engines, crankcase dilution is not being experienced in the average late model tractor to the extent it was in previous years. It is, nevertheless, an ever-present cause of worry, and is responsible for a very high percentage of the repair bills which have to be met for worn engines.

In the motor-car engine only a very small percentage of crankcase dilution occurs, on account of the fact that the spirit used for power purposes is highly volatile and vapourises very readily, with the result that very little of it finds its way past the piston rings into the crankcase.

In the tractor where the internal combustion motor is using kerosene as a fuel, however, a certain percentage of crankcase dilution must occur on account of the fact that, when the piston draws in a cylinderful of gas, the gas comes into contact with the cylinder wall, which is comparatively cool, and some of it condenses in small globules of liquid kerosene, which is absorbed by the oil on the cylinder wall, and therefrom works its way into the crankcase.

The tractor driver himself can do much to obviate the causes of trouble. It is a fact that a careless driver will increase the percentage of dilution considerably by—

- (1) Switching over to kerosene before the engine is sufficiently warm. The result of this is that the kerosene being drawn in does not vapourise, and consequently does not burn completely.
- (2) Running the motor too cold. The most efficient working temperature for a tractor burning kerosene is 200 deg., or almost boiling. Mechanical faults such as poor ignition, incorrect carburetter mixture, worn piston rings, &c., all result in an excess of unburnt kerosene getting into the oil.

Naturally, the percentage of crankcase dilution is also governed to a very marked degree by the quality of the kerosene which is used in the engine. If the fuel is too heavy complete vaporisation does not take place, and these unvaporised fractions get down between piston and cylinder wall and heavily dilute the oil in the crankcase. Kerosene is not a lubricant, and crankcase oil which has a content of kerosene loses the major portion of its lubricating value. It is interesting to note that the new "Cross" kerosene just placed on this market by the Shell Company is remarkable for its property of complete combustion wherein an absolute minimum of crankcase dilution is assured. Only in a kerosene specially prepared to meet all conditions of tractor operation is this very desirable feature to be found.

## **FOOD FLAVOURS IN CREAM.**

By CHAS. McGRATH, Chief Supervisor of Dairying.

**T**O increase the consumption of dairy products it is necessary that all engaged in the industry shall take such action as will ensure a supply of dairy products of a quality that will attract the favourable attention of consumers. A food product in order to maintain a favoured place in competition must appeal to the taste, and there is no food more subject to off flavours and odours than milk and its products.

### **Causes of Undesirable Odours.**

Undesirable flavours and odours in milk and milk products are attributable to one or more of the following causes:—Abnormal physical condition of the animal, feeding highly flavoured foods, absorption of odours by the milk, and changes due to biological changes in the milk and its products.

The defects due to the two first-mentioned causes are noticeable immediately after milking, and are to a great extent under the control of the dairy farmer.

Odours absorbed by the milk include such as arise from tainted air in the milking shed, separator room, cream room, from coming in contact with gas and oil fumes, and odours arising from other sources of contamination. Biological changes in milk and its products are controlled to a great extent by care in production, handling, prompt cooling, and modern sanitary methods of manufacture.

Pronounced food flavour in dairy products is chiefly attributable to the cows consuming highly flavoured feeds which are mixed with our native pasture, introduced grasses, chiefly on scrub soils, and in fodder crops.

### **Growing of Fodder Crops Essential.**

The growing of fodder crops is essential in the economics of dairy farming and the production of milk and cream free from strong fodder odours and flavours is difficult in many localities under varying seasonal conditions.

The elimination of food odours and flavours has received the close attention of many research workers, who found that for the most part this kind of undesirable odour and flavour comes through the body of the cow, being transmitted through the stomach and lung walls direct to the blood, then through the mammary glands to the milk.

Grading officers are familiar with the strong odours and flavours in milk attributable to the feeding of highly flavoured foods such as green lucerne, silage, turnips, rape, rank pasturage, also the animals eating small quantities of certain weeds and shrubs. It is found that if the milk is drawn from the cow within one to two hours after she has eaten some varieties of high-flavoured feeds the milk will carry the strong food flavour, and if drawn subsequent to such period it may be comparatively free from food flavour.

The odour and flavour imparted by some varieties of high-flavoured weeds and fodders will impregnate the milk drawn three to six hours subsequent to being consumed.

Cream, the product of healthy cows grazed on weed-infested pastures or fed strong-flavoured foods produced and handled under approved conditions, will, on account of its strong flavour, be classed below first grade at the factory.

### **The Possibility of Elimination of Odours.**

An important matter for consideration is the processing of cream so as to eliminate the undesirable food flavour and odour.

We realise that the highest quality of butter will be produced from choice cream, and that any improvement in the general quality of cream will come from a keen appreciation on the part of the producer of the importance of care in production and handling, rapid cooling, and frequency of delivery at the factory. The problem of preventing or overcoming the food flavour and odour defect in cream is difficult of solution.

The elimination of undesirable weeds from pastures and cultivated plots on which the dairy cows are grazed is a matter that offers many difficulties owing to the conditions under which the industry is carried on.

Pasteurisation of cream for butter-making has a decided commercial and economic value by improving the flavour and storing qualities of the butter.

One of the many beneficial effects of the process is the elimination of certain strong food flavours, volatile and volatilisable flavours and odours being diminished or eliminated in the process of heating, cooling, and aeration.

The successful heating of the large quantities of cream of varying acidity to pasteurising temperatures is an art and science more complex and more difficult than the pasteurisation of market milk.

Any method of processing to be successful must be carried out without injury to the butter fat, which is very sensitive to other agencies than micro-organisms.

The fat in sweet fresh cream is not injuriously affected by temperatures high enough to sterilise it. The treatment of cream delivered at the butter factories in a sour condition presents an entirely different problem.

The combination of high acid and heat constitutes a powerful corrosive or oxidising agent and, by inviting oxidation of the less stable components of the butter fat, particularly the olein, gives rise to oily and metallic flavours and lowers the storing qualities of the product.

The elimination of food flavours from cream has received the attention of research workers in the dairy industry for some years, and as a result of their investigations a method of deodorisation has been introduced. A deodorising unit combines the processes of pasteurisation and aeration of the cream, and may be used solely as a batch pasteuriser.

Under the process the cream is heated and aerated in a partial vacuum so as to prevent oxidation of the butter fat, which is liable to take place when cream is exposed to high temperatures at atmospheric pressure.

#### Acid Reduction.

Before submitting the cream to high temperatures excess acid must be removed. The process of acid reduction of the cream must be carefully carried out in order to obtain satisfactory results.

In butter factories with large outputs a deodorising unit would be used in conjunction with a flash pasteuriser, the cream passing from the pasteuriser to the deodoriser.

The deodorising unit is a vacuum pan constructed of glass enamelled steel. The heated cream is passed from the flash pasteuriser into the deodoriser when the gauge shows a reading of 18 to 20 inches of vacuum. As the heated cream passes through a spray device into the vacuum pan it forms into a fine mist, which facilitates the removal of the off flavour and odour. The temperature of the cream delivered into the deodoriser should be approximately 145 deg. Fahr., at which temperature it should be held during the processing.

This treatment, however, is not sufficient to remove strong off flavours and odours, and the cream is treated with large volumes of heated air (temperature, 160 deg. Fahr.) under a vacuum of 7 to 10 inches.

During the processing the cream is circulated from the bottom back over the distributing pan at the top of the deodoriser, the circulating cream being held between 140-145 deg. Fahr.

Samples of cream are taken from the deodoriser at intervals in the processing, and when the removable off flavours and odours have been eliminated the processing is completed.

It is necessary to stress the point that only volatile and volatilisable flavours such as green lucerne, silage, rank pastures, and a variety of feed flavours and minor taints are eliminated by the process. Flavours that are not volatilisable may be somewhat reduced, but are not eliminated by processing. They may be classed as follows:—Metallic, cheesy, bitter, rancid, and fermented cream.

By careful grading of the cream material benefits are obtained by deodorisation, as the treatment is effective in removing volatile and volatilisable flavours and odours.

Experiments carried out over two seasons have given favourable results from deodorisation when the cream was carefully graded.

The improvement in the flavour of the product of the pasteurised and deodorised cream varies from 1 to 1½ points higher than the product of the pasteurised but undeodorised portion of the cream.

## BERKSHIRE PIGS. A BRITISH BREED—ITS ORIGIN.

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

**O**F the several breeds of pigs suited to the climatic conditions and the environment of Queensland, none appear to be so popular or so widely distributed as the Old English Berkshire, also occasionally referred to now as the Improved Berkshire and more frequently and correctly as the Berkshire. The type was named after the county in England in which it was originally developed and bred, and is considered to be the oldest of the improved British breeds of pigs. By the term "improved" it is intended to indicate that the breed has been built up and improved upon as a result of an admixture of breeds, inbreeding, selection, and gradual grading up from a mixed type to one recognised for more than a century as a pure breed that can be depended upon to reproduce its type faithfully and regularly, under almost any normal farm condition.

### Historical Record.

Historical records tracing away back to the year 1820 indicate that among the early fanciers of this class of pigs was one, Lord Barrington, who did much to improve the type, which at that time was of a very much heavier and coarser build than is common nowadays. In colour these older types were variable; some were white, some were quite black, while some were black and white with a patch of white on the shoulder; some were reddish, some rough-coated, others fine, and they were not noted for early maturity or prolificacy as we understand such terms in these days.

Herbert Humphrey was a very successful breeder of Berkshires in 1862, the year when the breed was first given a special class at live stock shows. He was the chief mover in establishing the parent body, the British Berkshire Society; for over twenty years he compiled the Herd Book and edited its proceedings. Since then breed societies, like the show yard, have exercised a stronger influence on type and quality than any other activity.

The British Berkshire Society has now amalgamated with the National Pig Breeders' Association of England (The N.P.B.A.) and pedigrees are included in the Herd Books which that association publish. In Australia the interests of Berkshire breeders are cared for by the Australian Stud Pig Breeders' Society (formerly the Berkshire and Yorkshire Society of Australasia).

### The Popularity of the Berkshire.

Berkshires, the world over, appear to have attained a standard of popularity not excelled by any other breed, though breed competition is exceedingly keen and there are many aspirants in the bid for popular favour.

The breed certainly had an advantage in being one of the first of the British breeds to be popularised, its dual purpose nature and adaptability have also been advantages and will continue to stand to the breed against competition from any other medium or large breed of similar type. They appear to be adapted not only to the cooler climatic conditions prevailing in England, Europe, and America, but to the warmer climes of Africa, the islands of the Pacific and to Australia and New Zealand, while they acclimatise readily and become adapted to conditions in almost any part of the world. Coupled with this popular favour the breed possesses a ready aptitude to mature either as porkers or baconers, and can be utilised to advantage as porkers at around 4 to 4½ months of age and as baconers at less than six months of age. It costs a good deal more to feed them after they scale 130 lb. dressed, and the bacon curers class them in a lower grade if too coarse and heavy.

### Their Early Development.

It is recognised of course that Chinese, Neapolitan, and perhaps also Siamese pigs were used for mating with the old English wild pig to form a foundation of the new type, while doubtless the prolificacy of the Old Chinese type (this breed was white in colour) has been handed down through the various stages of improvement. The older types of Berkshire, as illustrated in a very old oil painting in possession of the Agricultural Department of the University of Edinburgh, shows the breed as of a chestnut colour with dark patches through the hair; russet coloured spots were also common, and these still appear in Berkshires that show a tendency to degenerate, the reddish tinge in colour coming out very strongly in second and third crosses of improperly marked stock.

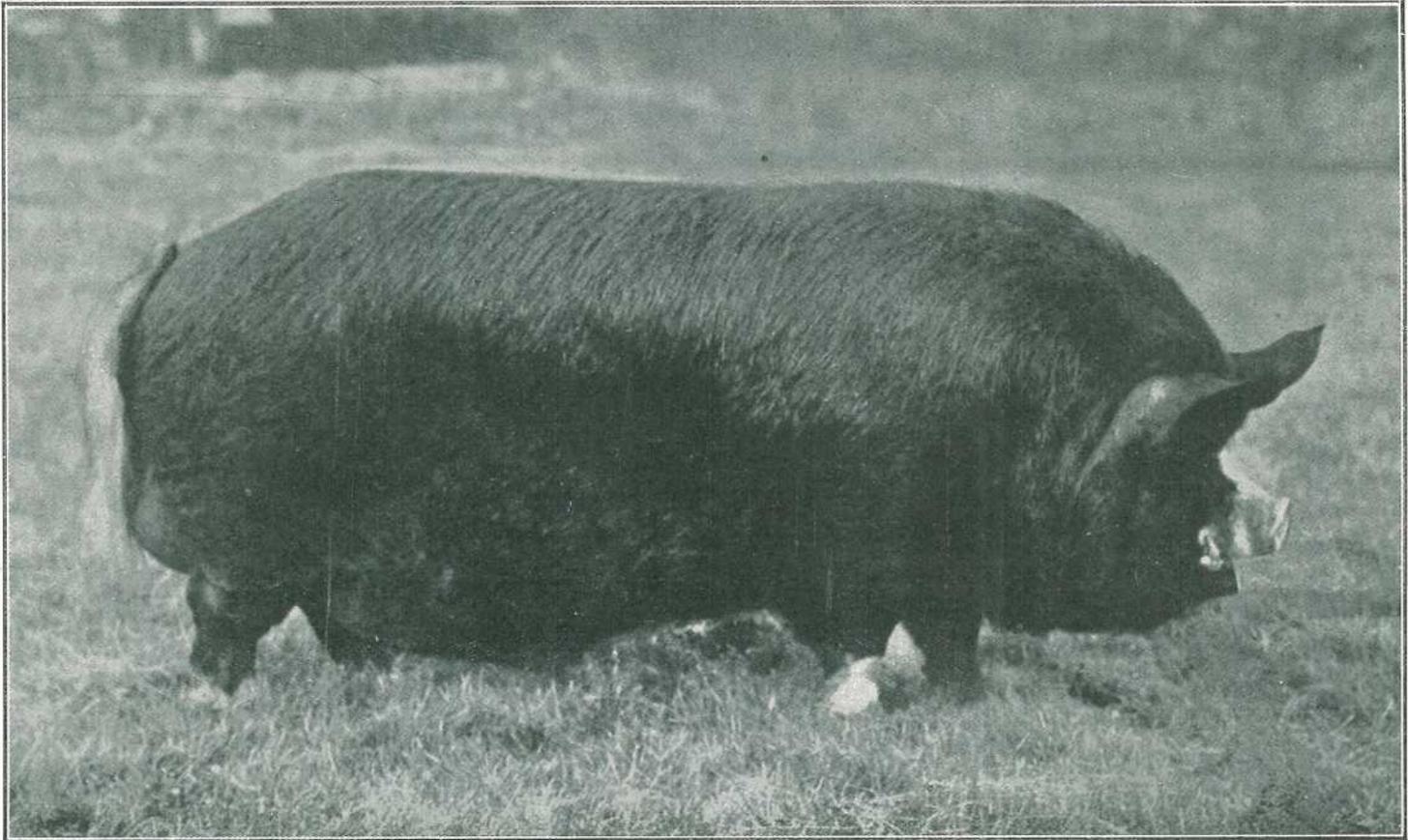


PLATE 118 (Fig. 1).

Berkshire Boar "Leadenham Duke" B. 748. Winner of the "Eaton" Challenge Cup for the best Berkshire pig exhibited at the Royal Agricultural Society's Show, Newport (England), 1927. Bred by Captain J. S. Reeve. Exhibited by Mr. J. D. Player. Note comely, attractive appearance, masculine sturdy type, great length and depth of body, colour markings, strength of legs. A type of Berkshire popular with British and Australian, and with many overseas breeders. Photo. by "Farmer and Stockbreeder," published in Vol. 44, National Pig Breeders' Association Herd Book.

In America they still have a "red" Berkshire, a type evidently evolved from this Old English russet-coloured strain, with, possibly, additional Tamworth crosses. The journal called the "Complete Grazer," in an issue in 1845, describes the breed after it had been materially improved from the standard of earlier days, as in colour, reddish-brown, with brown or black spots, sides very broad, legs flat, ears large and pendulous over the eyes, body thick, close and well made.

### The Modern Type.

In a report published a year or two ago by the British Berkshire Society it was stated the chief characteristics of the modern Berkshire are their hardness, active disposition, general conformation, and their evenly developed carcase; the article adds that the breed is unsurpassed as grazers and foragers. As a result of their strong digestive and assimilative powers their increase in weight is large in proportion to the amount of food consumed.

The average quality of Berkshire pork and bacon is such that if properly fed and handled from birth the carcase can be graded as extra prime. The fat and lean should be evenly intermixed and of excellent texture, while the pigs should dress out well in proportion to their live weight. The roomy lengthy framed Berkshire with a medium type head and a fine coat of hair is much sought after; these are noted for early maturity, quick growth and for prolificacy, three very desirable characteristics in any breed of pig.

### Show Yard Influences.

There can be no denying the fact that the Berkshire has undergone more changes in type under the influence of the show yard in recent years than any other breed of pig which has been recognised in prize schedules for an equal length of time. There never was a time when quality and correct type were more keenly sought after and obtained by the breeder than now, for there is no call at all nowadays for the longer nosed, rough coated, coarse type of years ago.

Be it understood, too, it is no easy job breeding the correct type, nor is it an easy matter securing well marked pigs, as markings are. In fact it is doubtful if there is any other type in which it is so difficult to secure the ideal set out in the Herd Book standards as in the Berkshire; hence really well marked, typical animals, guaranteed breeders, and of an early maturing, prepotent type are always worth breeding. Fortunate is the breeder who has such types and who can perpetuate all these good qualities in his herd of pigs.

### Colour Markings.

From the layman's point of view, it is a debateable point whether it really pays to stick to the Herd Book standards of colour markings seeing they are so difficult to reproduce, and that they are of no value whatever from a pork butchers' or bacon curers' point of view. Breeders of other types of live stock have had to face the same difficulties, and in many instances have had to give way and resort to broken coloured animals in order to retain other valuable characteristics, like conformation, prolificacy, and early maturity. Breeders of Clydesdale horses, for instance, have had to depend on many occasions on sires that carried broken (or even to the layman indifferent) markings; breeders of Jersey cattle years ago would not have dreamed of using the broken coloured animals one notices nowadays in the show ring, yet it would not be correct to say that broken coloured animals are any the less valuable in the herd than the whole coloured stock so popular in days gone by. Berkshire breeders and those responsible for the preparation of the Herd Book standard have, however, not thus far given away on this important point, hence colour markings are still required to be as per the standard published in the concluding paragraph of this article.

