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

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

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXXIII. 1 JUNE, 1930. PART 6.

Event and Comment.

Facts and Figures.

STATISTICIANS of the Commonwealth and State services assembled in Brisbane in the course of the month for their annual conference, and much useful information was made available as a result of their deliberations. Appreciation of this service to the community was expressed by the Minister of Labour and Industry, Mr. Hubert E. Sizer, when he said at a social function in connection with the conference that if ever there was a stage in Australia's progress when the people needed the guidance that could be given them only by the enthusiasm and work of the statisticians it was now. We as a people have embarked on a career of attempting to establish high standards and of teaching the rest of the world how to live. The fact that the conference had met in Brisbane was rather appropriate, for the Government had taken full cognisance of the value of the work that statisticians could do. The people generally had not yet come to appreciate how much statistical information could help them in dealing with economic problems; there was still a big majority of people who would not face facts. If the conference were able to correct that position it would be the means of radiating light among the people in forming public opinion on the right lines, which would mean a tremendous advantage to the nation in the years to come. The Government had no doubt that good results would be the outcome of the establishment of the Bureau of Statistics with Professor Brigden at the head. In the progress now being made we would need statistical information more and more, and the work of the statisticians in the present age would be tremendously magnified.

Queensland an Ideal State.

ACKNOWLEDGING Mr. Sizer's appreciative remarks and his correct appraisal of the value of the systematic collection of statistics and the economic deductions to be made from them, Mr. C. H. Wickens, Commonwealth Statistician and Actuary, said that he had heard of the magnificence of Queensland and of the warm-heartedness of the people, but since coming here he was satisfied that what he had heard was only half. The action of the Queensland Government in appointing a Director of Economics would have the approval of all statisticians, and he congratulated the Government on its selection of Professor Brigden. It always had appeared to him that Queensland was the ideal State in Australia, and he felt that it would occupy a leading position in the course of time. It had developed rapidly, and of the big States—Western Australia, South Australia, and Queensland—it had the largest area of usable land available. One of the purposes for which statistical data had been used had been the determination of wages, but in this regard he made a plea on behalf of the statisticians that they should not be held responsible for the fixation of wages. They were merely responsible for the gathering of information. The fact that the Queensland Government had appointed a Director of Economic Research would mean that the figures compiled by the statisticians would be put to better use than hitherto. He did not want to depreciate the good work of Mr. George Porter (Queensland Registrar-General) or the other statisticians, but he believed that much of the work was essentially that of an economist.

The Science Congress.

BIENNIALLY the Australasian Association for the Advancement of Science holds a congress, and Brisbane was the venue for the 1930 gathering, which opened on 28th May. That the success of the Association had far exceeded the expectations of the founder (the late Professor Liversidge, formerly of Sydney) was evident by the assembling in Brisbane of eminent scientists from every important centre of the Commonwealth and the Dominion of New Zealand. The main object of the Association is to bring together, from time to time, scientific workers from both dominions to discuss investigations on which they are engaged, as well as to stimulate general interest in research and create scientific opinion. The co-ordination of scientific research is also sought. At the conference valuable scientific and technical papers were read, and those bearing on rural problems will be subjects of extended notice in these pages in due course. Through public lectures and the Press, public interest was aroused in the latest researches of science. Largely as an outcome of the Association's activities the Council of Scientific and Industrial Research was constituted, and this body, with headquarters at Melbourne, has helped to co-ordinate and to a great extent direct the practical application of science throughout the Commonwealth. In Queensland, for example, it is specially interested in the recent developments in the eradication of prickly-pear which have demanded long, sustained, and much patient work by eminent entomologists. Other problems in course of investigation are the discovery of an insect enemy of the sugar-cane beetle, which would be of vast value to the sugar industry; the eradication of bunchy-top in bananas and remedies for other plant diseases. The best method of preserving meat, fish, fruits, and other perishable produce is also a subject of inquiry by members of the Association.

Another point of especial interest to Queensland was an account submitted to the Congress of studies of the life and conditions of our surviving aborigines. Pasture management, improvement, and research problems, all of peculiar interest to Queensland, were also discussed. Other matters affecting primary industry in Queensland that came within the range of the congressional programme were fodder conservation, stock nutrition, Australian tobacco, soil characteristics, cereal yields, pasteurisation in the dairying industry, wheat statistics, maize-breeding, lucerne-breeding, hybridisation of oats, cultural problems, field experiments, forestry, power

alcohol, pests and parasites in sheep, and agricultural economics. The Congress was successful from every point of view and the outcome of its proceedings must have a large influence on the better understanding, if not the solution, of many of our present problems.

The Gospel of Work—Sense of Service—No Room for a Leisured Class.