These matters are well worth discussion at meetings of breeders interested in the stud pig business, for they are important, and may or may not have far-reaching effects on the future breeding of this class of pig. Suffice it to say, the animal must have a colour acceptable to the breeders of the type, and at present broken coloured pigs, those with patches of white in the ear, with one or more black feet, with a black tail or with white on any other portion of the body than those allowed for, will not realise top values except they are otherwise of exceptional merit, and really worth the money. Nor is it likely the broken coloured sorts will win in competition with better marked animals at any of the more important shows where Herd Book standards are accepted. The call is for well marked and well developed sorts, and without these qualifications stud values cannot be expected.

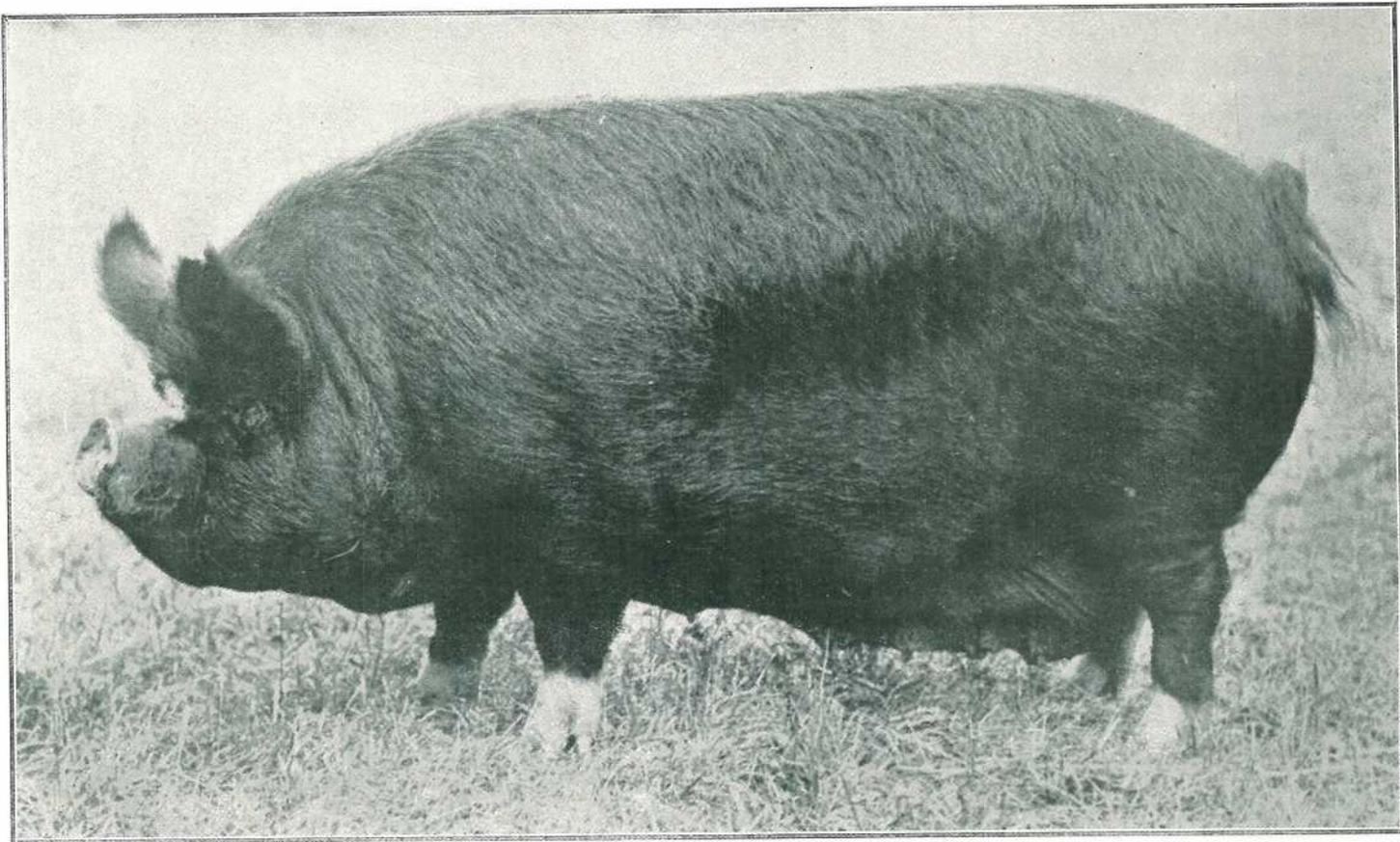


PLATE 119 (Fig. 2).

Berkshire Sow, "Whitley Ella's Beauty" S.5593. Winner of the "Eaton" Challenge Cup for the best Berkshire pig exhibited at the Royal Agricultural Society's Show, Nottingham, England, 1928. Bred and exhibited by Reading Corporation. Note difference in type and appearance to the Canadian Berkshire in Fig. 3, this indicating the wide range in type preferred by breeders in different parts of the world. The Canadian type has not yet been introduced into Queensland, where British types are predominant. Photo, "Farmer and Stockbreeder," published in Vol. 45, National Pig Breeders' Association Herd Book.

### Breed Characteristics.

Prominent amongst characteristics claimed for the Berkshire breed by breeders of this type might be mentioned—

(1) Great muscular power and vitality which renders them less liable to disease. The boars are prepotent to a degree; the sows are fairly prolific.

(2) Activity combined with strong digestive and assimilative powers; hence Berkshires return a maximum of flesh and fat from the food they consume. They are good doers but need very careful handling, otherwise they become over-fat, and this in turn may lead to sterility and barrenness, and to unsatisfactory growth.

(3) The sows are reasonably good nurses and good sucklers if in medium breeding condition. They possess good limbs and good quality flat bone. Care should, however, be taken to avoid weak-legged pigs when selecting, for some strains have inbent knees and "cow" hocks and are down on the pasterns.

(4) The young pigs are strong, smart, and active at birth, consequently are well able to look after themselves if carefully handled.

(5) Berkshire can be fattened for market at any time, whilst they can be fed to any reasonable weight required.

(6) The flesh provides a high quality pork and bacon much sought after by pork butchers and bacon curers. Australian experience proves that the Berkshire for this purpose is ideal when crossed for pork with the Middle Yorkshire or a similar type and with the Tamworth or other large breeds for bacon. Some breeders also favour the use of Berkshire boars with first cross Tamworth-Berkshire sows, these latter sows having proved their adaptability and usefulness for farm purposes here. There are many instances where these grade pigs would be even a better proposition than the purebred Berkshires for pork and bacon production.

(7) The Berkshire boar possesses remarkable powers in transmitting the valuable qualities of the breed to his progeny, both in the purebred form and when used as a cross. This power is referred to as "prepotency," and is a very desirable quality. No breed has been used more extensively for cross breeding purposes than the Berkshire, nor has any been found to be more useful in refining the progeny of coarser types.

(8) Berkshires possess unsurpassed uniformity in quality and type; they reproduce themselves faithfully; their reasonable size, quick growth and easy feeding powers with uniformity and hardiness make them a favourite with breeders of pigs generally. Special care is necessary in the selection of breeding stock to ensure securing animals from well marked reliable strains; these are worth more money than those strains not noted for trueness to colour markings, &c.

(9) When slaughtered Berkshire flesh has a fine texture with a good proportion of fat and lean. The meat is sweet and of good flavour, this the result of quick growth and early maturity. Avoid overfat meat or stock.

(10) Both boars and sows have an excellent disposition; they are quiet, docile, and contented, and it is uncommon to find a bad-tempered fence-breaker amongst them; if one is found there should be no delay in immediately culling him or her from the herd. Cull out all unsatisfactory sorts without reference at all to breeding or purchase price. It does not pay to keep or feed inferior stock.

(11) Under normal farm conditions Berkshires are reasonably prolific and this characteristic can be distinctly improved by careful selection and breeding. In and in breeding, breeding too closely, and neglect soon tell their tale in reduced and irregular breeding powers; this also lowers the standard of quality and causes animals to be classed as "slow growers."

(12) Both fine and thick-haired types do well. The former or a medium type is the more popular; the thick, coarse haired types of years ago are not common or desirable now, for they are not as attractive or symmetrical as the medium coated (often referred to as the improved) types.

Berkshires are medium in size, trim in appearance and free from roughness—coarse wrinkly types should be ruthlessly discarded as breeders. They are well modelled and possess—in specially selected strains—the very necessary length and depth of body and hams. Short dumpy types are undesirable. The face is short and dished; the ears erect and slightly pointed; the hair glossy, soft and fine. Swirls, roses, and cowlicks in the hair along the back or rump are distinctly objectionable as these are regarded as definite faults in the show yards. To the pig fancier the well-bred Berkshire has a captivating and symmetrical outline.

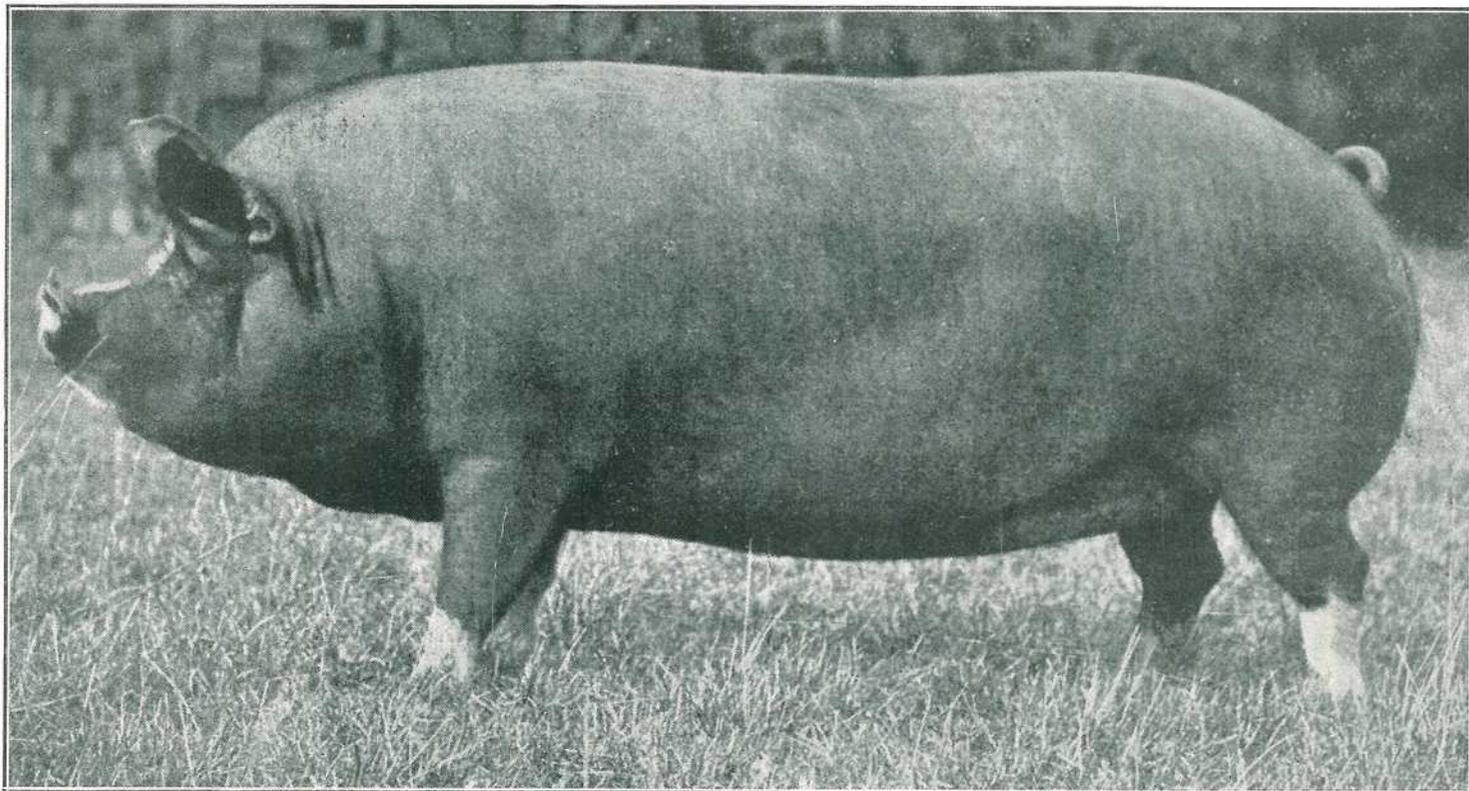


PLATE 120 (Fig. 3).

Berkshire Sow, "Woodburn [Laurel]," imported from Canada. Royal Champion Berkshire Sow, Palmerston North, New Zealand, 1928, owned by Mr. J. A. Russell, Gillespie's Line, Palmerston North, New Zealand. A type of sow popular with Canadian and Dominion breeders on account of great length and depth of body, well developed hams, and fine quality of skin and hair. Note striking contrast to British types. Photo. courtesy New Zealand Pig Breeders' Association, Inc. Published also in the New Zealand Herd Book, Vol. 40, 1928.

### Some Objectionable Features.

As with all other breeds some strains of Berkshires and some individual animals have undesirable features. A few of these noted over a long experience in the judging of pigs are as follows:—

*Legs and Feet.*—Weak, inbent forelegs, flat feet, weak pasterns and cow hoeks. A pig with weak legs and feet is a very poor proposition and should be culled and sent to the butcher as soon as it is possible to put the animal in marketable condition.

*Head.*—Crooked jaws, tongue protruding from side of mouth, undershot or overshot top or bottom jaw, snout too long and crooked, ears lopped and too large. Eyes weak and with heavy overgrowing eyelids eventually causing blindness.

*Body.*—Heavy wrinkles behind the shoulder and along the side; weak loin and tucked-up flanks. Sows showing very poor development of and insufficient number of teats (less than twelve, evenly placed, prominent teats). The number considered most desirable is twelve to fourteen. Boars showing signs of rupture (hernia) in region of navel or in scrotal sac. Goose rump, drooping away towards low-set tail and weak tucked-up hams.

These, together with the tendency to carry too much condition and become lethargic or dopey, are all serious faults in any breed and should be avoided at all costs. No breed or no animal is perfect, and an inferior, badly marked Berkshire is no better than an inferior animal of other breeds. It pays to keep the best.

### Breed Societies.

Following on after the formation of the British Berkshire Society in 1845, the American Berkshire Association was organised in 1875 and the National Berkshire Record in 1893. It was during the year 1900 that the Berkshire and Yorkshire Society of Australasia was organised, and this society grew to such dimensions that in later years it became necessary to reorganise the parent body. This has now been completed, and the new organisation, styled "The Australian Stud Pig Breeders' Society," has headquarters in Melbourne, Victoria, and branches in the various States. The Queensland Branch Secretary is Miss J. Mackay, of Inns of Court, Adelaide street, Brisbane, from whom can be obtained a beautifully illustrated brochure entitled "Better Pigs on Every Farm," in which the organisation and development of the society is referred to.

These societies have done much for the Berkshire and for the other breeds registered in their herd books. Our own Society has been the means of organising the distribution of the various breeds to the four corners of the Commonwealth. To-day in Australia Berkshires stand at the head of the list as being the most readily adapted to any climate, soil or condition; they will reproduce with equal facility and quality both for pork and bacon.

### The Berkshire as a Breeder.

The Berkshire sow makes an excellent, contented mother—sturdy, vigorous, and thrifty, cleanly in habit (if given a chance to be so), fairly prolific, averaging from eight to ten per litter. The suckers when born are sturdy, lively, keen, and develop rapidly.

Sows should not be retained as breeders when over seven or eight years of age, as they lose their teeth and often become very clumsy and poor sucklers. They can, of course, be fattened and marketed as back-fatters if food is reasonably cheap and plentiful.

If the stock are too finely bred, however, they deteriorate and produce puny litters. The breed exercises a powerful influence in the production of good type pigs in country districts. Cross-breeding can thus, by the maintenance of pure, strong, prepotent types, be made of considerable local value.

### Berkshire Boars.

Some very high prices have been secured for Berkshire boars abroad. We have record of a genuine Canadian sale of the Berkshire boar, "Premier Longfellow," who was champion at the St. Louis State Fair in 1916, and at the sales realised £400. The record price in England is £500, whilst Berkshire sows have topped the sales on many occasions. Stud pigs have never realised these prices in Australia, but



PLATE 121 (Fig. 4).

Champion Prize Winning Berkshire Sow, "Dundas Dora" 6628. Owned and exhibited by M. Porter and Sons, "Roselock," Wondai, Qld. The winner of many championships, and with litter, the winners of numerous prizes at Queensland shows in 1929. This type of sow, popular with Australian breeders, indicates the capacity of the Berkshire to reproduce itself faithfully, and to breed consistently. This sow's progeny have realised hundreds of pounds sterling, and though five years old she is still producing and rearing excellent litters.

from fifty to seventy-five guineas has been paid on several occasions in New South Wales and Victoria for selected animals.

A few years ago it was considered that the Berkshire was much superior to any other breed in prolificacy, but many breeders, taking advantage of the opportunities at auction sales of stud pigs in show rings, have followed a system of excessively fattening their animals. This has, in some instances, resulted in a loss of refinement and quality in the young stock, and a still more serious defect in the loss of hereditary prepotency.

It has been truly said that the "pig is what the breeder and feeder make it." The show yard winner of to-day is, unfortunately, often a short, chubby, unprofitable animal with an unnatural obesity, thick heavy forequarters, and poor breeding powers.

### Berkshires for Pork and Bacon.

In an interesting and informative pamphlet entitled "Berkshires for Pork and Bacon" issued a year or two ago under the auspices of the British Berkshire Society, the following records of the Berkshire breed appear. We make these excerpts for the benefit of breeders generally:—

#### (1) THE RECORD OF THE BERKSHIRE BREED.

After being cultivated with increasing carefulness by individual breeders for more than one hundred years, Berkshires were the earliest registered of any breed of pigs in England, and they have been consistently developed with strict reference to commercial requirements ever since. To this is due the wonderful record of the Berkshire breed—a record unrivalled in the history of British Live Stock.

#### (2) THE PERCENTAGE OF LIVE WEIGHT TO DEAD WEIGHT OF THE BERKSHIRE BREED.

The following table, compiled at the Cambridge University for the "Journal of Agricultural Science," giving the comparative percentage of meat for pigs of different ages exhibited and slaughtered at Smithfield, shows the marked superiority of Berkshires over other breeds for both pork and bacon:—

		Three Months.		Five Months.		Seven Months.
Berkshires	.. ..	77.0	..	78.7	..	81.1
Middle Whites	.. ..	73.0	..	76.8	..	82.4
Large Whites	.. ..	73.0	..	76.9	..	80.9
Large Blacks	.. ..	72.9	..	73.9	..	79.7

It is to its superior fleshing capacity, combined with a higher proportion of lean to fat at the early age requisite for tender meat, that the pre-eminence of the Berkshire breed in the carcass classes is due, not only at Smithfield, but wherever they are shown in competition with other breeds.

#### (3) THE BERKSHIRE PIG ABROAD.

In the Argentine, Australia, and New Zealand—countries in which the commercial aspects of live stock breeding are alone of importance and where the most up-to-date methods are exclusively employed—Berkshires constitute two-thirds of the purebred pig population, which is a striking tribute to the suitability of the breed for all climates and conditions.

This fact assumes particular significance in the case of Australia and New Zealand, where bacon production is a large and growing industry.

In South Africa and Canada, they are second in order of popularity, and they thrive in increasing numbers in Japan, India, the Malay States, and Central Europe.

In the United States of America, Berkshires have long had their own breed society. At the International Live Stock Show at Chicago, held annually, Berkshires have sired thirty champions, and have won first prize in one or more classes nineteen out of twenty-one years—a record unequalled by any other breed.

Since the war the demand for Berkshires for export to all parts of the world has steadily increased.

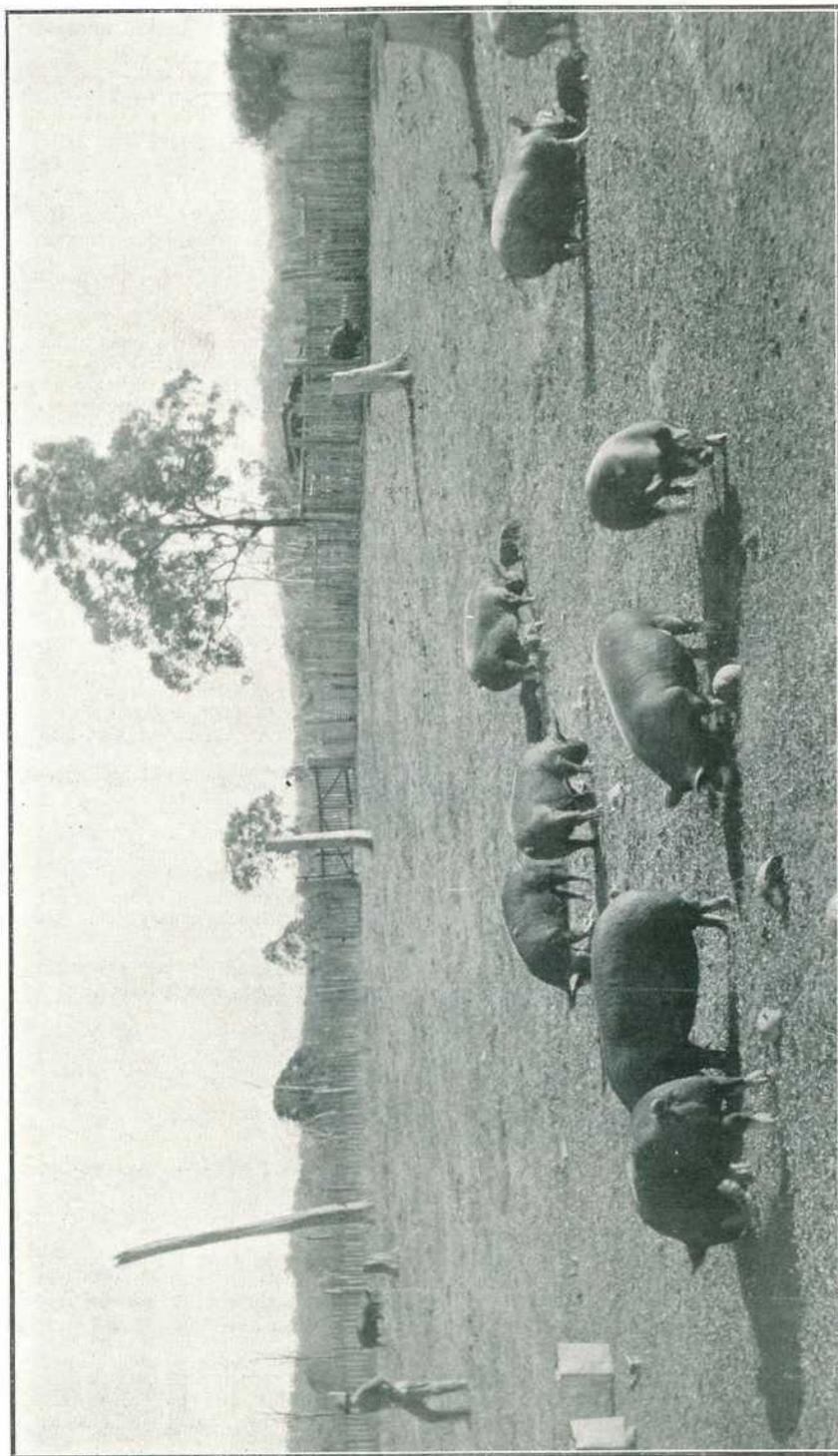


PLATE 122 (Fig. 5).

A group of Berkshires at the "Bon Vale" Stud, property of J. W. Handley, Murphy's Creek, Qld. Productive, prolific, and profitable.

## (4) THE SUPERIORITY OF THE BERKSHIRE CROSS FOR BACON.

All independent experimental research for ascertaining the best cross for bacon shows that one or other parent—preferably the dam—should always be a Berkshire.

For Wiltshire bacon, which commands the highest price in the world, the Western Curers' Association in their leaflet, "Pigs for Bacon," say, "To produce at the greatest profit the best pigs for prime quality lean bacon the farmer is recommended to breed pigs from large white boars and pure Berkshire sows."

The experiments of the Canadian Government at Scott, Saskatchewan, which have been conducted under the supervision of a committee of curers, have reached the same conclusion—viz., that the large white boar on the Berkshire sow is a better cross for bacon than any other breed or cross.

**The Conformation of the Berkshire—"Standard of Excellence."**

How closely the type to which the Berkshire has been bred corresponds with the requirements of the bacon curer may be seen by setting out in parallel columns the standard of excellence of the British Berkshire Society and the specification of the curers at a recent conference (in England), at the Ministry of Agriculture, called for the purpose of ascertaining their requirements.

The Curer's Specification.	The Berkshire Standard of Excellence.
Back—Long and level, with ribs well sprung.	Long and level, with ribs well sprung.
Sides—Level and moderately deep.	Level and deep; free from wrinkles.
Hams—Broad, wide and deep to hock; tail set high.	Broad, wide and deep to hock; tail set high and fairly large.
Belly and Flank—Thick with straight underline.	Thick with straight underline.
Shoulders—Light, and on a line with forelegs below, and with sides laterally, free from wrinkles.	Light and aligned with forelegs below and with sides laterally, well sloped backwards, free from wrinkles and coarseness.
Flank—Aligned with sides.	Aligned with sides; should handle firm.
Head, Neck, and Jowl—Light.	Moderately short, face dished, snout broad, wide between the eyes and ears; ears fairly large, carried erect or slightly inclined forward and fringed with fine hair; jowl light; neck light, and evenly set on shoulders.
Legs—Short, and set wide apart; the pig should stand well up on the tips of the toes.	Short, straight, and strong, set wide apart, and hoofs nearly erect.
Bone—Fine.	Fine.
Flesh—Firm without excessive fat.	Firm, without excessive fat.
Skin—Free from coarseness and wrinkles.	Fine and free from wrinkles.
Hair—Fine.	Long, fine, and plentiful.

**Some Interesting Litter Records.**

The statement that "Berkshires do not farrow enough pigs," a statement that has often been made in Queensland and in the other States and abroad, has recently been challenged by the Berkshire breeders of America through their secretary, E. M. Christen, an authority on the breed, and an official who has done a great deal of research work over a long series of years.

When asked why this statement had been made, on the occasion of a chat to a prominent Berkshire breeder recently, the answer was short and not altogether satisfactory, for, said the breeder referred to, "I don't know, but that is what people tell me."

Observation had, however, taught Secretary Christen that these remarks were not true, because he had seen as many "producing" Berkshires as any other breed in the course of a five years' special study of the type. The ability of the Berkshire sow to produce a sufficient number of pigs was unquestioned in his mind. "Now," said he, "what was the evidence which could be presented to even a biased mind which would convince him that average Berkshire sows not only farrow as many pigs as any other breed, but they also rear as many."

So attention has been turned to the statistics as contained in the first 1,400 litters in volume 63 of the "American Berkshire Record." This survey brought the data strictly up to date, as the 1,400th litter was entered on the 2nd July, 1924. The record of 1,400 litters does not include duplicates such as litter mates. The 1,400 litters showed a total of 12,309 pigs farrowed, or an average of 8.792 pigs to the litter. This is as good or better than the other breeds do, and considerably better than averages on farms where purebreds only are used.

Of the 12,309 pigs farrowed in these 1,400 litters, 9,803 of them were reared. This makes an average of 7,002 pigs reared per litter, which is well within the probabilities of a net return from the brood sow even now.

When one considers that these litters were farrowed, and the records came from every State in the Union, from every age of sow, farrowed in every season of the year, and under every condition, we can accept them as authentic, and without hesitation. One of the tasks of Berkshire breeders is to see that this information passes into the hands of the men who do not know about the breed.

A Berkshire sow, or any sow to be profitable, must farrow a reasonable sized litter, and then rear them. It is true that many pigs are lost before weaning time because of carelessness of the owner, improper management, or wrong feeding. The sow is nearly always charged with the loss, whether it is her fault or not, especially by the sceptic who does not know, nor desires to find, the truth. Breeders must present facts to counteract this.

At the same time we must not bind ourselves to the fact that certain sows or certain families do not produce as large litters as others. When such an animal is found, the sow should be sold for pork. It is reasonable to expect the pigs in a small litter to be plumper and more attractive looking than those in litters of seven, eight, or ten. They ought to be, but there is no reason why they should be retained on the farm. The breeder must ask himself, and answer the question: "If the sow or boar in the big litter had had the same chance, would she or he be as good as the pig before us from a small litter."

This has not been done in the past, and our selection of breeders has been largely a selection without respect to breeding, ancestry, or the chance the pig has actually had. Many simply select the best looking pigs. This is shown by the fact that practically every pig in litters of three, four, or five, were all reared and (in the case of the American Herd Book referred to) were all registered, while it was seldom that more than four pigs were ever registered from a large litter.

It was also noticed that the litters in some herds ran uniformly large in size, while in others they were uniformly small. This goes to show that selection or care, or both, affect the number of pigs farrowed and reared.

A summary of the 1,400 litters mentioned above shows—

9 litters of 3 pigs each			130 litters of 11 pigs each		
19	"	4	61	"	12
46	"	5	42	"	13
99	"	6	12	"	14
177	"	7	11	"	15
282	"	8	2	"	16
294	"	9	1	"	17
215	"	10			

Total 1,400 with a total of 12,309 pigs farrowed and an average of 8.792 pigs to the litter.

In conclusion, we can say, and should say, that Berkshires are prolific, and use the above-quoted authentic figures to show it. Also, that these Berkshire sows are good mothers, as they reared over seven pigs to the litter, or, to be exact, 9,803 pigs to the 1,400 litters. These figures come without any omission, with no effort to find a favourable record, but as a clear, short presentation as to what an average Berkshire sow will do and can be expected to do.

The Federal Council of the Australian Stud Pig Breeders' Society has adopted the following "Standard of Excellence" for Berkshires, with points allotted:—

	Points.
<i>Head and ears.</i> —Moderately short; face dished; snout broad and wide between the eyes; ears fairly large, carried erect or slightly inclined forward, and fringed with fine hair .. .. .	15
<i>Neck and shoulders.</i> —Medium length, evenly set on shoulders; jowl full but not heavy; shoulders fine, sloping backward, and free from coarseness .. .. .	10
<i>Back and sides.</i> —Back long and straight; loin full; ribs well sprung; sides deep and full to flank, showing straight underline; and in sows twelve good, evenly placed teats .. .. .	20
<i>Hams.</i> —Wide and deep to hocks; tail set high on back line, and fairly large .. .. .	20
<i>Legs and feet.</i> —Legs short, straight, and strong; feet set wide in line with shoulders; hoofs nearly erect .. .. .	15
<i>Colour, skin, and hair.</i> —Black, with white on face, feet, and tip of tail; skin fine and free from wrinkles; hair long, fine and plentiful .. .. .	10
<i>Character.</i> —A combination of all points showing distinctive breeding, type, and quality .. .. .	10
Total .. .. .	100

### PIG HYGIENE.

By H. G. CHEESEMAN, Senior Slaughtering Inspector.

*From a paper read before the Pig Raisers' School at the Queensland Agricultural College, Gatton, June, 1929.*

Close association with meat inspection and piggeries for the past thirty years enables me to speak with some knowledge of the life and habit of the short-lived pig from its birth to its appearance on the table in various food forms. As we have all been taught, the pig belongs to the order mammalia, species pachydermata, or, otherwise, thick-skinned animal. Briefly, the generic characters of the domesticated animal are small head, ears short, thin, and sharp, neck full and broad, cheek full, flexible and short snout flattened in front, small and quick eyes, mouth small, strongly built body, uniform in line carrying a wealth of condition, short twisted tail well set, four toed, short legged, and full ham.

The wild pig has different characteristics, namely, long legs, long neck and snout, long narrow roach back, thin hams, carcass generally spare of flesh, eats ravenously, and develops big belly and lives on carrion offal.

According to design and nature the dentition of the pig varies considerably; at nine months he shows 40 teeth, and at eighteen months a full mouth of 44. In order, the teeth are divided into incisors or nippers, canine or eye-teeth, molars or grinders. Therefore, from the number and position of the teeth, physiologists are enabled to define their nature and functions, as they are always intimately related to the food and habit of the animal. They form, for the same reason, important guides to the naturalist in classification of animals. Thus the domestic pig can be classed as much a grinder as a biter, for he can as well live on vegetable as animal food, although a mixture of both is economically sound, which has been decided as the most natural.

From this description the pig may be regarded as a link between the herbivorous and carnivorous tribe, and is consequently known as an omnivorous quadruped; or, in other words, an animal capable of converting any kind of foodstuff into nutriment.

#### Characteristics of the Pig.

Physiologists and naturalists are all agreed that the functional characteristics of the pig are the same in whatever part of the world he may be found—he is known for his gluttony and indifference to the character and quality of his food. Occasionally he shows an epicure's relish for a succulent root, pumpkin, or other vegetable. He will the next moment turn with equal gusto to some unsavoury offal, sour swill, or even liquid and stagnant filth from wallow holes in and about his lair, or, in other words, will endeavour to convert any kind of aliment, good or bad, into supposed nutriment. Hence, from its coarse and repulsive mode of feeding, slothful habits, laziness, and indulgence in sleep, he has gained for himself the unenviable name of being an unclean animal. The question arises "Why?" Well,

the answer is simply because the unfortunate animal is the victim of circumstances, brought about by the indifference of his keeper. Consequently, it is only reasonable to suppose that under such influence he is particularly susceptible to disease, saying nothing of other ailments of a dietetic nature, and which set up derangement of the alimentary canal.

Now, as filth defiles physically the characteristics of the flesh, or meat, it behoves those whose livelihood it is to depend upon pig-raising to consider the seriousness of violating the law of Nature, for it rests with man to counteract the evil consequences of some of his habits which the animal is unable to teach himself.

It is a remarkable fact that, though everyone who keeps a pig knows how prone he is to disease or other ailment which injures the quality and wholesomeness of the meat or flesh, yet very few have judgment to act on what they see and provide against it by strict attention to his diet, housing, and general welfare.

By strict attention to diet particularly is meant the thorough cooking or sterilising of all flesh food such as offals from slaughter-houses, skimmed and separated milk from dairies, butter and cheese factories, scraps of cooked animal substances, and boiled vegetables, bread and other aliment cast from banquets and possibly plates of sick and ailing individuals. The lastmentioned is most necessary, and the old adage "Prevention is better than cure" always stands good, for it is known, for instance, that the pig is most susceptible to tuberculosis. We also know that there are many individuals in our midst suffering from that dread disease, and experimentalists have shown the possibility of infection from human beings. In nearly every case the pig is infected by ingestion, thus it will be seen how easily he might become infected if care is not exercised in the systematic selection and proper boiling of all foodstuff.

#### **Tuberculosis in Pigs.**

It is quite common knowledge that tuberculosis in the pig develops rapidly without showing any external symptoms. The disease can only be definitely detected upon slaughter. Anyway the disease is always the same from whatever cause. Though subject to disease, no domestic animal is more easily kept in health, cleanliness, and comfort. By comfort is meant that his sleeping quarters should be perfectly dry and well sheltered from all changes of the weather. He should have a nice cosy bed to burrow in; moreover, under cover in his sty, there should always be a trough full of clean drinking water. The trough should be so arranged as to prevent the animal from immersing his body or standing in it, or otherwise fouling it. Clean water is most essential to a pig, saying nothing of a shovelful or two of charcoal, some lime, brimstone, Epsom salts, or other medicinal agent, which are necessary to correct physical disorders caused by his artificial existence.

#### **The Pig's Economic Value.**

As you all must know, habit blunts the sensibilities of most of us; and men are not naturally cruel. Still, I am a believer that there are some among us who never realise the fact that the brute beast can be made to suffer quite unnecessarily. What would happen if a pig had a voice to tell its sufferings and needs? I am afraid that many of us could not listen without feeling a twinge of conscience.