REVIEWING the report of the Central Technical College recently, His Excellency the Governor, Sir John Goodwin, said that it was more than satisfactory; it was really excellent, for it revealed a state of affairs and a record of achievement on which all concerned deserved to be congratulated. It was gratifying to know that the year was a record one, and in addition to the results gained by study, he sincerely congratulated the girls on their successes in physical culture, swimming, and first-aid work. He strongly held that only the best results could be obtained from the intellect if the body were sound and healthy. He was glad to know that the instruction in wool-classing was of such a really practical nature. The work carried out by the college was of an infinitely broader and more far-reaching character than could be represented by a simple record of honours obtained, of diplomas awarded, or of passes secured, important though these were. The college was teaching the most important thing of all, and that was the habit of work.

There was no more contemptible being than one who devoted himself entirely to the pursuit of pleasure. Indeed there was no greater slavery than service to one's own pleasure. He held the very firm conviction that even if individuals were so endowed with the world's goods that work for a livelihood was not a necessity, yet if they were at all worthy of their manhood or citizenship, they would have a feeling of duty to their fellows, a real sense of service, and that sense would compel them to devote some portion, at least, of their lives to the welfare of their fellow men. Service embraced all that was best in mankind. There was no place in the present workaday world for a leisured class or for a leisured individual.

"We may feel thankful and happy," concluded His Excellency, "that the future men and women of Queensland are being taught to be workers and not permitted to be idlers, that all the students here are being so moulded and taught that they will become worthy citizens of their great State of Queensland."

Poisonous Plants and Livestock.

LECTURING on poisonous plants in relation to livestock before the Science Congress, Dr. H. R. Seddon, Director of Veterinary Research, New South Wales, said that the subject was of considerable interest to workers in more than one science in Australia. He used the general term, "poison plant," to include not only plants that were actually poisonous, but those which in any way disturbed the health of stock. Two methods of determining the poisonous nature of a plant were:—(1) Feeding the plant to the animal or a species reputed to be poisoned by it; (2) discovering by chemical analysis that, in a quantity of the plant such that an animal might consume, there were present some identifiable chemical substances in such a quantity that it would have poisonous effects. Were the active principles of our poisonous plants better known, the latter test might be availed of more than it was. In some instances, the quantitive test was the only means of determining the poisonous nature of the plant. The fact that a plant was poisonous to one class of animals did not mean that it was poisonous to others. Factors which influenced variation in the toxicity of a plant were locality, season, stage of growth, environment of the animal (exposure to sunlight, and exercise), and the breed and colour of an animal. The lecturer emphasised the importance of the exact botanical determination of plants known to be, or suspected of being, poisonous. Experience had taught that vernacular names varied considerably, and that plants at one time believed to be of the same species, might, on further investigation, prove to be different botanically.

THE QUEENSLAND SUGAR INDUSTRY.

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

PART VI.

(b) Review of the Industry since Federation.

(Continued.)

IN the last number it was stated that the sugar industry was divided on the question of whether it was better to remain under Commonwealth control or revert to the State. The State politicians were rather keen on the industry being under State laws and regulations, while some of the Commonwealth politicians uttered dismal forebodings as to what would happen if the Commonwealth gave up control, and prophesied that the industry would be glad enough to come back again to Federal control once more. This prophecy was realised during the war period and for some years thereafter, for the reason that the Commonwealth after all controlled the tariff, and Price Boards in the Southern States were unduly depressing sugar prices.

In 1911, the Commonwealth Government decided to appoint a Royal Commission to inquire into matters relating to the sugar industry of Australia. Amongst other matters submitted to the Commission were "The operation of the existing laws of the Commonwealth affecting the sugar industry and any Commonwealth legislation relating to the sugar industry which the Commission considered expedient to recommend."

The Commission in their report (made in 1912) said the bounty regulations had served useful purposes in the past in promoting the white labour policy, and in improving the wage standard, but that the progress of events had materially diminished the value of the bounty and excise system. For practical purposes the transformation in the fields from coloured to white labour was virtually an accomplished fact as 94 per cent. of the labourers were white. The bounty system in conjunction with the excise duty had been a source of revenue to the Commonwealth Treasury, and the Commission were unable to see any adequate justification for a tax on the sugar industry. By a great body of the growers the bounty regulations were regarded as irksome in their practical working. A much more serious objection was that the bounty regulations were partial in their operation. They applied only to the growers, leaving the employee of the millers and refiners unprotected. It was an obvious anomaly that the one class of profit-earners who got the least return for the capital they invested in the sugar industry was the one class which was subject to the control of the bounty regulations. As a result of these, a certain amount of discretionary power was left in the hands of the Government of the day. This appeared to be a grave objection, it invited the intrusion of political influence and introduced an element of instability into the industry.

As far as Queensland was concerned the most preferable method of cutting out the bounty and excise regulations would be the direct prohibition by legislation of the employment of coloured labour in the canefields, and the Commission understood that the Queensland Government were prepared to act in the direction indicated. The maintenance of standard wages and conditions of labour could be, and ought to be, secured by legislation (either Commonwealth or State) embracing the whole of the industry and not applying, as the bounty regulations apply,

to one selected portion of the industry. The Commission recommended:—

> "That the bounty and excise be abolished provided that the Commonwealth Government, by co-operation with the States or otherwise, take whatever steps may be necessary to promote the white labour policy and to ensure the maintenance of a living wage in the sugar industry generally."