There is no domestic animal so profitable or so useful to mankind as the pig. Its value per pound exceeds that of all other flesh-giving animals.

#### **Meat Inspection.**

Meat inspection is of great national importance to a meat-eating community such as we are in Australia, especially as our daily bill-of-fare is made up largely from the flesh of the ox, sheep, or pig. Therefore, it is only reasonable to expect that the great mass of consumers—the general public, for they are the most interested in the matter—should have some sort of guarantee that the flesh they do eat is perfectly free from disease.

Meat-eating people throughout the whole world recognise the necessity and importance of inspection of their meat and other food products.

#### **Diseases of the Pig.**

Tuberculosis is commonly spoken of as "T.B.," technically it means "Tubercle Bacilli." We are told that tuberculosis is a specific bacterial disease, and above all the most widely distributed of all contagious diseases, saying nothing of its being the most universally dangerous and deadly to man and animal. Of the latter, swine, according to statistics, are first among its victims.

Speaking generally, I have endeavoured to show how easily a pig might become tuberculous when fed on material rich in tubercle bacilli. Apart from such mechanism of infection, a tuberculous sow may infect all its young when its teats are contaminated or otherwise infiltrated by tuberculous deposits. We are also told that infection by the respiratory tract is certainly possible, but rare owing to the fact that affected animals are usually slaughtered before the softening of the pulmonary lesions have time to disseminate the virulent matter.

The disease can only be definitely detected upon slaughter; that being so, the inspector has no difficulty in locating the presence of the disease, that is, as far as the naked eye is concerned.

More often the glands of the head are affected than the body, which accounts for the greater number condemned. Times out of number the question is raised, "Why condemn the head and not the body?" It may be explained this way. The pig mainly breathes through his mouth where straying germs of disease gain an entrance which are absorbed by the delicate membranes of the mouth, tongue, and tonsils, resulting in the fact that the glands draining the part act as fortresses against further invasion of the body. It then only remains a matter of time when they may be overcome by the enemy, thus the barrier being broken down the germ has a clear passage along the ducts into the next lymphatic vessels. It therefore will be understood that if only a speck of disease is found elsewhere in the carcass, it involves seizure of the whole body.

Often a recommendation of the Royal Commission on Tuberculosis in 1898 is cited, which reads: "In view of the greater tendency to generalisation of tuberculosis in the pig, we consider that the presence of tubercular deposits in any degree should involve seizure of the whole carcass and of organs."

This rule, of course, is not carried out in the case where the head is only affected.

Another feature of the disease, from an inspection point of view, lies in the fact that it is seldom met with in the flesh or bones of the pig, mainly confining itself to the lymphatics and delicate linings of the chest and abdominal cavity and organs. The glands, or kernels as they are commonly called, play an important part in meat inspection. It is from them the inspector gets the first indication of the presence of disease. The normal condition and colour of a gland is moderately small, somewhat firm, and on cutting exudes moisture (lymph) the colour of—in fact it resembles—common yellow soap.

The most accessible glands are the sub-maxillary and cervicals of the head and neck, dorsal (back), renal (loin), inguinal or mammary, and the iliac. Of the visceral glandular organs, lungs, liver, and mesentery, &c., are all more or less subject to disease.

With regard to condemnation for parasitical infestations, very rarely is a pig totally condemned. The only parasite of any consequence is the kidney worm known as the "Stephanurus dentatus." Very little is known about it other than it is very destructive and will sooner or later cause economic losses if the pig farmer does not attend strictly to the laws of sanitation.

The worm itself varies in size, being a thick, round, and mottled specimen and is found abundantly in the kidney region and in other portions of the body. The presence of the worm gives rise to cysts and abscess formation containing pus-producing organisms and eggs of the parasite. They are also found in the ureter; from whence they pass out with the urine. Old sows and boars are very subject to the parasite, and no doubt are the cause of all the trouble in younger pigs. Pigs during life show no evidence of the infestation, unless they are old sows. From my experience the complaint is more pronounced in cold weather than hot.

The conditions which are most favourable for the infestation of the kidney worm are filthy wallows, insanitary feeding and watering places, especially where large numbers of pigs are kept year after year on a small area. Veterinarians tell us there is no reliable method of dealing with the trouble other than thorough sanitation. That being so, the pig farmer must then seriously consider the matter of changing his sties and yards every year or so to fresh ground, and planting a crop before using the piggery again for pigs. In any case, pig yards should be selected with a view to securing proper drainage, cleanliness, and sanitation. They must also be as free as possible from the common type of mud wallow, which soon becomes a reservoir of concentrated filth and bacteria.

In conclusion, I would plead for the pig's welfare and comfort, and again stress the fact that much disease and other disorders are due to insanitary feeding and unclean drinking troughs in which the pigs are able to place their feet which carry filth direct from the floor of the sty

## REARING AND FEEDING OF CHICKENS.

P. RUMBALL, Poultry Expert.

**P**OSSIBLY the most important feature in poultry-keeping is the successful rearing of the young stock. To be profitable in after life, stock have to be well grown and correctly fed from infancy. Many conditions are necessary to obtain this class of stock, but given good sound breeding stock and good incubation, the rearing and feeding are the next essential points.

### Rearing.

If the chickens are hen-hatched, very little attention other than keeping them free from vermin, protecting them from predatory animals, and correct feeding are necessary, but when hatched by incubators artificial means of brooding have to be resorted to.

Artificial brooding of chickens is a difficult process with an inefficient plant. The aim is to supply heat or to keep chickens warm, and at the same time wean them from brooders as quickly as possible. No hard and fast rules can be laid down either for artificially-heated brooders or cold brooders. We have to govern our actions by the climatic conditions.

A good illustration of the requirements of brooding is given by the hen. She regulates the heat to the chicks under her care according to the age and weather conditions. If the chickens are young she moves about very little and sits fairly close, gradually increasing the amount of range as the chickens develop. On a cold wet day you will notice her collecting the chickens frequently and warming them up. It does not matter what type of brooder is used, young chickens should be confined to a very limited space until they learn where it is warm. The range can then gradually be increased, and the more outdoor life and healthy exercise they have the better.

### Temperature.

In artificially-heated brooders temperature is a very important factor. If insufficient heat is supplied the chicks crowd together. The correct heat is the only method by which this can be prevented. Over-heating is also to be avoided on account of its weakening effect and the difficulty that will be experienced in weaning from the brooders. The general comfort of the chickens is a sure index that the temperature is fairly satisfactory, and if the droppings are well scattered under the hover in the morning, it is proof that the chickens have been fairly comfortable. When the chickens are first put into the brooder, they come from a nursery in the incubator which generally has an average temperature of 90 deg., and it is as well to start your brooding at this temperature, gradually reducing it until heat can be dispensed with in from three to four weeks.

### Ventilation.

More chickens are lost annually due to the lack of ventilation than by any other cause. Brooders which are usually made to hold a 100 day-old chickens are generally too small for the same number of chickens a week old. It frequently happens also that the attendant makes no allowance for additional ventilation with the growth of the chickens, and although he has been successful in rearing them to the age of one week they then start crowding and dying. The lack of ventilation has a great weakening effect on both young and old stock. It causes the young to crowd, and renders the older birds more susceptible to disease. When chickens have crowded they present a wet appearance in the morning, to which the term of "sweating" is applied. Sweating is not the cause. The wetness is caused by the condensation of the moisture content of the breath which would have been carried away if proper ventilation had been provided. Chickens which have been overcrowded rarely recover from the ill effects, and it should be avoided at all costs.

In brooding under any system the following are the essential points:—

- (1) Limited range, increasing with age.
- (2) Sufficient heat, which should be reduced as early as possible.
- (3) Ventilation, which should increase with age.
- (4) Correct accommodation. What is just enough room for 100 day-old chickens rapidly becomes too little as they grow.
- (5) Never attempt to brood chickens of mixed ages.

### The Colony Brooder.

Where a large number of chickens are to be reared the colony brooder is the cheapest and possibly as effective as any other type. With this class of brooder several hundred chickens can be run together with little more trouble than would be required for a lot of 100 under most systems.

Five hundred chickens should, however, be the limit in any one colony brooder, but possibly 100 less would give slightly better results.

The colony brooder consists of a heater having a metal hover for the purpose of deflecting the heat. The fuel used in some cases is coke, while other makes are built for burning oil. Whatever type of colony brooder is to be used a special house is necessary. This house should measure approximately 14 ft. by 16 ft., and be at least 6 ft. high. The roof may be either a hip-roof or skillion. The building should be lined and ceiled and provided with ample light.

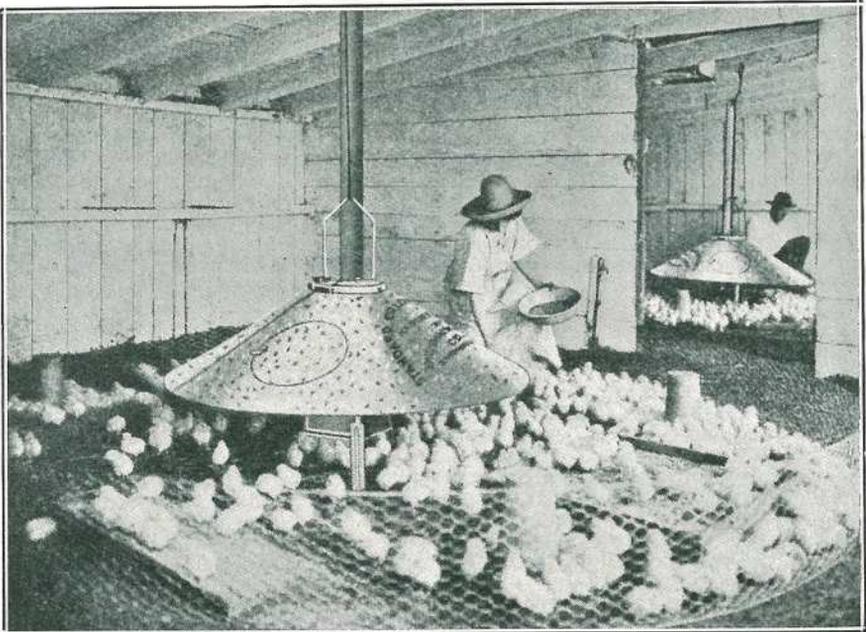


PLATE 123 (Fig. 1).—COLONY BROODER.

Note enclosure of wire netting restraining to some extent the liberty of very young chickens.

The house may be built with timber or iron. Iron is to be preferred, being of a more lasting nature, and at the same time it is not easily sealed by rats. The lining and ceiling should for preference be of  $\frac{3}{4}$ -in. tongue and grooved pine, but for economy sake wheat sacks sewn together and whitewashed will serve. The floor should be concreted and the iron walls sunk into the ground to the depth of about 1 ft. This prevents rats burrowing under the floor, while the concrete floor is readily cleaned.

It is possible to make use of a less elaborate house for the operating of colony brooders, but it will readily be understood that a house not lined or ceiled will require a greater amount of heat to maintain the desired temperature, with the result of increasing the fuel consumption and attention to heaters.

### Cold Brooding.

The term cold brooding is a misnomer. Under this system the heat of the body is retained by means of cloths or flannel and a restricted circulation of air. This method of brooding has been in operation for many years, but it is only recently that the practice has been adopted by commercial poultry breeders. The illustration of cold brooders will convey the nature of their construction. This cold brooder can be

operated in brooder-houses or rearing-pens of simple construction. They have given excellent results in Queensland, and are extensively used by a large number of breeders.

### Placing Chickens in Brooders.

When chickens are to be placed in brooders from the incubators the floor should have a light dressing of dry soil to absorb any excreta and to give the chickens a good footing. A small amount of litter in the nature of chaff or short straw will provide exercise and tend to keep the chicks active, especially if some of the scratch grain is occasionally scattered among it. As previously stated, they should be confined somewhat until they learn where they can get warm, and after this encouraged to take as much exercise as possible by ranging either in specially erected runs or at liberty about the farm.

### Cleanliness.

Cleanliness in every operation is essential; insanitary conditions not only pollute the atmosphere of the brooders but are frequently the cause of serious epidemics of disease. Where brooders and brooder-houses are thoroughly cleaned vermin cause little or no trouble. Brooder-houses should be cleaned out at least twice weekly, while a daily cleaning of the actual sleeping quarters is recommended.

### Weaning.

When chickens are three to four weeks old it is generally necessary to remove them from the brooder-house to make room for younger ones. This is also necessary to protect the soil becoming contaminated by growing stock. Successful and correct brooding will materially assist these operations.

Colony-houses are possibly the most suitable for the housing of the chickens on leaving the brooder. These can be built on slides or wheels and moved about the fields or made fixtures. Under either conditions hurdles or netting-yard are necessary to confine the chickens until they become accustomed to their new quarters. After a week or ten days these hurdles can be removed, and, providing the rearing-houses are not too close, little or no trouble is experienced with chickens becoming mixed. The numbers put out together, of course, varies with the accommodation at your disposal, but larger flocks than 100 are not recommended, although cases are known where 300 were put out in one lot and no ill effects experienced. As the stock develop it is possible to cull out the cockerels. This leaves more room for your valuable growing pullets, and protects them from the attentions of the cockerels.

A good size rearing-house for 100 chickens is one 10 ft. long, 8 ft. deep, 6 ft. high in front, and 5 ft. at back, with a 3-in. space between the top of the back wall and roof to provide ventilation. The front should be open and netted in with a gate provided. This enables you to lock the house at night as a protection from predatory animals. A temporary curtain of bag covering half of the front will afford sufficient protection from winds, &c. When the chickens are first placed in this house they are too early to perch. Various arrangements can be made to protect them from crowding into the corner, but the writer has had the best results by bedding them down on baled straw. The straw needs to be fairly deep and loose, with the corners of the house well blocked. The chickens appear to be content to snuggle in the straw instead of making warmth by crowding together. It is then only necessary to go around in the evening with a fork and loosen the straw up, shawing the droppings through on to the floor, which can then be readily cleaned up.

Poultry are largely creatures of habit and can generally with care be trained to act as required. When once they form a habit—good or bad—it is difficult to alter. A little time spent in seeing that chickens go into the house of a night when first placed in a new yard or when they are first let out of the brooders into the netted runs will amply repay poultry-keepers by preventing losses through crowding.

### Feeding.

There is a good deal of difference of opinion on this subject. Foods and methods of feeding which answer well with certain lots of chickens, and where operations are on a small scale, are not always workable where hundreds of chickens are to be reared.

Your primary aim is good healthy growth. The speed with which a chicken grows is very rapid, and nothing must be done that will retard it. You cannot be over-cautious in the feeding. Some animals can be neglected for a day and not experience



any ill effect, but a chicken is such a delicate piece of machinery that great care must be exercised always. When a chicken is born it weighs about  $1\frac{1}{2}$  oz., and in six months' time you want it to be a well-developed pullet of 4 lb. or more—that means that it has to make forty times its original weight in six months.

Chickens need no feed for at least forty-eight hours after incubation. Nature has provided for this period, as just prior to hatching the balance of the unabsorbed yolk is drawn into the abdomen, and under natural conditions this food supplies the chicken with its requirements until it has strengthened up. Feeding before this period sets up bowel trouble with the results of heavy mortality. Feeding should be done frequently—little and often is the best policy.

### Kinds of Foods.

In deciding upon the kinds of foods that are necessary for growing stock, it is desirable to have some idea of the constituents of the body of the animal, as they must all be derived from foods. Slight variations in composition exist, but there is always a certain approximation to the normal, full-grown animal.

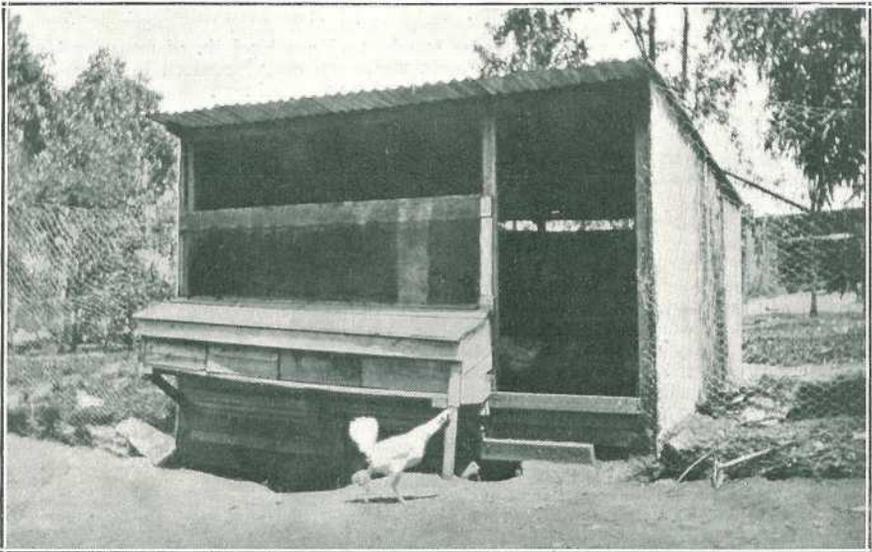


PLATE 125 (Fig. 3).—TYPE OF HOUSE SUITED FOR THE HOUSING OF CHICKENS AFTER LEAVING THE BROODERS.

Analyses made at the New York Experimental Station gave as an average of a Leghorn hen 55.8 per cent. water, 21.6 per cent. protein, 17 per cent. fat, and 3.8 per cent. ash. This is the composition of the whole of the body—bones, blood, feathers, and viscera.

The egg, which is potentially a chick, shows a striking resemblance in analyses to the body of a full-grown bird. Of the dry matter of the egg, apart from the shell, 49.8 per cent. is protein, 38.6 per cent. fat, and 3.5 per cent. ash.

It will be seen, therefore, that about half of the dry matter of the whole body is protein and about 8 per cent. ash. This suggests that slow growth would follow the use of foods which contain small amounts of nitrogenous and mineral matter.

Chickens at liberty consume large quantities of protein matter in the form of insect life, but it is not suggested that large quantities of meat-meal should be used. There are many excellent chick foods and growing mash on the market, and it is questionable if it pays the individual to mix his own. Too many think it an unnecessary expense to purchase these foods, but, from remarks upon the necessity for the proper development of the stock and those upon the analyses of the bird, it is hoped that the necessity for the correct kinds of foods is demonstrated. Experience has

taught us that a balanced ration is necessary for the feeding of chickens as well as for the production of eggs, and that this balance can only be made by using a variety of foods.