The Queensland Premier had already advised the Commonwealth Government that if the Excise and Bounty Acts were repealed he would be prepared to submit legislation for the exclusion of coloured labour.

It was therefore determined by the Commonwealth Government that the excise duty on sugar and the bounty should be abolished on condition of the Queensland Parliament introducing satisfactory legislation to deal with the matter. Accordingly, Acts to repeal the excise duty on sugar and the *Sugar Bounty Act*, 1905 *to* 1912, were passed providing the abolition should commence on a day to be fixed by Proclamation. In July, the following year (1913) the Proclamation was issued, and the excise and bounty regulations which had governed the sugar industry since 1902 became a thing of the past.

The legislation introduced by the Queensland Parliament consisted of the following Acts:—

(1) "*The Sugar Growers Act of* 1913,"

(2) "*The Sugar Growers' Employees Act of* 1913,"

(3) "*The Sugar Cultivation Act of* 1913."

All these three Acts were to commence and take effect on and after the date of the commencement of the Act of the Parliament of the Commonwealth intituled the *Sugar Bounty Abolition Act* 1912.

"*The Sugar Growers' Act of* 1913" provided for the prompt payment to sugar-cane suppliers of a part of the value of the cane. Upon delivery to the owner of a sugar-mill of any sugar-cane agreed to be purchased, the owner should pay to him such part of the price of the sugar-cane supplied as was equal in amount to a sum at a rate per ton in accordance with the scale hereunder:—

Name of District.	Payment per Ton of Cane Supplied.
	s. *d.*
No. 1 District	9 8
No. 2 District	9 2
No. 3 District	8 8
No. 4 District	8 2

The boundaries of the districts were the same as in the Commonwealth Bounty Regulations, but the payments were 2s. 2d. in excess of the previous rates of bounty, the excess being equivalent to the £1 hitherto retained by the Commonwealth Government.

The Sugar Employees' Act made temporary provision with respect to the rates of wages and conditions of employment in the sugar industry until such matters were dealt with by Awards under "*The Industrial Peace Act of* 1912." The rates of wages payable and the conditions of employment were the same as laid down in the Commonwealth Act of 1912 prescribing same.

The third Act was for the purpose of prohibiting certain labour in the production of sugar. By this Act a certificate could be required from certain types of labour of having passed a dictation test in such language as the Secretary for Agriculture might direct. The object of this Act was to shut out certain coloured labour or aliens as might be required, or to prevent such persons from owning or cultivating land for sugar-growing—all this in furtherance of the growing of cane by white labour. The application of the Act did not apply of course to all native-born residents of Australia of European descent—all residents of Australia of European parentage—all residents of Australia descended from any resident of the Continent of North America (other than from any aboriginal native thereof or negro or aboriginal of African or Asiatic race), nor to other nations set out in the regulations, such as Italy, Russia, &c., where treaties existed.

The abolition of the excise and bounty regulations, as applied to sugar, relieved growers of a considerable burden in making returns and filling up statutory forms.

The so-called bounty was in reality only a rebate, and out of £4 per ton of sugar levied as excise the Federal Government returned only £3 to the grower, the other £1 being retained by the Federal Treasury, so that the Sugar Bounty Act passed by the Commonwealth Government as part of the White Australia policy did not cost the people a penny; indeed, it was estimated that it put £2,600,000 into the Commonwealth funds.

Within two or three years of the introduction of the above three Acts by the Queensland Government, many changes came about, due to the war. Industrial Courts came into being for the regulation of wages. Agreements were entered into as to the price of sugar between the State and Commonwealth due to the war, and Cane Prices Boards were established. The payments of different sums for different districts provided for in the Sugar Growers' Act ceased once cane began to be purchased on its commercial sugar value. These points will be dealt with more fully later. Meantime, having finished with the Commonwealth Acts for sugar excise and bounty, we may retrace our steps and get back to earlier in the century.

In 1902, perhaps the most severe drought in the history of the sugar industry was experienced. The following comparison of the rainfalls in the various sugar districts with the average, will show the intensity of the drought, especially in the more southern sugar areas:—

Place.	Rainfall, 1902.	Average Rainfall from first taking Records up to 1912.
Beenleigh	15·07	48·87
Nambour	14·94	60·93
Childers	17·62	42·07
Bundaberg	13·30	44·40
Mackay	36·51	68·52
Ayr	11·62	44·48
Ingham	37·31	80·53
Innisfail	69·87	149·20
Cairns	50·34	90·49
Port Douglas	37·82	82·91

In the Annual Report of the Sugar Experiment Stations for 1902 it was remarked that the intensity of the dry weather was most marked in the southern districts, the ground was stone hard and manuring was out of the question on crops that were being burnt up by the drought. The Logan district had only crushed 1,500 tons of cane compared with 21,000 in the previous year, while in the Childers and Bundaberg districts it was estimated that only some 75,000 tons of cane would go through the rollers in comparison with a crop of over 300,000 tons in 1901. At Mackay, things were better though there was a big drop there also, from 230,000 tons in 1901 to 150,000 tons in 1902. Further north, about Innisfail and Cairns, the crop was more nearly normal in production per acre. As a matter of fact the 1902 crop would come almost wholly from the areas including Mackay and further north. During the 1902 drought the cane crop in the south had been largely diverted to other uses than sugar production. Naturally, when things were so dry on the coast the western areas were far worse. Not only cane tops but hundreds of acres of cane were used for feeding purposes. The value given to the stunted crops as fodder had been a very material aid to cane producers, while on the other hand the cane crop had been an actual providence to stock holders. Sugar-cane, even in poorly developed condition, was looked on as an exceptionally valuable emergency crop in periods of drought and fodder famine, such as then existed. These factors caused the crops of 1902 and 1903 to be much smaller than in 1901 and 1904. The figures are as follows:—

Year.	Tons Cane per Acre.	Tons Sugar made.
1901	1,180,091	120,858
1902	641,927	76,626
1903	823,875	91,828
1904	1,326,989	147,688

Mackay and the far North produced 90½ per cent. of the crop in 1902. As much of the cane crop was killed right out, in 1902, it greatly affected the 1903 crop also. Fourteen of the sugar mills did not crush at all in 1902, and the larger mills in the South, such as Bingera and Fairymead had very small crops to crush.

In 1904, the fact that many of the Central Sugar Mills established under the 1893 Act were not paying their way called for investigation. Some of these mills had been put in the wrong places. Others did not receive a sufficient cane supply every year to render their operations payable, and management was not as efficient as it might have been. A report was called for on the condition of certain central mills, and upon the causes which led to their present unsatisfactory state, and for recommendations, the adoption of which might produce more practical results.

The mills reported on were Gin Gin, Mount Bauple, Nerang, Moreton, and Proserpine, specifically, and the remainder in general terms. In the report it was stated that neither "*The Sugar Works Guarantee Act of* 1893" nor the regulations under that Act contained any provision for enforcing the growing of "a sufficient quantity of cane for keeping the sugar works employed." The Act, in requiring "that sufficient land to keep such a sugar works so employed and of a quality to

produce adequate crops of cane,'' omitted wholly to provide that central mills should be placed in localities only where an average of rainfall is assured by the records of previous years to co-operate with such land to produce cane crops. It was shown that the main effect on earning power of four of the five mills reported on was shortage of crop due to small rainfall.

The Act as it stood merely provided that the Treasury might hand over public moneys to a central mill to be engaged in the business of sugar-making under the control of the directorate selected from the members of the company, and without the co-operation, aid, or restraint of the Government which, to all intents, was a partner in the business, and was, moreover, solely responsible for the public capital that had become engaged in the business. The directors were generally men who had no knowledge of the business of sugar manufacture, nor experience in the control of large undertakings, and the shareholders comprised in the main cane farmers, men of small means whose experience had related to business on a domestic scale. It was due to the results of the provisions of the Act that such men assumed the direction of technical and commercial undertakings outside of their experience and competence.

The recommendations were that the central mills should be divided into three classes, as under:—

A. Central mills which had maintained their business in a sound condition and had met all obligations up to that date. There would be no ground for intervention in the affairs of mills of this class, and the Government should confine itself to affording any aid or advice which their directors might solicit.

B. Central mills whose business was not in a progressive or sound state and that were in arrears in their obligations. In the direction of the affairs of such mills the Government should co-operate and aid in the management and control of its business.

C. Central mills that have not met any portion of their obligations to the Treasury and whose present conditions are unsound and without assurance. Such mills should be taken over from the company by the Treasurer and their affairs controlled in the interests of the Treasury and others concerned.

As the outcome of these recommendations, a Bureau of Central Sugar Mills was established under the Treasury, whose Minister was the mortgagee and lawful representative of the State.

The mills that came under Class A were the Isis, Mulgrave, Mossman, Racecourse, Marian, Plane Creek, and North Eton Central Mills. Those in Class C which were taken over by the Treasurer as mortgagee, and the management of whose affairs was under the Comptroller of Central Mills, included Nerang, Moreton, Mount Bauple, Gin Gin, Pleystowe, and Proserpine Central Mills.

In the case of those mills which were to have come under Class B, the arrangement recommended was found impracticable owing to the opposition of the directorate to the advisory counsel of the Comptroller. The Treasurer therefore entered into possession of such sugar works, and they were included in Class C.