When the chickens are first placed in the brooder they should have access to grit or coarse sand. They will eat a little of this, and it will then be in the gizzard ready to deal with the food to follow. Grit should always be in evidence in the pens of chickens, and should consist of quartz or hard shell grit and charcoal.

Drinking water can be supplied immediately on leaving the incubator. This needs to be kept clean and replenished at least twice daily. The inverted bottle and tin is the cheapest water container.

For two days feed rolled oats on a bag or board. The chicks soon learn to pick this up. After this a mixture can be made of good cracked grains, such as hulled oats, skinless barley, wheat, and maize. Some of this grain should be scattered on the litter and the chicks taught to work for their living. This exercise promotes health, develops the bird, and frequently assists in checking the vice of toe-picking. From about four days a dry mash can be fed, composed of one part bran and two parts pollard. For every 20 lb. of the mixture add 1 lb. of the buttermilk powder and 1 lb. bone-meal and 2 oz. of salt. In mixing the salt, do so with a small quantity of the food first, and then add this to the bulk. By doing this an even distribution is made.

*From 6 to 12 weeks.*—The buttermilk can be replaced by  $\frac{1}{2}$  lb. of meat-meal and  $\frac{1}{2}$  lb. of bone-meal. The grain could remain the same, only increased in size. This feeding can be continued until the chicks are twelve weeks of age.

*From the 12th week until laying.*—The grain can be increased in size until full-sized grain is consumed, and fed once a day. The mash can also be altered considerably by the use of lucerne meal. The mash then could be made of the following constituents:—Lucerne meal, 12 lb.; bran, 26 lb.; pollard, 56 lb.; meat-meal, 2 lb.; bone-meal, 4 lb.; salt to be added at the rate of 10 oz. to the 100 lb. of mash.

### Green Feed.

This is essential for the best results, and can be fed after a couple of days. Chickens in their natural state, at liberty, consume large quantities of the most tender growth of grass, &c. Lucerne chaff and lucerne meal are excellent substitutes for green feed, but they are not a suitable food for chickens until they are about at least three months of age. The most suitable green feeds are the tender-growths of barley, oats, &c. As the chicks grow they have rape, kale, or lucerne, but always feed it while tender and green.

### Milk Feeding.

On a farm there is frequently a surplus of skim milk which can be fed to chickens with advantage. Some interesting experiments were carried out at the College of Agriculture, West Virginia University, on feeding chickens, in which skim milk was used, and it was found that chickens fed on a ration where milk was used—

- (1) Consumed more grain;
- (2) Grew more rapidly;
- (3) Laid earlier than chickens fed on similar foods without milk; and
- (4) The mortality in the milk-fed chickens was not so heavy.

The milk may be fed in either a sweet or sour state. If sour, it is claimed by some authorities that it assists in preventing outbreaks of coccidiosis and white diarrhoea. Although dry mashes are recommended, small quantities of wet mash mixed with milk are very beneficial, and, where large quantities of milk are available, animal food in the form of meat-meal or buttermilk is not necessary.

#### THE MODERN FARMERS' NEED.

A *Nutgrove (Cooyar Line) farmer writes (24th July, 1929)*:—"I wouldn't miss my *Journal*. . . . Keep up the publication. It is one of the best and cheapest and contains the knowledge an up-to-date farmer needs."

## General Notes.

### Staff Changes and Appointments.

It has been approved that Mr. W. D. Lewis be further seconded for duty as Temporary Inspector under and for the purposes of "*The Diseases in Plants Acts, 1916 to 1924*," as from 1st July, 1929, until 31st December, 1929.

Senior Sergeant W. O. Ingram now stationed at Cairns has been appointed an Inspector of Slaughter-houses as from 18th July, 1929.

The services of Mr. C. G. Munro, as Manager, State Farm, Home Hill, are to be continued until 30th June, 1930.

The services of Mr. J. H. Mitchell, Inspector under the Diseases in Plants Acts, are to be continued until 31st December, 1929.

Mr. A. E. Adecock, of Dalby, has been appointed an Acting Inspector of Stock as from the 1st August, 1929.

Acting Sergeant F. Conaty has been appointed an Inspector of Slaughter-houses as from the 17th August, 1929.

The following have been appointed Assistant Cane Testers for the forthcoming sugar season to be employed at the following mills:—Miss E. M. Mullin, Plane Creek; Mrs. M. E. Nally, Babinda; Miss T. M. Payne, Invicta; Miss A. Murray, Moreton; Mr. St. C. G. Fanning, Pioneer; and Mr. D. Walton, North Eton.

Messrs. W. J. Ross and H. J. Freeman have been appointed Senior Instructors in Fruit Culture, Fruit Branch, Department of Agriculture and Stock, and Messrs. H. Barnes, H. St. J. Pratt, S. E. Stephens, R. L. Prest and E. F. Duffy have been appointed Instructors in Fruit Culture, Department of Agriculture and Stock.

### Fruit Marketing Regulations.

Regulations under "*The Fruit Marketing Organisation Acts, 1923 to 1928*" have now been passed providing for the election of members of the Banana, Pineapple, Citrus, Deciduous and Other Fruits Sectional Group Committees, and also for the amendment of Form 5 which the secretary of every Local Association shall, when required by the Committee of Direction of Fruit Marketing, forward to the office of the Committee in Brisbane giving particulars of his roll of members. The Fruit Marketing Organisation Act Amendment Act of 1928 provides that a Sectional Group Committee shall not consist of more than ten members, and in accordance with this stipulation the new Committees shall consist of—

Banana Sectional Group Committee	..	..	..	10 members
Pineapple Sectional Group Committee	..	..	..	10 members
Citrus Sectional Group Committee	..	..	..	9 members
Deciduous Sectional Group Committee	..	..	..	9 members
Other Fruits Sectional Group Committee	..	..	..	8 members

The Regulations state definitely the Local Associations and Groups of Local Associations which shall constitute an electorate and the number of members to be elected by each electorate.

### Diseases in Plants—New Proclamation.

Proclamation No. 4 under the Diseases in Plants Acts has now been rescinded and a new Proclamation been issued in lieu thereof. Under the old Proclamation, the introduction into Queensland of plants or portions of plants of all and every species of grape vine was absolutely prohibited, but the introduction of grapes from New South Wales and Victoria was permitted, provided the consignments were accompanied by certain certificates as set forth. The introduction into Queensland by sea from South Australia and Western Australia of grapes was also permitted.

The new Proclamation makes provision for the above, but in addition provides that grape cuttings from South Australia or Western Australia may be introduced for a period of eight weeks from the 15th August, 1929, on the condition that the cuttings are accompanied by a certificate from the Horticultural Instructor of South Australia or the Superintendent of Horticulture of Western Australia, as the case may be, setting out that the cuttings are entirely free from any disease of the grape vine and are from a district entirely free from Phylloxera. So far as is known, both South and Western Australia are free from Phylloxera, and have no diseases of the grape vine which do not already exist in Queensland.

### Man not a Robot.

"Modern educationists have to realise that in this mechanised life man is not a robot, but has a soul to put into his work," said Mr. C. Sydney Jones, High Sheriff of Lancashire, speaking recently on "Industry and Education." "One of the great duties of education to-day was to give vision to the people. However clever our mechanics might be, we should not be able to hold our own in the world unless we had that soul which only came from the intellect and the spirit."

### Close Season for Game.

An Order in Council has been made altering the Close Season for Goose and Duck in Queensland. In District No. 1 (Northern Queensland) the period of close season is from the 1st October in each year to the 30th April in the following year inclusive. In that portion of District No. 2 situated north of the 22nd parallel of south latitude (Central Queensland) the period of close season is from the 1st November in each year to the 31st May in the following year inclusive, while in that portion of District No. 2 south of the 22nd parallel of south latitude (Southern Queensland) the close period extends from the 1st December in each year to the 30th June in the following year inclusive.

### Importation of Infected or Suspected Pigs—Prohibition Renewed.

The Order in Council prohibiting the introduction into Queensland of any infected or suspected swine or any carcass or portion thereof of infected or suspected swine from the States of New South Wales, Victoria, South Australia, Western Australia, and Tasmania has been renewed for a further period of twelve months. This Order in Council shall not apply to or affect the introduction into Queensland from the said States of bacon, hams, and cured or dressed pork if no viscera or portion thereof, in an uncooked state is introduced therewith. The introduction of viscera or portion thereof in an uncooked state is prohibited. Further, pigs for immediate slaughter, which in the opinion of an inspector are healthy, may be admitted with the approval of the Minister for Agriculture under such conditions as may be imposed by him.

### The Real America.

"Most generalisations about the United States may be set down as false. The country is too vast, its life too many-sided, and the elements of it too heterogeneous, to be covered by any single formula. For example, it is not true that the people are bound body and soul to the worship of the 'almighty dollar.' Vast numbers of them are, but the forces which resist materialism are also in evidence, and are active everywhere. The intellectual life of America is marked by an intense eagerness to learn. One might almost say that the American mind welcomes disturbance by new ideas. The hunger for knowledge is widespread, like the diffusion of wealth. It is true that knowledge is mostly valued as a means of earning money, but that is by no means the end of the story. The interest in education is widespread, and though the quality of American education has many glaring defects, these defects are well known to the leaders of American thought, and immense efforts are being made to remove them."—Principal Jacks.

### The Royal Society of Queensland.

The ordinary monthly meeting was held in the Geology Lecture Theatre of the University on Monday, 29th July, at 8 p.m. The President (Professor J. P. Lowson) was in the chair.

The secretary (Mr. F. A. Perkins) read extracts from a paper by Dr. John Legg entitled "Some Observations on the Life History of the Cattle Tick."

Dr. W. H. Bryan and Dr. F. W. Whitehouse read a paper entitled "A Record of Devonian Rhyolites in Queensland." The paper reviewed the evidence of the occurrence of Devonian rhyolites at Kangaroo Hill and Mount Coolon, and placed on record several other rhyolitic series (some of proved Devonian age and others apparently belonging to that period), discovered by one or other of the authors within the last few years, from the following localities:—Herberton, Mount Etna, Tungamull, Mount Morgan, Raglan, Gore.

Dr. W. H. Bryan exhibited: (1) An amethyst-coloured specimen of halite (rock salt) obtained by the Chief Government Geologist (Mr. B. Dunstan) from the Kaiserrode Mine, Borken, Germany; (2) a specimen of decomposed but unweathered granite from the Ashgrove Quarry, Brisbane, containing purple crystals of fluorite associated with quartz and zeolites. This marked the first record of fluorite from the Enoggera granite.

### Open Season for Ducks.

As a result of an Order in Council issued on the 8th instant, a variation of the open season for goose and duck in certain portions of Queensland is provided for. The present open season in No. 1 district of the State, which includes Southern and Central Western Queensland, has been extended to the 30th September next, and thereafter the season will be closed until the 1st May next. In that portion of No. 2 district situated south of the 22nd parallel of south latitude, and which includes an area approximately bounded by St. Lawrence on the north, Bororen on the south, and Clermont on the west, the season will be open until the 30th November next, and will be closed thereafter until 1st July next. In the northern portion of the State the present open season will extend to 31st October next, and will be closed thereafter until 1st June next. This will provide an open season of five months in each year throughout Queensland.

### The State Clydesdale Stud.

The Minister for Agriculture, Mr. H. F. Walker, has announced that six years ago six Clydesdale stallions were purchased by the late Government and their services were utilised in different districts for the improvement of the draught horse stock of the State. Altogether 1,670 mares were mated, and as a result, from the satisfactory number of foals each year, there had been a decided improvement effected in the type and quality of the young draught stock in the agricultural districts where these sires were used. It had been decided, however, that in future this practice will be relinquished, in so far as the State ownership of the stallions is concerned, and that the four stallions—General Wallace, Premier Again, Bold Yullie, and Prospector—were to be offered at auction at the Exhibition sales. All the horses have been regularly exercised and are in first-class condition, and in consequence they should be fit for the approaching season's duties. In the hands of good horsemasters these stallions should have several years of useful stud work before them.

### Out of Doors.

"You have noticed how colour is brought to the cheeks by exercise in the open air, how the functions are quickened, and the spirits lightened—there is an exhilaration to be imbibed such as no artificial therapy can promise. Pure atmosphere contains elements of nourishment, as necessary as the daily portions we attack with knife and fork. Invisible, it yet sustains and purifies—it is the one item of our dietary to be taken without fear of surfeit," says Reddie Mallett, in "Nature's Way Monthly." "Not a soul has truthfully said that fresh air had undermined his strength. Cows, grazing in the fields, give better milk than those stall-imprisoned; the latter inhale less nitrogen, and thereby suffer. Get out of doors, then; let the kiddies draw from the illimitable fount of health."

### The Fountain of Wisdom.

"Wisdom, after all, comes by suffering, and, though no doubt it is easy to point to some limiting and narrowing consequences of the particular facts of his life, the splendid genius of Dickens, far from being, as it might have been, embittered or undermined, emerged from a long series of ordeals not only with strength undiminished and brilliancy undimmed, but, perhaps, also with no little gain in tenderness, in insight, and in sympathy. And so it came about that, although, perhaps, he reaped and enjoyed too little of 'The harvest of a quiet eye that broods and sleeps on his own heart,' nevertheless, this sad man was able to make others laugh; this unhappy man was able to make others forget; this great-hearted poet in the true sense of the term, himself self-educated, was and will be the cause of education in millions of his fellowmen."—The Lord Chief Justice of England, Lord Hewart.

### The Age of Power.

"We are living in a power age. Power must be properly used, or it will destroy us. We are due for a big change in educational methods. That is one of the reasons why we are at present trying out our trade-school form of teaching. It seems to be the tendency of our generation to want things in tabloid form. . . . Such a process is likely to stunt our reflective power. . . . The great problem in the home to-day is that there is too much drudgery there. . . . There has been no decrease in the hours of wives. We should spend more time in the study of food and how to eat it. Most of us eat too much. We eat the wrong kind of food at the wrong time, and ultimately suffer for it. When men are job-centered they are less self-centred, and there is, therefore, less soil for the interference of personal likes and dislikes, personal pride, and personal prejudices."—Mr. Henry Ford.

### Wool Baling.

When baling wool, the bales should be as even in weight as possible. Between 300 lb. and 336 lb. is a good weight for fleece wool, "pieces," "bellies," &c., usually being heavier. To get fairly even weights of fleece wool it is a good idea to count the fleeces into the bale, and when it is weighed one has a guide to go on. In a small clip a few mixed bales are unavoidable, but as few as possible should be made, and when two lots of wool are put in the one bale, be sure they are of about the same value, because the bale will always be valued on the lowest wool in the bale. It pays the farmer to market his wool clip as far as possible in even lots—even in quality, length and condition.

### When Feeding Scrub Supplement the Ration if Possible.

Native scrub and trees such as kurrajong, wilga, mulga, myall, willow, currant bush, emu bush, gidgea, and whitewood have a considerable value during such times as those through which pastoralists are unfortunately now passing, but it must always be borne in mind, writes an officer of the Stock Branch of the New South Wales Department of Agriculture, that these are only emergency fodders. They do not provide a balanced ration; and while alone they may keep up the health of stock for a limited period, eventually condition will be lost and signs of digestive disturbance be noted. In any case they are entirely unsuited to lambing ewes. Their value is much increased by—

1. The addition of small amounts of grain or meal concentrates daily, say, 4 to 8 oz. per sheep.

2. The addition of salt, Epsom salts, and molasses in the form of a lick. This acts as a corrective, and lessens the liability to impaction of digestive organs. The proportions might be—1 part Epsom salts, 3 parts Liverpool salt, 4 parts molasses. The amount of Epsom salts might be increased if deemed necessary. Sulphate of iron, although it is recommended as a good tonic in normal seasons, should not be used, as it is an astringent and increases the liability to constipation.

3. Add a little hay to the above ration. If hay is added even only once or twice a week the stock would resist the adverse conditions more successfully.

### Making Concrete—Material Required.

The question is often asked, "How much cement, sand, and metal will be required" for a particular job when making concrete. The table given below, which shows the cubic feet of cement, sand, and stone needed for 1 cubic yard of various mixtures, will, in conjunction with the appended explanation, enable the computation of the necessary quantities:—

*Materials required for 1 cubic yard of concrete.*

Mixture.			Cubic Feet.		
Cement.	Sand.	Stone.	Cement.	Sand.	Stone.
1	2	4	5·84	11·88	23·76
1	2·5	4	5·44	14·04	22·14
1	2·5	5	4·76	12·42	24·57
1	3	5	4·52	13·77	22·95
1	3	6	4·00	12·42	24·84
1	3	6·5	3·84	11·88	26·65

If, for instance, it is desired to lay a concrete floor 4 inches thick gauged 1:3:6, in a room 12 feet by 14 feet, the total quantity of concrete required will be  $12 \times 14 \times \frac{1}{3} = 56$  cubic feet = (approximately) 2 cubic yards. From the table of quantities for a 1:3:6 mix it will be seen that for 1 cubic yard of concrete the materials required are 4 cubic feet of cement, 12·42 cubic feet of sand, and 24·84 cubic feet of metal. Therefore, for 2 cubic yards twice these quantities will be required. If, say, 8 cubic yards of concrete were required for a job, the quantities in the table would be multiplied by eight. As a bag of cement contains 1 cubic foot, the quantity of cement required, as computed in cubic feet, is the quantity in bags.

For rendering, a bag of cement mixed with two equal bags of sand will cover about  $8\frac{1}{2}$  square yards,  $\frac{3}{8}$ -inch thick, and  $6\frac{1}{2}$  square yards,  $\frac{1}{2}$ -inch thick.

### Green Pea Cultivation.

Growers of green peas are reminded of the importance of an early preparation of the soil.

The water requirements of a crop of peas are considerable, and the preparation of the soil should be commenced sufficiently early to enable a supply of moisture to be stored. The land should be cultivated as required to conserve all rain that falls, to destroy weeds, and to produce a good tilth in which the roots will find favourable conditions. Every effort should be made to induce germination of weed seeds before the crop is planted. If this is done the subsequent cleaning of the crop will be much easier. During the picking season there is often little time to attend to the destruction of weeds, hence the necessity for thorough cultivation during soil preparation and early stages of growth. A good strike of weed seeds can usually be controlled by harrowing, which is so much quicker than inter-cultivation work, which would be necessary once the crop is planted.