Subsequently, the Pleystowe Mill passed out of the possession of the Treasurer into the hands of the original Pleystowe Central Mill

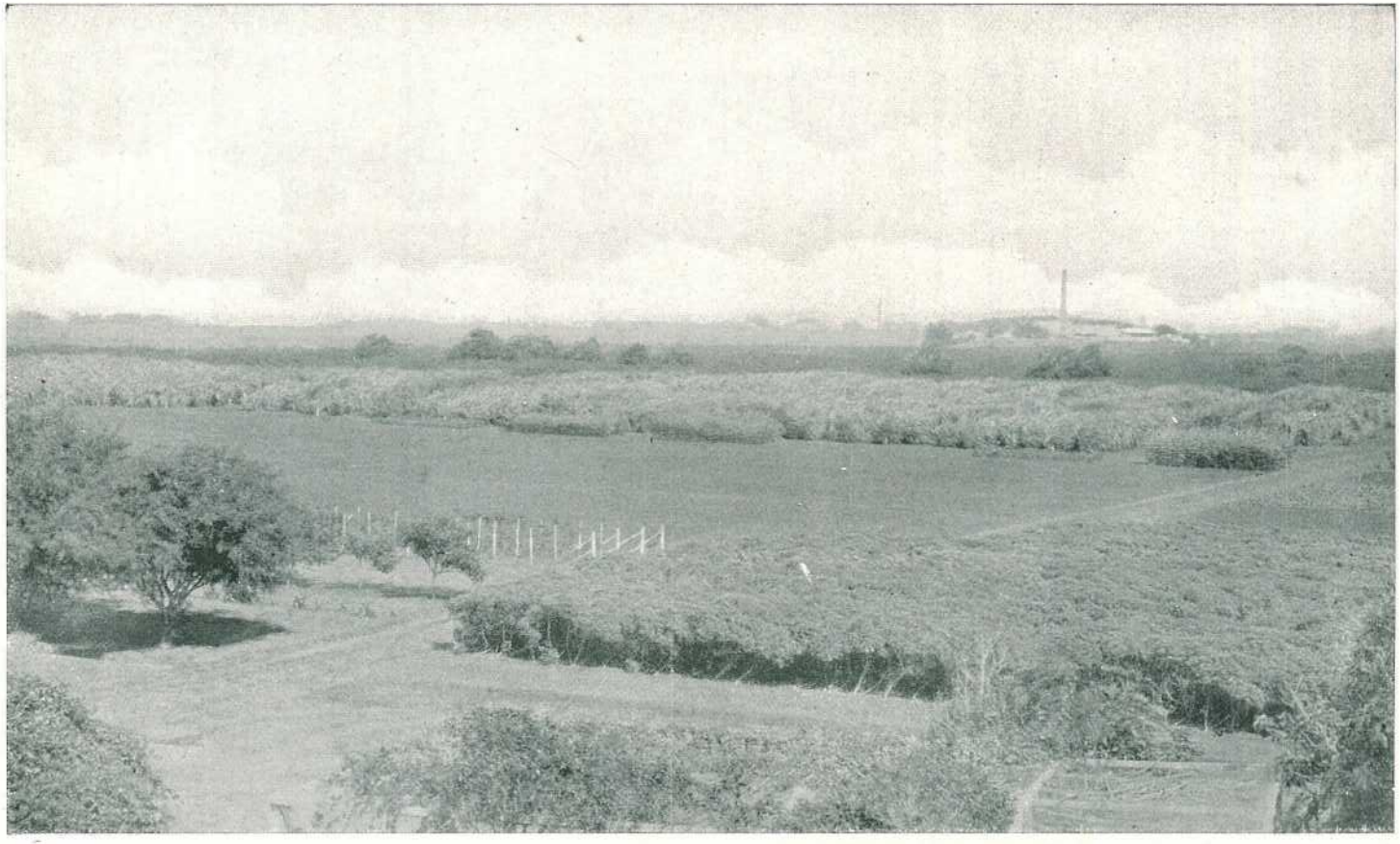

PLATE 75.—ON THE SUGAR EXPERIMENT STATION AT MACKAY, OLD SUGAR MILLS IN THE DISTANCE.

Company, Limited, in conjunction with the Queensland National Bank; that bank paid off all arrears of money and made itself responsible for all payments until the amount of the obligation of the mill to the Treasury had been liquidated. The transfer of the Moreton Central Mill from the Treasurer to the original company took place in January, 1907, they having paid to the Treasurer an amount in total liquidation of all capital moneys and interest due thereon. By June, 1907, the Racecourse Central Mill met its final payments, and its obligations to the Treasury were totally liquidated. This was the first of the central mills to redeem its obligations without outside assistance.

The next mills to pay off their indebtedness to the Government were the Marian at Mackay—which did so during the 1909-10 season—Plane Creek (Mackay), and Mulgrave (Cairns) in 1920-1921 season, Isis (Childers) in 1921-1922 season, and Mossman in the 1923-1924 season. Nerang Mill was closed in 1918, as it had been a losing concern for years. North Eton got into difficulties, and was taken over by the Government during the 1918-1919 season.

Of the original central mills there thus remained only Mount Bauple, Gin Gin, North Eton, and Proserpine, under Government control up till the year 1928.

The erection of the new central mills at Babinda, South Johnstone, and Tully will be dealt with in a later section, as well as the disposal of Mount Bauple, Gin Gin, and North Eton to Co-operative Sugar Milling Associations, by the Government.

[TO BE CONTINUED.]

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS.

LOOK OUT FOR SIGNS OF WIREWORM INJURY.

The larvæ or so-called wireworm of certain of our elaterid and tenebrionid beetles, commonly known as "skip-jacks," &c., cause considerable damage at times to newly-planted cane setts by eating the eyes or young sprouting buds, or killing the older shoots by boring into same below ground level.

These pests are pale-yellow, shining, firm-bodied creatures, which slip easily from between one's fingers.

Some of the following methods of combating them will doubtless interest Queensland canegrowers, since they refer for the most part to cultural treatment of infested soil.

1. On heavy soils, the land should be very well worked, and not allowed to remain caked on the surface.

2. Attend to the drainage conditions if necessary; this being considered a very important point.

3. Plough deeply and at the same time collect as may of the wireworms as possible by hand before planting a crop.

4. Use organic manures; increase the humus content of the soil by means of green manuring, &c.

5. In severe cases of attack, fumigation of the soil may be necessary. This can be done with calcium cyanide or benzine after pre-baiting the land with suitable seed-traps.

In the event of this becoming necessary, the grower should communicate with the Entomologist at Meringa, who will supply full information on the subject.

6. Strew poison-baits along the bottom of furrows ploughed at regular distances; a good formula is:—Bran 25 lb., Paris green 1 lb., nitrobenzene one-eighth of an ounce. Other baits or trap-plants used are sliced-carrot, rice-bran roasted dry and moistened with water, and potatoes cut on one surface and set in the soil a few inches deep and about 10 feet apart; a piece of stiff wire piercing the tuber and showing above ground serves to indicate position of the bait.

SELECTION OF GOOD SEED.

When planting, reject all setts showing tunnels of the weevil borer. Do not purchase same, if possible, from a locality or plantation known to be borer-infested. Such seed often harbours young larvæ, which later on may eat so much of a sett as to make it useless for support of the young shoots, or perhaps result in their dying, thus causing unsightly misses. By means of such diseased setts this weevil borer often obtains a footing in clean canefields, and once becoming established is not easily got rid of.

In the Burdekin district great care must be taken in this connection to select seed free from tunnels of the white-ant or "Giant Termite" (*Mastotermes darwiniensis* Frogg.).

Should a grower wish to save seed of a valuable variety of cane chancing to show evidence of the presence of this borer, such setts should be immersed for half an hour before planting in water heated to a temperature of from 55 to 60 degrees Cent. When using top plants of Badila or other soft varieties, keep a look out for moth-borers, the presence of which is betrayed by tunnels opening on to the surface of the rind, blocked more or less by webbing or pellets of excreta.

CANE PEST COMBAT AND CONTROL.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following entomological report from Mr. E. Jarvis, Entomologist at Meringa, near Cairns:—

RELATION OF SUGAR ENTOMOLOGY TO BIRD LIFE.

In these enlightened days of scientific research, when entomologists are so fond of voicing the merits of biological control, we are, perhaps, inclined to dwell too much upon the entomological side of the question and not enough on the advantages to be derived from a closer study of our insectivorous birds and their habits.

Although the percentage of cane pests is probably small in comparison with that accounted for by parasitic and predaceous insect enemies—which attack not only the adults but also their eggs, larvæ, and pupæ—we should not forget that the services rendered by birds in helping to maintain what is known as the balance of nature cannot be too highly valued by the man on the land.

In the year 1914, when reporting on the sheep-maggot fly pest in Western Queensland, I noticed that the question of bird preservation was intimately associated with the trouble, and that, as a general rule, timbered country or scrub land affording shelter for bird life was free from or but slightly infested by sheep maggot flies—whilst on extensive areas devoid of trees the pest was generally at its worst. This was very noticeable both at Longreach and Emerald; those portions supporting timber being usually free from the fly, but the adjoining cleared open areas generally infested. (Queensland Agricultural Journal, Vol. I., pp. 174-181.)

Probably much of the land at present devoted to the cultivation of sugar-cane in Queensland (exceeding 224,000 acres) was originally more or less timbered country. After being cleared and planted, however, conditions very similar to those obtaining in the west with regard to bird life would naturally tend to become established throughout most of our cane land.

Deprived of suitable shelter and facilities for nesting, and forced, therefore, to retire from tracts of country on which they had been breeding in the past, the services of many of our useful insectivorous birds have been practically lost to us. To make matters worse, itinerant so-called sportsmen, continue to invade bird sanctuaries, and often for the mere lust of killing, blow to pieces every little songster they may chance to hear. Such crass ignorance is lamentable, and admittedly a crime against humanity at large, seeing that posterity is being robbed

by us in this manner of certain beautiful species of the animal kingdom which once destroyed can never be replaced. Incredible as it may seem, one occasionally hears reports of the shooting of ibises and other grub-eating birds for food by some of our own canegrowers. Such foolish slaughter, if continued, must eventually lead to several of these feathered friends avoiding the neighbourhood of canefields and feeding elsewhere. Fifteen years ago it was a common sight to see flocks of the "straw-necked ibis" (*Carphibis spinicollis*) in cane lands around Gordonvale and Highleigh picking up grubs behind the plough; but now only one or two specimens are noticed at work in a field, and in some localities this valuable bird appears to have disappeared altogether.