A sandy loam is most suitable for the crop, but almost any soil of fair average quality will yield good results. As with all legumes, the supply of nitrogen in the soil is matter of less moment than that of phosphoric acid, potash and lime, and hence it is that in some localities dressings of fertilisers that contain the last three have a material effect upon the yield. The crop has the strong recommendation that, in addition to yielding profitably, it contributes to the fertility of the soil for the purpose of subsequent crops by increasing the store of nitrogen, and by enabling the gardener or farmer to add to the soil a considerable quantity of top-growth of a kind that humifies readily when turned under. It does well on newly broken land, and can be used as a preparation crop.

### Points in Citrus Packing.

Though citrus fruits do not show injury from bruises for some time after picking, in reality the oil cells of the skin are very easily damaged, and it is through such injuries to the skin that decay germs, such as those causing blue mould, make their entrance; hence great care is necessary when picking and packing for market. Gloves should be worn or the finger nails kept extremely short, and the fruit should be clipped with the button adhering but with no length of stalk to come into contact with and puncture other fruit. The fruit should be placed right into the picking receptacle, and not dropped in from the top, and the same care should be exercised in all subsequent handling between picking and packing.

Though paper lining, by checking the circulation of air in the case, may tend to produce conditions favourable for the development of blue mould, the rough timber of unlined cases injures the skin and allows infection by the disease, so that lining paper is an advantage when packing citrus fruits, unless the inside of the case is planed, as is done in some other countries.

The proper packing of fruit is of great importance, as growers are now realising. Space packing has now become almost universal, and it certainly is the best method to adopt in packing fruit, as the work can be done quickly, and the fruit carries well. Moreover, the pack is attractive and is liked by buyers.

### The Prayer of a Horse.

“To thee, my master, I offer my prayer.”

“Feed me, water, and care for me, and when the day's work is done, provide me with a shelter, and a stall wide enough for me to lie down. Talk to me. Your voice often means as much to me as the reins.”

“Do not whip me when going uphill. Don't beat or kick me when I do not understand what you mean, but give me a chance to understand you. Watch me, and if I fail to do your bidding see if something is not wrong with my harness or feet.”

“Examine my teeth when I do not eat. I may have an ulcerated tooth, and that, you know, is very painful. Do not tie my head in an unnatural position, or take away my best defence against flies and mosquitoes by cutting off my tail.”

“And, finally, oh, my master, when my useful strength is gone, do not turn me out to starve, or sell me to some cruel owner to be worked and starved to death; but do thou, my master, end my life in the kindest way. You may not consider me irreverent if I ask this in the name of Him who was born in a stable.”—Translated from the Arabic.

**Lucerne—A Reminder.**

The value of top-dressing lucerne with superphosphate as a means of increasing the yield has been proved by trials in various parts of the State. Lucerne, being a legume, can gather nitrogen from the air, and by means of its wonderful root system can traverse a wide area in search of the other necessary plant foods, but the crop makes heavy demands on the soil, and if the stand is to last as long as possible and to yield the utmost profit nothing must be neglected that will help to invigorate and maintain it. The usual cultivation in early spring is not sufficient if the best results are to be obtained.

Top-dressing with superphosphate is advantageous in four ways:—

- (1) The green fodder yield is greatly increased.
- (2) A better quality product results—in fact, a healthy, dark-green colour is noticeable throughout the whole growing period.
- (3) The general condition of the stand is built up consequent upon the vigorous growth developed.
- (4) The useful life of the stand may be extended, and depleted stands largely restored.

Recent experiments indicate that the early spring is the best time to apply dressings of superphosphate. It is advisable first to stir the surface soil with a springtooth cultivator, and then to apply the superphosphate through the wheat drill, with the tubes loosely adjusted so as to give a broadcasting effect, or use a top-dressing machine to spread the fertiliser. Where there is no wheat drill or top-dressing machine, as on a good many coastal farms, it is better to broadcast the superphosphate by hand than to neglect the operation.

The dressing should be at the rate of about 2 cwt. per acre; where the method is broadcasting a slightly heavier application can be made with advantage.

**The Laying of Poison Baits for Animals.**

The Society for the Prevention of Cruelty has approved of the following standing warning:—Persons laying poison on their property are reminded that it is unlawful for the occupier of any town or suburban land to lay poison on his land for the purpose of destruction of dogs or other animals. The occupier of any land beyond the limits of the town or suburban lands may lay poison on his land for the purpose of destroying dogs, but notice of such being laid must be advertised in three successive issues of any two papers circulating in the district where such land is situated or in the "Government Gazette," and must also be conspicuously exhibited on such land, and in no case, must the poison be laid within two hundred yards of any public road.

**SOME FIRST-AID REMEDIES FOR POISONED ANIMALS.**

*Emetics.*—The quickest is 20 grains of sulphate of zinc, dissolved in half a tumbler of water. Failing that, a dessertspoonful of mustard mixed in a tumbler of lukewarm water, or even the warm water alone with or without a tablespoon of common salt in it. A quid of pipe tobacco pushed down the throat can be used in emergency.

After cleaning the stomach, give large quantities of milk, whiting scraped off a wall, and water, white of eggs, butter, or any sweet oil.

It is best to administer doses of liquid by closing the dog's mouth, drawing one corner of its mouth outwards so that the lower part of the cheek forms a pouch, and pouring medicine into same a little at a time as the dog swallows it. Do not hurry, or you may choke the dog, and be careful not to interfere with the breathing by pressing on the nostrils.

If magnesia is unprocurable, use lime or the scrapings off a white-washed wall.

*Arsenic Poisoning.*—Symptoms: Intense pain, heat and tenderness of stomach, distressed and painful breathing, vomiting and diarrhoea.

*Treatment.*—Give emetic and large quantities of oil and butter; 4 oz. of magnesia in water. Keep up strength with wine or spirits and water.

*Phosphorus.*—Give emetic and repeated doses of magnesia in water, followed by one teaspoonful of turpentine in a little milk.

*Strychnine.*—Symptoms: Violent and continued spasms.

*Treatment.*—Give emetic, then extremely large doses of spirits and water, or of chloral.

**Tyred Pedestrians—The Shoes of the Car Become the Shoes of Man.**

A brisk trade in a new type of footwear is being created by the cobblers of Albania, Turkey, and parts of Persia. They are making shoes out of old "Dunlop" tyres by the simple process of cutting well-worn motor tyres into the required lengths, fashioning a toe and tongue, and lacing a thong of leather around the top to bind the whole together. The finished article resembles a Dutch sabot, and a traveller who has just made a tour of the Near East reports that in the bazaars the demand for the new shoes is great, because they cost less and wear longer than sandals or the more modern boot.

**Hydatid Disease—Its Nature and Control.**

What are "hydatids," in what way is the disease contracted, and by what means can it be controlled? These questions are of particular interest to country dwellers, because the country dog is the most common agent of man's infestation. The character of the disease and the measures necessary for its control are the subject of an informative article in a recent "New South Wales Agricultural Gazette."

Hydatid disease, it is stated, is perhaps the most important parasitic disease of man in Australia. It is caused by the presence in the internal organs of large bladder-like cysts, which are larval or immature stages in the development of a very small tapeworm of the dog. Cattle, sheep, and pigs are all very commonly affected.

The adult tapeworm referred to is so small that unless very carefully looked for it will not be seen. The eggs of the worm pass on to the soil, and may remain there for some weeks, but cannot develop unless swallowed by either man or some other animal. In the case of domestic animals the eggs are swallowed with the grass as the animals graze over the infected pastures. They hatch in the intestines and a minute larval worm emerges, bores into the bowel wall, and enters a blood vessel. It is then carried to the liver, lungs, or other organ and development into the cyst proceeds. These cysts interfere with the normal functions of the organs. If a liver or other organ containing this cyst is eaten by a dog, the tapeworm head enclosed in the cyst attaches itself to the wall of the dog's bowel and develops again into the adult worm.

*How Man Becomes Infested.*—Man cannot become affected from eating the cysts of sheep or cattle, and if no dogs were allowed to eat organs containing these cysts all danger of man contracting hydatid disease would cease. One of the methods by which man most commonly becomes infested is by carelessness in handling country dogs, inasmuch as if the dog happens to have some of the eggs of this tapeworm on its coat they may be transferred to the man's hands and thence to his food if he neglects to wash his hands, and so into his system. The danger is naturally greatest in the case of children, who exercise less care in personal cleanliness.

Contaminated water and green vegetables, which were at one time regarded as the most common sources of infection, are probably not comparable in importance with that just mentioned. It is possible that flies may infect food with the eggs of the tapeworm, which is another argument for the many in favour of fly control. The cleanly habits of the house cat make it a less probable source of infection than the dog. Foxes and dingoes are probably an important factor in the infection of stock.

Unfortunately, the presence of tapeworm in a dog does not give rise to any noticeable symptoms. From the circumstances under which they live, country dogs are far more likely to be infected with this tapeworm than city dogs.

*Control.*—Control of the disease may be attempted in two ways—firstly, by preventing infection of man and herbivorous animals, and, secondly, by preventing infection of the dog. The second is the more important factor.

Since the dog can only become infected by eating hydatid cysts in raw meat, the complete prevention of this habit would go very far to eradicate the disease in man, and would be a considerable step forward in preventing the disease in animals. The dogs most likely to be fed on raw meat containing hydatid cysts are station dogs and slaughter-yards dogs. Where sheep are killed on a holding for rations the greatest care should be exercised to see that no infected organs are thrown to the dogs to eat. They would, of course, be quite harmless if boiled for ten minutes. Keeping the organs and feeding them later will not prevent the dogs from becoming infected, as the cysts may, in winter, remain alive for some weeks. No dog should be allowed into slaughter-houses, and on no account should raw organs containing hydatid cysts be given to them to eat.

Only water from a source which cannot become contaminated by the excrement of a dog should be used for washing down slaughter-houses, and every effort should be made to keep dogs free from tapeworms.

### “Do” and “Don’t” in Poultry Marketing.

Here are some humane reminders taken from the last annual report of the Queensland Society for the Prevention of Cruelty.

#### “DO.”

Do see that poultry are not overcrowded in crates.

Do see that your crates are not left out in all weather conditions at railway stations awaiting despatch.

Do send timely advice to the consignee so that poultry may be promptly called for and not left at a railway station famishing for food and water.

Do see that suitable tins are secured in opposite corners of your crate and filled with water, also arrange for refilling on transit or while the birds are awaiting sale.

#### “DON’T.”

Don’t place poultry in a crate of less height than the birds placed therein.

Don’t put poultry in a crate with open spaces between the bottom boards. This causes the birds to get their legs broken or injured. Crates should be constructed with a wooden frame and bottom, and wire-netting sides.

Don’t overcrowd your crates. The following dimensions of crates are given for guidance of consignors:—

For twelve pigeons and chickens the crate is required to be 2 feet long, 14 inches wide, and 9 inches high.

For twelve fowls or common ducks, 3 feet 6 inches long, 2 feet 6 inches wide, and 18 inches high, or a space of about 1½ cubic feet per bird.

For ten geese or turkeys, 6 feet long, 2 feet wide, and 2 feet 6 inches in height, or a space of 3 cubic feet per bird. This crate should be cross partitioned, keeping the birds in two lots.

Any alteration in the number of birds could be met by a corresponding alteration in the size of crates.

Don’t send poultry with their legs tied together or tied to other birds.

Don’t send turkeys or geese in a crate with smaller poultry, such as fowls or ducks. It involves cruelty to the smaller birds.

Don’t forget in consigning poultry to market contrary to conditions set out, or in any manner which involves cruelty, leaves the consignor liable to a fine of £25 or six months’ imprisonment.

Don’t forget that the inspectors of the Queensland Society for the Prevention of Cruelty visit the poultry market, and that henceforth the law will be enforced, and that court cases are costly in time, money and reputation.

A similar circular was distributed per medium of the “Poultry Farmers’ Journal” to over seventeen hundred poultry raisers, and the circular has been supplied to the poultry dealers who have promised to send out copies with account sales to their clients. In this way almost every raiser has been reached. So that from now on, pleading ignorance of the law cannot be accepted as an excuse.

We are glad to be able to say that as a result of the action taken a very great improvement has been effected, and the poultry farmer will profit because the heavy loss in birds will be avoided.

#### A USEFUL JOURNAL FOR THE FARMER.

*A Kingaroy producer writes (13th August, 1929):—“It is with much pleasure that I forward my renewal subscription for the ‘Queensland Agricultural Journal.’ I feel grateful . . . for its usefulness to the man on the land.”*

**British Thrift.**

"The volume of capital owning by the mass of the people is now immense. Despite the lean years, in which many 'nest-eggs' have been used up, the Trustee Savings Banks hold for 2,410,000 depositors nearly £114,000,000 in deposits and £33,000,000 in stocks or bonds, while the ten million accounts in the Post Office Savings Banks amount to over £284,000,000," says a writer in the "Quarterly Review." "Meantime War Savings Certificates, already in 1918-19 amounting to just short of £227,000,000, now total £362,000,000, and in 1925-26 even rose to £375,500,000 (interest in each case being omitted from these figures). The consumers' co-operative movement has capital and reserves of little short of £170,000,000, while another £91,000,000 is held by Friendly Societies. But perhaps most striking, as showing the development since pre-war days, are the figures of the Building Societies. With some 600,000 members and assets of £61,000,000 in 1914, their membership is now well on the way to 2,000,000 persons, and their assets have increased to £225,000,000."

**Some "Don'ts" for Horse Owners and Drivers.**

Don't fail to rug your horse when he stands in the cold.

Don't forget that ills often result from exposure and chill which follows suddenly-checked perspiration.

Don't fail to keep your horse well shod.

Don't work a lame horse or you may make a temporary injury a permanent one.

Don't let any alleged blacksmith lame your horse. Do you cut your own feet down to fit your boots? Well, don't forget that your horse's shoes should be shaped to fit his feet, and not his feet shaped to fit his shoes.

Don't load your horse too heavily, especially when the streets and roads are wet and slippery.

Don't force him to back a heavy load over a slippery road or uphill.

Don't fail to oil your wagon axles. There is a heap of humanity in wagon grease.

Don't put badly-fitting harness on your horse.

Don't forget that there is more profit in coaxing a horse than in kicking him.

Don't thrash your horse if he jibs. Lift his collar and wipe it and his shoulder, and let the air at them; then tie your whip thong round his foreleg just below the knee and pull his leg forward to start him. Try it.

**Railing Stock to Market.**

Another extract from the same report:—This is another matter that the Society has been concerned about for some years. The Society keeps hammering away on the subject. We have got in touch with the Railway Department, the United Graziers' Association, and the Brisbane Fat Stock and Produce Association, through whom most of the stock are sold at Newmarket Sale Yards. The Commissioner for Railways seems to be really anxious to minimise the trouble, realising as he does, the heavy losses sustained. An instance of which it may be mentioned that in January last, of the cattle arriving and handled at Newmarket Sale Yards, 26 head were dead and over 200 head injured. Fat bullocks at that time were bringing from £10 to £12 per head. The dead bullocks are disposed of to a pig farmer at a mere nominal sum, and the injured at a very much reduced price, so that the loss sustained during that month may be reasonably approximated at about £1,000. These losses are mainly due to want of care in long railway journeys. A competent careful man should accompany every cattle train, look over all trucks at every stopping place, and get the assistance of the train crew to lift any cattle that are down. This with more careful loading and unloading would minimise the trouble considerably, and in this connection it may be mentioned that the officers of this Society, who visit the sale yards frequently, on one occasion found over 20 sheep horns embedded in the ground where a truck of sheep had just been unloaded. Instead of using a ramp or gangway, which was provided by the Railway Department, for the sheep in the top story of the truck, they were forced out by the employees at the sale yards, a number of the sheep falling on their heads drove their horns into the ground, and in releasing themselves wrenched off the horns. The visits of the Society's Inspectors have considerably checked this rough work, but they cannot attend the unloading of every stock train, and the Society gets very little encouragement from stock owners, only in one instance, and that by the Warrego Branch of the Graziers' Association has our work been recognised.

## 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 increasing their health and happiness and decreasing the number of avoidable cases of infant mortality.*

#### WHAT EVERY BABY NEEDS.

A good deal has been written in these pages concerning the importance of the correct feeding of infants, but so far little mention has been made of other factors which require regular and daily attention. With good feeding alone, even the best possible feeding with mother's milk, we cannot hope to attain the highest standard of health for baby, though, as will be pointed out later, careful feeding will ensure that other of his needs are also receiving attention.

Doctor Sir Truby King, of New Zealand, the world-famed authority on infant welfare, has called the points which should receive daily and careful attention, the "twelve essentials" for baby's health.

#### Fresh Air for the Infant.

The first essential is fresh air. In his earliest months, more than at any other time in his whole life, baby requires pure fresh air. Not only is it required to purify the blood, but at this time baby is growing very quickly, and for this reason also it is important that the air he breathes should be of the purest and freshest. Most mothers see that baby has fresh air in the daytime by putting him on a veranda to sleep, but at night, when his need is just as great, he does not always fare so well. Not infrequently, the baby shares his mother's bed, where he lies cuddled in to her side, and perforce is breathing stuffy and used-up air. Some mothers think that baby, sleeping by himself, would not be sufficiently warm, but the healthy baby who is comfortably warm when put to bed, does not require the warmth of his mother's body to keep him so. When the weather is very cold he could have a hot bottle or rubber bag in his cot, carefully covered, and so placed that he could not be burnt by it. At night he should sleep in a well-ventilated room, with doors and windows open to permit of a constant moving current of fresh air. This should be the rule, summer and winter. Even in winter, in Queensland's beautiful climate, baby could sleep on a veranda. Pure, cold air will do him no harm. The cot, whether in a room or on the veranda, should be placed so that it is not in a draught. The baby who is accustomed, day and night, to fresh air, is much less likely to contract colds and other illnesses than the one who sleeps at night in a stuffy room. Another way of depriving a very young baby of the air it needs is by pinning a handkerchief to the front of its bonnet when it is taken out, so that the handkerchief lies over the little face. This is done with the intention of protecting baby's eyes from glare, but it is possible to hold a baby so that its eyes are protected from the light without depriving it of air. If the mother once tried going for a walk for an hour, with a handkerchief close against her face, she would, long before that time was over, feel the need for more air, and would not again treat her baby in that way.

Leather-hooded perambulators, some of which do not permit of free ventilation, can be stuffy and unhealthy.

#### The Value of Clean, Cold Water.

Another essential for baby is water. From birth babies should be given some plain cool water daily. They get thirsty at times, just as grown people do, especially in the summer when the skin acts freely. Milk is food and not a drink for the baby, and will not quench his thirst and satisfy him when he is thirsty, as well as some plain cool boiled water. For the baby who is fed on his mother's milk, a spoon and cup should be used, and for the "bottle baby" his feeding bottle. He soon learns to like, and to look for, his drinks of water. In illness, the habit of water drinking can be valuable. The sick baby who, from any cause, has his food lessened or stopped, and who refuses to drink water, has a poorer chance of recovery than the one who drinks plenty of water. Give him as much as he likes; it will not hurt him, whether he is ill or well.

**Suitable Clothing.**

Suitable clothing is another essential. In clothing a baby the most important point to remember is that the first, and main object, should be comfort for the baby. The patterns should be simple, so that the garments are easy to put on and take off. They should hang from the shoulders and have no tight bands to hinder development. The materials used should be porous, non-irritating, and light. The clothing should be loose and either warm or cool, as the weather and the child's condition may demand. Under all conditions too heavy or too many garments should be avoided. They should be made in such a way as to ensure easy washing, drying, and ironing. Unnecessary thicknesses of material, which are difficult to air well should be avoided.

No hard-and-fast rule can be made as to the number of garments required by an individual child. Very young, small, or feeble babies require warmer clothing than those who are larger and stronger. Coldness of hands and feet and blueness of lips would generally indicate need for more clothing. Overclothing, which should be guarded against in hot weather, may cause restlessness, fretfulness, and increased perspiration.

**Bathing.**

The daily bath is an "essential" for baby, and is necessary, not only for bodily cleanliness, but also for the health of the skin, which has important work to do in ridding the body of waste matter. If the pores become blocked the skin cannot act properly, and the health of the whole body suffers. If baby is feverish or ill, substitute warm sponging for the bath, but whether well or ill, baby's skin should be washed all over every day. Remember that a baby's skin is very delicate. Avoid using hard water or strong soap.

**Exercise of Muscles.**

In baby's earliest days, sucking and crying are his chief forms of exercise. Vigorous sucking is valuable exercise. It strengthens baby's jaws, and helps in the development of his teeth. If he is bottle-fed, see that the hole in the teat is not large enough to let the milk flow through in a stream so that he gets it without effort. In his own interests the bottle-fed baby should work just as hard to get the milk from the feeding bottle as he would have to do if fed by his mother.

Crying exercises and strengthens his lungs and improves the circulation in the whole body. For this reason a certain amount is healthy. The mother who picks her baby up each time he begins to cry is not only spoiling him but depriving him of healthy exercise. When baby is three months old he should be allowed to lie and kick, unhampered by clothing, for about half an hour, morning and afternoon. Protect him from draughts, clothe him loosely and unfasten his napkin so that his movements are quite free. In a very little while he greatly enjoys and looks forward to this daily exercise.

**Training of Senses.**

The skin is stimulated and the sense of touch trained by such things as the daily bath, exercise in the open air, handling, and comfortable clothing. Sight is trained by placing baby where he can watch people moving, see branches of trees waving, or other moving objects. Hearing develops early and is stimulated by ordinary daily sounds and by talking to the child, though mothers should not do too much of this. The sense of smell does not develop early. Taste is acute, even in very young babies.

**Warmth.**

The body temperature needs to be evenly maintained. In cold weather clothe baby so that all parts of the body are protected from chill. If the body is warm, pure cold air, day or night, will do no harm. In hot climates the aim must be to keep the child cool, but remember that young children chill quickly. Cold hands or feet can cause acute discomfort and prolonged crying.

**Regularity of all Habits.**

Regularity in baby's life should begin when he is born. In particular, there should be clock-like regularity of feeding, bathing, bowel action, sleeping, and exercise.

**Cleanliness.**

This does not mean baby's personal cleanliness only. The mother's hands and nipples should be regularly washed before the child is fed. If baby is "bottle-fed," much care and attention must be given to the food and all the appliances used, which must be scrupulously clean and protected from flies. Never leave dirty linen in baby's room. Remove soiled napkins immediately and place them in water. Always wash the hands thoroughly after handling napkins.

**Mothering.**

Proper handling is necessary for the best growth and development of baby. Infants who are allowed to lie passively all day in cots become pale and languid and do not thrive. Baby should not be nursed all the time he is awake. He grows and thrives better if left to kick and amuse himself. But do not leave him too long unnoticed, or in the same position. Speak to him in passing, turn him from side to side, or prop him up with pillows. A change of position is a relief and rest for baby, just as it is for older people, and it also gives him the attention which, among other things, means the mothering of the child. On the other hand, too much attention can do much harm. Do not constantly talk to or play with baby; it is tiring to his brain, and a strain on his nervous system. Too little attention may result in the child being listless and unhealthy; too much attention can upset his nervous system and turn him into a spoiled little tyrant.

**Management.**

This consists in carrying out daily and regularly all the essentials for the child. Do not feed him or give him a dummy because he cries. Teach him to understand that he cannot get his own way simply by crying for it. By your own example teach the child to have faith in you. Even to a baby never make a promise that you do not intend to keep.

**Rest and Sleep.**

These depend on the carrying out of the above essentials. If baby is fed, clothed, cared for and managed properly, he should sleep well. If he does not, look for the cause and try to remove it.

Newly-born infants should sleep about nine-tenths of their time; that is twenty-one hours out of twenty-four. At six months they should sleep about two-thirds of their time, that is about sixteen hours out of each twenty-four.

Mention was made in the previous article that the correct feeding of a baby ensures correct training in some other directions also. If baby is fed correctly and regularly, he is being trained to punctuality and regular habits. By giving him no night feeds from birth, he has the opportunity for the uninterrupted rest and sleep which is so necessary for him.

Attention during the first year to "Baby's Twelve Essentials," not only makes for his health and happiness during his first and subsequent years, but forms, on the right lines, the foundation of his character.

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**KITCHEN GARDEN.**

Our notes for this month will not vary much from those for September. Sowings may be made of most vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 feet apart with 18 inches between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Spraying for fungoid diseases should be attended to, particularly all members of the *Cucurbitaceæ* and *Solanum* families, of which melons and tomatoes are representative examples. Give plenty of water and mulch tomatoes planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

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**FLOWER GARDEN.**

The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant tuberose, crinum, ismene, amaryllis, pan-cratium, hémocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphids, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

## MARKET GARDENING.

### Starting a Garden.

In selecting a site for a market garden there are four essential points to be considered—water, soil, aspect, and shelter. Another point to be remembered is that, in growing garden stuff for sale, there is also the question of convenience to rail and market to be taken into consideration.

To attain any degree of success in market gardening a good water supply is an absolute necessity. As a rule, the best situation for a garden is on the bank of a creek or near a lagoon or waterhole; but, if none of these is available, the alternative is to sink a well or make a dam, *for water you must have*.

There may be months and months during which no watering will be required, but it is quite certain that sooner or later a dry spell will come, often in August and September, when most vegetables should be vigorously growing, and if you have no supply you will probably lose the result of months of labour. Therefore, whether your garden consists of 20 acres or 20 perches, be certain that the water supply will keep it going at all seasons of the year.

### The Soil.

You may rest assured that you cannot have too rich a soil for market gardening. But, at the same time, if a very rich soil be unobtainable, it is very easy to make it rich by a liberal and judicious use of manures; and it must be made so if you are to have success in growing cabbages and cauliflowers.

The deep alluvial flats commonly found near the banks of many of our creeks and rivers are ideal soils for this class of produce, being usually very rich in humus, resulting from decayed vegetable matter. Such a soil contains all the elements necessary to produce high-class vegetable crops. A light, sandy loam is better for such crops as onions, carrots, and plants of similar habit; but, as it is not always possible to get several kinds of soil within the limits of a garden, it follows that the soil must be made, as far as practicable, to suit each different crop by varying methods of treatment and manuring.

In locating the garden, it is well not to have it too far from the dwelling; in fact, if the house is *in* the garden, so much the better.

As to aspect, if the garden is on a slope, the fall should be to the east; but a level site is preferable, as level ground can be more easily and economically worked than a slope, and there is not the danger of both soil and crop being washed away during heavy rains, or of the valuable soluble portions of manure, where applied, leaching out, which effects are always to be feared in a garden located on a hillside. Then, if possible, the garden should be protected against heavy winds by a ridge or belt of timber.

In clearing scrub lands for a garden, it is advisable to leave a belt of trees standing on the side from which the prevailing winds blow. This belt should be 2 or 3 chains wide, and not sufficiently close to the garden to interfere with the free access of light and air to the plants.

### Preparing the Land.

In preparing the land for gardening, deep working is recommended. Get down 15 in. or 18, if you can. If you use horse implements, break up the subsoil with a subsoil plough, but be careful not to bring the subsoil to the surface. The advantage of this deep working will be chiefly apparent in a long spell of dry weather, when plants in deep soil will be found to grow and thrive, while others in shallow soils will require constant care and watering to keep them alive. Should the ground be very level or wet in places, such parts should be drained either by means of surface-drains or by one of the cheap methods of under-draining. The land being thoroughly broken up and brought to a fine tilth, the next step is to mark it off in sections for the various kinds of crops that you wish to grow.

If the garden is small and horses are not used, then a lesson may be learned from the Chinese gardeners, and that is, to make the beds of such a width as to obviate the necessity of trampling on them when weeding or transplanting. Very narrow pathways between the beds will suffice to give access to them, so that not much space is lost in this manner. But no hard-and-fast rule can be laid down. It is all a matter of convenience and circumstances, but always bear in mind that, even in a small garden, horse labour is cheaper than hand labour; therefore, arrange things in such a manner that as much of the work as possible may be done by means of horses.

Never sow garden crops of any kind *broadcast*. This is an obsolete custom, which, in view of the means now provided for sowing seeds by seed-saving implements, should have been done away with long ago.

This broadcasting of garden crops cannot be too strongly condemned, as it is wasteful, untidy, and unprofitable, except to the seed-sellers, who are the only people who benefit much by it.

Always sow in rows, and have the rows far enough apart to enable you to use either horse or hand cultivators between them. By following this system it is easy to keep the ground clean, and also to keep it open, and conserve the moisture by cultivation—a thing which cannot be done effectively where crops are sown broadcast.

A very simple hand seed-sower for small seeds may be made out of a tin, by boring a couple of small holes in the bottom sufficiently large to allow the exit of a seed. Fasten this to a wooden handle and shake as you go along the drill. There will be very little waste of seed.

### Sowing the Seeds.

Cabbages, cauliflowers, and various other kinds are mostly raised in seed-beds; and it will be found better to sow all these in narrow shallow drills in the bed than to sow broadcast. Young plants grown in drills are much easier to lift and transplant than if broadcast, and as a rule are stronger and sturdier. In preparing the bed, the soil should be raked as finely as possible, and the seeds must not be sown too deeply. A quarter to a half inch of soil above the seed is usually enough. If the drills are covered in with a little, very fine, and thoroughly rotten manure, germination takes place quickly, and in transplanting, a ball of the manured soil will readily stick to the rootlets, which, not being unduly disturbed, thus affords the plants a greater chance of success.

In preparing soil for seed-sowing in the open ground, always have the soil thoroughly tilled, cleaned from weeds, and well pulverised. A harrow immediately following the plough will reduce most soil to a very fine tilth; and if not, the rake must be used to finish off, especially with such seeds as carrots and onions and plants of similar habit.

Excellent hand seed drills and hand cultivators are on the market, the latter being fitted at will with tines, sweeps, or miniature plough attachment. No market gardener can afford to do without an outfit of this description.

Where enough ground is available, all strong growing crops should be sown far enough apart to permit of a horse cultivator being used.

### Transplanting.

For transplanting, the ground should be prepared, more especially for delicate plants, in precisely the same way as for seed-sowing. The finer the surface soil is, the more easily will the young tender rootlets be able to force their way down in search of food and sustenance; and as a consequence leaf growth will necessarily follow.

If the soil is hard and lumpy, the attempt of the rootlets to strike into it becomes to some extent useless, and it naturally follows that all growth is retarded, and the ultimate success of the vegetables is problematical. When taking the plants from the seed-bed, be careful not to break the roots too much, and endeavour to lift them with a little of the soil adhering. Never pull young plants up, but lift them carefully. It is a good plan to give the bed a thorough soaking with water some time before beginning to lift the plants.

Always, if possible, choose a dull or showery day for transplanting, but, should the weather be warm and dry, do the work in the afternoon, and water well after planting; and, if suitable material is procurable, mulch the ground for a few inches round each plant. Set the plants a little deeper in the ground than they were in the bed, and firm the soil well around the roots without bruising the necks of the plants.

Take care always to make the hole for planting just deep enough, so that the plant will not hang in it, and give the plants plenty of room to grow to their fullest possible size without crowding.

Should the weather be dry for some time after planting, it will be necessary to water the young plants several times a week until they become established; the watering being done either early in the morning or late in the afternoon. On unmulched land, the surface soil around the plants should be lightly stirred at intervals between the waterings to prevent crusting.

A great deal of watering and hoeing will, however, be saved if *mulch* is used as already advised. The importance of mulching cannot be overestimated. Almost anything will do—stable manure, grass, or litter of any kind, provided it can be easily and conveniently placed around the plants. Mulching prevents the ground

from baking after watering, and so saves hoeing; and it also helps to arrest evaporation and economises water; it tends also to keep the temperature of the surface soil equable and promotes a healthy and vigorous root action. Protection of this character is invaluable. Systematic mulching is confidently recommended for all classes of garden crops which require to be transplanted, and the grower who follows this practice, is assured of a greater degree of success in all operations.

### Shading Seedlings.

The object of shading newly planted-out seedlings is not to entirely exclude the sun's rays, but to break them up, so that the great heat and light may be gently distributed, until the young plants resume their natural functions and activities.

(To be continued.)

## COUNTRY WOMEN AT WORK. IMPROVING RURAL LIFE.

"Keep us, O Lord, from pettiness—let us be large in thought and word and deed.

"Let us be done with fault-finding, and leave off self-seeking.

"May we put off all pretence, and meet each other face to face without self-pity, and without prejudice.

"May we never be hasty in judgment, and always generous.

"Teach us to put into action our better impulses straightforward and unafraid.

"Let us take time for all things—make us grow calm, serene, and gentle.

"Grant us that we may realise that it is little things that create differences—that in the big things of life we are one.

"And may we strive to touch and know the great woman's heart common to us all, and, O Lord, let us not forget to be kind."

—*Marie Stuart.*

With such thoughts to guide them it is not difficult to understand the very real success of the National Federation of Women's Institutes in England and Wales, and the reason why the institutes should now number 4,400 with a membership of 267,000.

The main purpose of women's institutes is to improve and develop conditions of rural life by providing centres for educational activities and social intercourse. The Country Women's Association in Australia has exactly the same desire, and though the way in which the institutes work to achieve this end differs so greatly to that of the branches of the Country Women's Association, this is only so because of the entirely different conditions under which country people live in England and Australia. The desire of both the Women's Institutes in England and the Country Women's Association in Australia is that each organisation shall retain its simplicity in spite of the power given it by an ever-increasing membership; both organisations wish to concentrate on simple things which directly affect country people.

As the branches of the Country Women's Association set out to gather the women in their districts, and work together to make conditions of life better for the women and children of the community, so the members of the institutes in England meet each month. The institute meetings are made very interesting by lectures and demonstrations on almost every subject one can think of, such as household jobbing, soft toy making, all kinds of cooking and preserving, poultry keeping, gardening, pruning, furniture re-covering, all kinds of handicrafts. Competitions of original thought cause much interest and fun. In one case after a talk on the potato, its history and culture, each member received a potato to set for a competition. Hundreds of dozens of eggs are collected each year by members, and are given to hospitals, children's homes, and similar institutions.

Exhibitions of women's work of every description, debates, concerts, and plays keep the interest in the meetings very keen. The international spirit of the members is very evident, and they take an active interest in the work of women of other countries. As a body the work of the institutes in providing opportunities for educational activity, assisting in securing good nursing services, more maternity and child welfare centres, and generally safeguarding the health and happiness of country people is really very wonderful.

From the work of the institutes it is seen that money-raising enters very little into its objectives; friendliness between women of all classes and creeds and the providing of interesting subjects for thought and entertainment for women in rural districts means very much more to them.

The thirteenth annual general meeting of the National Federation of Women's Institutes was held in London at the beginning of May, and was attended by 2,700 delegates from all over England and Wales, as well as visitors from other countries.



PLATE 126.—A QUEENSLAND HOME AND GARDEN.

Mrs. Hubert Fairfax, of Queensland, attended this meeting as representative of the Country Women's Associations of the States of Australia, and was warmly welcomed. Lady Denman, chairwoman of the National Federation of Women's Institutes, addressed the delegates and said: ". . . It must be very satisfactory to all of us to think that not only in our own country, but all over the world, country women are banding themselves together to add to their own happiness and to help on new ideas and to carry them into effect. In the past country women in most parts of the world have accepted the conditions of their lives and have had no power to alter them. They were not united in any organisation, and had no means of considering the questions which affect them and of making their wishes known. Thirty years ago Canadian women formed the first women's institute. Their lead has been followed in this country, and the movement is spreading throughout the British Empire. Simultaneously associations of country women have been growing in Europe and in the United States of America. I think it is very satisfactory to realise that now in most parts of the world groups of country women need no longer lead lives of utter loneliness. They can form an institute; they can meet and make friends; they can enjoy acting, dancing, and singing; they can study the past and consider the present questions of the day; they can take their share in promoting the good of their countries and the peace of the world."

## FARM HOMES.

### MAKING THEM BEAUTIFUL.

Beautiful home grounds are the first essential to a beautiful State. No matter how attractive the grounds around public buildings, or how well cared for the borders of our highways, or how numerous and fine the natural beauties of the State, if our home grounds are slovenly and unattractive, then we cannot boast of a beautiful State.