Growers should take note that under Clause 8A of "*The Animals and Birds Acts, 1921 to 1924*," our birds are the property of the Crown, and that anyone found shooting animals or birds on areas proclaimed as sanctuaries, without a written authority from the Minister (Secretary for Agriculture and Stock) is liable to a fine of £20. In the event of an offender refusing to disclose his name or place of abode to an authorised officer, ranger, or any member of the police force, or to give up his gun or other weapon together with the birds or animals killed by him, runs the risk of being fined £5, or if offering resistance, a fine of £50. Moreover, land holders are not allowed to trap birds or animals on their own selections without a permit, which, however, does not entitle them to carry on such occupation on any other selections.

The areas proclaimed as bird sanctuaries which chiefly concern the Cairns areas are:—The Shires of Cairns and Barron, the Bellenden Ker Reserve, Kuranda (Mona Mona Mission) and Lake Barrine Reserve.

Amongst the list of 123 birds which are protected during the whole of the year throughout Queensland, the following are often found in our canefields, where they render more or less important services. The larger birds (1 to 9) devour great numbers of greyback cockchafers and their grubs, and probably many weevil borers and grasshoppers; while the smaller species doubtless account for their full share of leaf-eating caterpillars, small beetles, leaf-hoppers, &c., and by helping to thin the ranks of such prolific insects prevent them from becoming serious cane pests.

1. Straw-necked Ibis	*Carphibis spinicollis*
2. White Ibis	*Ibis molucca*
3. Pewee or Mud Lark	*Grallina picata.*
4. Indian Myna	*Acridotheres tristis.*
5. Brown Hawk	*Hieracidea berigora.*
6. Leather Head	*Tropidorhynchus buceroides.*
7. Laughing Jackass	*Dacelo leachii.*
8. Fig Bird	*Specotheres flaviventris.*
9. Blue Jay	*Graucalus melanops.*
10. Australian Bee-eater	*Merops ornata.*
11. Black and White Fantail ..	*Rhipidura motacilloides.*
12. Black-faced Cuckoo Shrike ..	*Coracina robusta.*
13. Pallid Cuckoo	*Cuculus inornatus.*
14. Leaden Flycatcher	*Myiagra rubecula.*
15. Rufous-breasted Whistler ..	*Pachycephala rufiventris.*

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following notes on the construction of machinery for fumigating scarabæid grubs, together with a brief report of experimental work against cane insects, for the period April to May, 1930, from the Entomologist at Meringa, Mr. E. Jarvis:—

FUMIGATING APPLIANCES.

Some Essential Points in the Construction of Machines for Fumigating Cane-Grubs

During the present season considerable interest has been taken by some of our cane farmers in the trial of various appliances for fumigating the soil of grub-infested cane land. As a result of such field demonstrations, two pre-eminently important facts have become evident. Firstly, that a machine of this kind should not be too heavy to handle conveniently, or steer in such manner as to easily maintain a uniform distance from the line of cane being treated, despite occasional irregularities due to faulty planting or to differences in growth of individual stools. In order to obtain these desirable features it should, therefore, in the second place, be designed to inject only one side of a row of cane, instead of two sides.

In machines intended for applying liquid injections, provision must be made for regulating the depth of same, so that a fumigant can be buried uniformly at distances varying from 2 to 5 inches below the surface. The roller which is used for levelling and slightly pressing the disturbed soil lying immediately above lines of injection is also an essential provision, and tends to ensure a uniform depth of application. This must not be too heavy, from 10 to 15 lb. weight being sufficient, and should not exceed about 8 inches in width. The main wheel that drives the mechanism for dropping the fumigant should have a diameter of about 18 inches, with flat tyre 2 to 3 inches wide, provided with short iron pegs to ensure getting a good grip on cultivated land. The position of this wheel and dropper must be so arranged as to enable the operator, if desired, to inject a line of the insecticide used about 4 inches from the nearest cane shoots. This can be accomplished by putting them to one side of the machine (the right hand preferably) instead of centrally. At the same time one should bear in mind that, while drilling close alongside the rows, the horse might be forced to walk a little out of the centre, so that damage to the stools from blows of the swingle-bar would need to be overcome.

A Promising Machine.

A machine for burying dry fumigants such as calcium cyanide, nodules of paradichlor., &c., lately constructed by Messrs. Wyper Brothers, of Bundaberg, working in co-operation with the Entomologist at the Southern Sugar Experiment Station, has been tested here this season under field conditions, and given good results. This appliance, which weighs about 1½ cwt. and is designed for treating one side of the row, is easily manipulated with one horse, and, after a few minor improvements have been made, should prove serviceable next season for fumigating plant cane from 3 to 4 feet high.