Our slogan should be, "All home grounds, attractive home grounds." Do I hear some one say, "Impossible or impractical?" Not so! It is only impossible or impractical when there is no desire for attractive surroundings or lack of initiative or ingenuity in making them attractive. Too expensive! No, not necessarily, for a little labour and the seeds of a few annual flowers to be had for a few pence can often change a repulsive yard into a place which will attract attention and elicit favourable comment. Let us no longer look for lame excuses as a reason for not doing something which we know needs doing and which richly rewards him who brings about the transformation and gives pleasure to his neighbour and to the passers-by.

### Fencing and Planting.

An attractive home ground must have the appearance of being well cared for. Nothing detracts more from a place than to have the yard littered with objects which do not belong there. This applies to the grounds in the rear of the house as well as to those in front. If it becomes necessary to store machinery or carry on certain operations between the house and barn, divide the space into two distinct areas and by proper fencing and planting hide the features which would detract from the beauty of home grounds. Twenty-five years ago one would scarcely see in a day's travel a farm home ground which was mowed with a lawn mower. But the farmer appreciates neat appearances as much as his city cousin, and as a result the lawn mower is rapidly becoming standard equipment on the farm. A hay field is attractive, but not when it surrounds the farm home. Mowing of the lawn is necessary, and the lawn mower is the best implement for that purpose. While other methods may be used for keeping the grass under control none of them produce as good a lawn or as satisfactory an appearance as the lawn mower.

### Part of the Picture.

Make the house appear as a part of the picture you are painting with grass, shrubs, flowers, and buildings. To do this you must give the house a setting. Trees are valuable for this purpose. Tall trees at the rear of the house and at the sides at some little distance from the house are very desirable. They may not look like much soon after planting, but in years to come they will form a background and frame for the house which will enhance its attractiveness manifold. Trees may also be used along the highway, and if the lawn is fairly large, as individual specimens on the lawn, or if very large, possibly in small clumps. Stick largely to the native trees, particularly the more permanent kinds, and never plant them in rows except along the drive.—J. J. MOORE, in "Hoard's Dairyman."

## Orchard Notes for October.

### THE COASTAL DISTRICTS.

October is frequently a dry month over the greater part of Queensland, consequently the advice that has been given in the notes for August and September regarding the necessity of thorough cultivation to retain moisture is again emphasised. Unless there is an adequate supply of moisture in the soil to meet the trees' requirements, the coming season's crop will be jeopardised, as the young fruit will fail to set.

Thorough cultivation of all orchards, vineyards, and plantations is therefore imperative if the weather is dry, as the soil must be kept in a state of perfect tilth, and no weeds of any kind must be allowed to grow, as they only act as pumps to draw out the moisture from the soil that is required by the trees or fruit-yielding plants. Should the trees show the slightest sign of the want of moisture, they should be given a thorough irrigation if there is any available means of doing so, as it is unwise to allow any fruit trees to suffer for want of water if there is a possibility of their being supplied. Intermittent growth, resulting from the tree or plant being well supplied with moisture at one time and starved at another, results in serious damage, as the vitality is lessened and the tree or plant is not so well able to ward off disease. A strong, healthy, vigorous tree is frequently able to resist disease, whereas when it has become debilitated through neglect, lack of moisture or plant food, it becomes an easy prey to many pests. If an irrigation is given, see that it is a good one and that the ground is soaked; a mere surface watering is often more or less injurious, as it is apt to encourage a false growth which will not last, and also to bring the feeding roots to the surface, where they are not required, as they only die out with a dry spell and are in the way of cultivation. Irrigation should always be followed by cultivation, so as prevent surface evaporation and thus retain the moisture in the soil.

All newly planted trees should be carefully attended to, and if they show the slightest sign of scale insects or other pests they should receive attention at once. All growth not necessary to form the future tree should be removed, such as any growths on the main stem or main branches that are not required, as if this is done now it will now only save work later on, but will tend to throw the whole strength of the tree into the production of those limbs that will form the permanent framework of the tree. In older trees all water sprouts or other similar unnecessary growths should be removed.

Keep a good lookout for scales hatching out, and treat them before they have become firmly established and are coated with their protective covering, as they are very easily killed in their early stages, and consequently much weaker sprays can be used. The best remedies to use for young scales hatching out are those that kill the insects by coming in contact with them, such as miscible oils, which can be applied at a strength of 1 part of oil in 40 parts of spraying material and will do more good than a winter spray of double the strength. In the use of miscible oils or kerosene emulsion, always follow the directions given for the use of these spraying materials, and never apply them to evergreen trees when they are showing signs of distress resulting from a lack of moisture in the soil, as they are then likely to injure the tree, whereas if the tree is in vigorous growth they will do no harm whatever.

All leaf-eating insects should be kept in check by the use of an arsenate of lead spray, taking care to apply it as soon as the damage appears, and not to wait till the crop is ruined. Crops, such as all kinds of cucurbitaceous plants, tomatoes, and potatoes are often seriously injured by these insects, and the loss occasioned thereby can be prevented by spraying in time. In the case of tomatoes and potatoes, a combined spray of Bordeaux or Burgundy mixture and arsenate of lead should be used, as it will serve the dual purpose of destroying leaf-eating insects and of protecting the plants from the attack of Irish blight.

Grape vines require careful attention, and, if not already sprayed with Bordeaux mixture, no time should be lost in applying this material, as the only reliable method of checking such disease as anthracnose or black spot and downy mildew is to protect the wood and foliage from the attack of these diseases by providing a spray covering that will destroy any spores that may come in contact with them. The planting of bananas and pineapples can be continued during this month. See that

the land is properly prepared and that good healthy suckers only are used. Keep the plantations well worked, and allow no weed growth. Keep a very careful lookout for fruit flies; destroy every mature insect you can, and gather and destroy every fallen fruit. If this is done systematically by all growers early in the season the subsequent crop of flies will be very materially decreased. See that all fruit sent to market during the month is carefully handled, properly graded, and well packed—not topped, but that the sample right through the case or lot is the same as that of the exposed surface.

### THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Much of the matter contained under the heading of "The Coastal Districts" applies equally to these parts of the State, for on the spring treatment that the orchard and vineyard receives the succeeding crop of fruit is very largely dependent. All orchards and vineyards must be kept in a state of perfect tilth, and no weed growth of any kind should be allowed. In the Western districts, irrigation should be given whenever necessary, but growers should not depend on irrigation alone, but should combine it with the thorough cultivation of the land so as to form and keep a fine soil mulch that will prevent surface evaporation.

All newly planted trees should be carefully looked after and only permitted to grow the branches required to form the future tree. All others should be removed as soon as they make their appearance. If there is any sign of woolly aphis, peach aphis, or scale insects, or of any fungus diseases on the young trees, these diseases should be dealt with at once by the use of such remedies as black leaf forty, Bordeaux mixture, or a weak oil emulsion. In older trees, similar pests should be systematically fought, as if kept in check at the beginning of the season the crop of fruit will not suffer to any appreciable extent. Where brown rot has been present in previous years, two or more sprayings with Bordeaux mixture can be tried, as they will tend to check other fungus growths, but at the same time the sodium or potassium sulphide sprays are more effectual for this particular disease and should be used in preference when the fruit is nearly full grown. All pear, apple, and quince trees should be sprayed with arsenate of lead—first when the blossom is falling, and at intervals of about three weeks. Spraying for codlin moth is compulsory in the fruit district of Stanthorpe, and wherever pomaceous fruit are grown it must be attended to if this insect is to be kept in check.

In the warmer parts a careful check should be kept for any appearance of the fruit fly, and, should it be found, every effort should be made to trap the mature insect and to gather and destroy any affected fruit. If this is done, there is a good chance of saving the earlier ripening summer fruits, if not the bulk of the crop. Tomato and potato crops will require spraying with Bordeaux mixture, as also will grape vines. Keep a very strict watch on all grape vines, and, if they have not already been treated, don't delay a day in spraying if any sign of an oil spot, the first indication of downy mildew, appears on the top surface of the leaf. Spraying with Bordeaux mixture at once, and following the first spraying up with subsequent sprayings, if necessary, will save the crop, but if this is not done and the season is favourable for the development of the particular fungus causing this disease, growers can rest assured that their grape crop won't take long to harvest.

Where new vineyards have been planted, spraying is also very necessary, as if this is not done the young leaves and growth are apt to be so badly affected that the plant dies.

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## Farm Notes for October.

FIELD.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds good with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, cowpeas, sorghums, millet, panicums, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred.

**DEPARTMENTAL PUBLICATIONS.****AVAILABLE FOR DISTRIBUTION.**

All the publications on this list are available for exchange with Agricultural Departments, Universities, Agricultural Colleges, Experiment Stations, and similar institutions.

“Queensland Agricultural Journal”—Subscription to farmers, 1s. per annum. (Some back numbers available for free distribution.)

**BOOKS.**

- Catalogue of Queensland Plants. Price 15s.  
 Chemistry for the Farm, Dairy, and Household (Elementary). Price, 2s. 6d.  
 Market Gardening, 1s.  
 Queensland Flora (Bailey), 6 vols., 30s.  
 Pests and Diseases of Queensland Fruits and Vegetables. Price, 2s. 6d. (Free to orchardists and market gardeners in Queensland.)

**BULLETINS.**

- Economic Dairy Bulletins, 1D, 2D, and 3D.  
 Economic Sugar Bulletin, 5SC.  
 Economic Cotton Bulletin, 4C.  
 Pig Raising Bulletin, 6P.  
 Poultry Raising Bulletin, 7P.  
 The Orange-tree Bug.  
 The Banana Thrips Rust.  
 Ear Rot of Maize.  
 The Banana Weevil Borer.

Bulletins on the Sugar Industry:—

*Division of Entomology.*

- No. 3. Notes on Insects Damaging Sugar Cane in Queensland. (2nd Edition, Revised.)  
 No. 4. On the Value of Poison Bait for Controlling Cane Grubs.  
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*Division of Pathology.*

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## PAMPHLETS.

- Pineapple Culture.  
 Bananas in Queensland.  
 Banana Packing and Grading.  
 Citrus Culture.  
 Advice on the Routine of a Dairy.  
 Cotton Growing in Queensland.  
 Annual Reports of Experimental Work on Cotton.  
 Stock Foods.  
 Phosphorus in the Livestock Industry.  
 Paralysis of the Hindquarters in Pigs.  
 Castration of Pigs.  
 Trade Classification of Pigs.  
 Self-feeders for Pigs.  
 A Ton of Pork in Six Months from One Litter.  
 The Gloucester Old Spot Breed of Pig.  
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 Menace of the Poultry Tick.  
 Some External Parasites of Poultry.  
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 Dairy Produce Acts and Regulations.  
 Fruit Tree Propagation.  
 Silage.  
 Tick Fever and Redwater.  
 Cotton Classing.  
 Cotton Growing in Queensland (Parts 1 and 2).  
 Cotton Research Farm, Biloela—Annual Reports 1925-26 and 1926-27.  
 Pink Boll Worm.  
 Sheep Maggot Fly Pest.  
 Root-Bark Channeller of Citrus.  
 The Grasshopper Pest in the Springsure District.  
 Orange Piercing Moths.  
 Entomological Hints to Cotton Growers.  
 Mealy Bug Attacking Paspalum Grass in the Cooroy District.  
 Baiting for Banana Weevil Borer Control.  
 The Banana Weevil Borer in Java, with Notes on other Crop Pests.  
 Natural Enemies of the Potato and How to Fight Them.  
 Special Cattle Fatality in the Maranoa District and its Relation to the Larvæ of *Pterygophorus anatis* Costa.  
 Pineapple Disease Investigations.  
 Records of Australian Thysanoptera (Thrips).  
 Records and Descriptions of Australian Ophioninae.  
 A Systematic Note on an Imported Lucerne Pest with Description of two New Allied Species.  
 Some Hawaiian Experiments in the Biological Control of Insect Pests.  
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 Plant Bugs Damage to Cotton Seed.  
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Passion Fruit Culture.  
Custard Apples.  
Orange Packing.  
Tomato Culture.  
Tomato Preserves.  
Phosphorus Deficiency in Stock.  
Malnutrition.  
Bee-keeping.  
Rations for Dairy Cows.  
Dairy Fodder Plots.  
Water for Irrigation and Stock.  
The Cult of the Colt.  
Killing Weeds with Arsenical Poison.  
Killing Trees with Arsenical Poison.  
Cultivation of the Peanut.  
To Repair a Leaky Galvanised Tank.  
Ginger.  
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Gestation Chart for Breeding Sows.  
Flushing the Breeding Sow.  
Precautions against Swine Fever.  
Diarrhoea or White Scour in Young Pigs.  
How to Make a Rope Pig-Net.  
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The Storage of Eggs.  
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*Entomological Leaflets.*

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- No. 3. The Woolly Aphis Parasite.
- No. 4. The Codling Moth.
- No. 5. The Banana Weevil Borer.
- No. 6. Insects and Their Relatives.
- No. 7. The Banana Thrips.
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- No. 14. Potato Tuber Moth.
- No. 15. Insecticides.

*Pathological Leaflets.*

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- No. 2. Irish Blight of Tomatoes.
- No. 3. Diseases of the Banana in Queensland.
- No. 4. Flag Smut of Wheat.
- No. 5. Fungi and Bacteria.
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J. F. F. REID,

Editor of Publications, Department of Agriculture and Stock.

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**ASTRONOMICAL DATA FOR QUEENSLAND.**

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.						Phases of the Moon, Occultations, &c.	
AT WARWICK.							
						MOONRISE.	
Date.	September, 1929.		October, 1929.		Sept., 1929.	Oct., 1929.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.	
1	6.9	5.35	5.35	5.49	a.m. 4.25	a.m. 4.32	3 Sept. ☉ New Moon 9 47 p.m.
2	6.9	5.36	5.34	5.49	5.15	5.6	11 " ☾ First Quarter 8 47 a.m.
3	6.8	5.36	5.33	5.50	5.59	5.39	19 " ○ Full Moon 9 16 a.m.
4	6.7	5.37	5.31	5.51	6.36	6.11	26 " ♃ Last Quarter 12 7 a.m.
5	6.6	5.37	5.30	5.52	7.9	6.43	Apogee, 13th Sept., at 5.18 a.m.
6	6.5	5.38	5.29	5.52	7.44	7.16	Perigee, 28th Sept., at 10.42 a.m.
7	6.5	5.39	5.27	5.53	8.15	7.52	The Moon will be passing from west to east of Jupiter on the 25th, at 9 a.m. They will then be well above the western horizon, a good deal (22 degrees) northward and it may be possible to detect Jupiter in the day time as its brightness has been increasing since March. A pair of binoculars will easily bring Jupiter into view in spite of the bright sunlight in the eastern side of the sky.
8	6.4	5.40	5.26	5.54	8.46	8.36	The apparent nearness of Venus and Neptune, especially on the 27th, will be less than the diameter of the Moon. The real distance between them will, however, amount to about 2,800 millions of miles. For ordinary observers the occasion is not exactly favourable, the planets being near the eastern horizon a short time before sunrise.
9	6.3	5.40	5.25	5.54	9.22	9.27	The Southern Cross will be on its side, like III on the clock-face about 8 p.m. on the 1st and about 6 p.m. on the 30th. It will be disappearing a few degrees west of south about 11 p.m. on the 1st and about 9 p.m. on the 30th. Aquarius will be rising at sunset on the 1st and Pisces on the 30th. The Great Square of Pegasus will be in the north-east at 8.30 p.m. in the middle of the month. The planets Venus and Jupiter which were, apparently, so near to one another in July, will be widely separated in September by a distance of over 100 degrees.
10	6.2	5.40	5.24	5.55	10.1	10.13	
11	6.0	5.41	5.23	5.55	10.43	11.5	
12	5.59	5.41	5.22	5.56	11.32	11.59	
13	5.58	5.41	5.21	5.56	12.23	12.55	
14	5.56	5.42	5.20	5.57	1.15	1.52	3 Oct. ☉ New Moon 8 19 a.m.
15	5.54	5.42	5.19	5.57	2.10	2.50	11 " ☾ First Quarter 4 5 a.m.
16	5.52	5.42	5.18	5.58	3.8	3.47	18 " ○ Full Moon 10 5 p.m.
17	5.51	5.43	5.17	5.58	4.6	4.45	25 " ♃ Last Quarter 6 21 p.m.
18	5.50	5.43	5.16	5.59	5.3	5.45	Apogee, 11th October, at 12.42 a.m.
19	5.49	5.44	5.15	5.59	6.1	6.47	Perigee, 23rd October, at 8.0 a.m.
20	5.48	5.44	5.14	6.0	6.57	7.52	On the 5th Jupiter will appear to have reached its farthest eastern position in Taurus, about 7½ degrees beyond Aldebaran. It will then, apparently, be retracing its path westwards towards Aldebaran, which it will pass about 4½ degrees to the northward on 17th October.
21	5.47	5.45	5.13	6.0	7.56	9.2	Mercury will be passing from the east to the west side of the Sun on the 8th. On this occasion it will avoid a transit across the Sun's face by passing on the south side of the Sun, about three times the diameter of the Moon from it. Mercury will, therefore, be invisible until after the 15th, as it will rise an hour before the Sun only near the end of the month.
22	5.46	5.45	5.12	6.1	8.59	10.8	The proximity of Saturn to the Moon, as they rise together on the 9th, about half-past 9 in the morning, will be observable only with telescope or binoculars.
23	5.45	5.46	5.10	6.1	10.3	11.13	When the Moon rises, about 10 p.m. on the 22nd, Jupiter will be seen to be 4 degrees to the south-west of its darker edge.
24	5.43	5.46	5.10	6.2	11.9	...	On the 23rd, Mercury will reach its greatest distance, 18 degrees on the west side of the Sun, and will rise about one hour before the latter.
25	5.42	5.47	5.9	6.3	...	12.14	
26	5.40	5.47	5.8	6.3	a.m. 12.16	1.8	
27	5.39	5.48	5.8	6.4	1.18	1.54	
28	5.38	5.48	5.7	6.5	2.17	2.33	
29	5.37	5.49	5.6	6.5	3.10	3.7	
30	5.35	5.49	5.6	6.6	3.54	3.39	
31			5.5	6.7		4.10	

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.

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