Horse-drawn machines for treating grub-infested second and third ratoons have yet to be invented, and are likely to prove a difficult problem. In the case of ratoon crops one is called to deal with stools which may vary from 1 to 2 feet or more in width, while, owing to the irregular growth of side shoots and matted surface roots, it is not easy to draw a straight furrow closer than 6 to 8 inches from the nearest shoots. Such fumigation could not be expected, of course, to destroy grubs which might be feeding near the centre of big stools a foot or more away from points of injection.

The maximum success of any machine for fumigating infested soil in which the grubs present are lying at a uniform depth from the surface is not likely to be achieved on indifferently cultivated land. As pointed out in my Monthly Hints for this month (May) (see "Queensland Agricultural Journal" and "Australian Sugar Journal") it should be the aim of every grower to gradually bring the first few inches of his top soil into an even friable state by means of frequent cultivation; seeing that the establishment of such level and mechanical conditions of soil porosity tend to ensure the fumigant being administered uniformly, as regards depth, quantity, distance from the plants, and between individual doses.

Experiments Against Grubs With Ortho-Dichlorobenzene.

The samples of commercial liquid Di-chlor Benzol, and soluble Dichlorbenzol received from Sydney last November, and forwarded to this Experiment Station for trial against cane grubs, have lately been tested in our laboratory and under field conditions.

Although deadly to grubs confined in cages of moist soil—a mortality of 100 per cent. occurring within three days—ortho-dichlor. when injected in doses of 7 cc. within 3 inches of the stools caused wilting, and in many cases ultimate death of the cane. The Assistant Entomologist, Mr. Buzacott, who carried out these experiments, believes this form of dichlorobenzene to be extremely poisonous to plant life.

Results obtained later under field conditions showed that when mixed with carbon bisulphide and injected 6 inches from cane plants slight wilting took place and living grubs were afterwards found under stools so treated.

Additional experiments, however, with this fumigant will be made later with a view to discovery of some way of making it less harmful to plant life.

Spraying Experiments Against Aphides and Scale Insects.

The plant louse of sugar-cane (*Aphis sacchari* Zehn.) has been fairly plentiful this season, having occurred at Aloomba and elsewhere in sufficient numbers to attract attention from our growers. Although of minor economic interest this pest appears to have increased during the last few years rather than diminished, and on several occasions has been found attacking the young heart-leaves of cane. When

confined to the older mature foliage the damage inflicted by these plant lice is practically negligible, but in the event of severe infestation there is always a danger of the winged forms and viviparous females ultimately finding their way to the upper portions of affected stools.

This insect invariably frequents the under surface of the leaves, which, acting like a roof, afford ample protection from extremes of heat or wet weather. Owing to this habit its presence on a plantation usually remains unnoticed until betrayed by blackening of the foliage, due to the growth of a fungus called Fumagine, which grows thickly upon a sweet fluid secreted by the aphides, and which is scattered freely over the surface of an affected leaf.

Upon the first appearance of such aphis attack the lower leaves of the surrounding cane should be carefully examined, and those found to be badly infested stripped off, remove from the affected block, and laid together in a heap to be burnt.

In the event of the heart-leaves being badly attacked the aphides must be destroyed by spraying. Recent experimentation carried out at Meringa laboratory has resulted in the elaboration of the following solution, which we have found to be both cheap and effective against soft-bodied insects:—Soap, 1 lb.; crude carbolic acid, ½ lb.; water, 4 quarts.

To prepare this spray, cut up the soap, boil in the water until dissolved, stir the carbolic slowly into it, boil together for about twenty-five minutes, and strain.

This makes the stock-solution, to each part of which, before using, add nineteen parts of water. It will be found a good plan to heat the solution before spraying, to about 40 deg. Cent.

Crude carbolic acid can be obtained from the Australian Chemical Company, Donkin street, South Brisbane, at 1s. 6d. a tin, of one quart. White bar-soap ("Witch" brand) was found one of the best to use for such purpose.

A simple form of Knapsack spray-pump will be found quite suitable for this work. Use a nozzle which will forcibly deliver a mist-like spray capable of thoroughly wetting and clogging up the masses of aphides.

The more difficult problem of mealy-bug control will be dealt with in my next report.

CANE PESTS AND DISEASES.

The Pathologist to the Bureau of Sugar Experiment Stations has contributed the following notes on Sugar Cane Quarantine Districts recently declared in Queensland.

The majority of Queensland canegrowers are no doubt aware of the fact that there are a number of the more serious diseases of sugar-cane which are not generally distributed throughout the State. That is to say, any one of these diseases may be present in one district and not in others. It naturally follows, therefore, that it is a very unwise practice to take cane from certain districts for the purpose of planting in other districts. For example, owing to the presence of Fiji and gumming diseases, it would be very dangerous to take cane plants from Bundaberg to the Burdekin, where these diseases do not exist.

In order to prevent haphazard interchange of sugar-cane varieties between districts, a special proclamation has been issued under the new Diseases in Plants Act of 1929. Under the terms of this proclamation the Queensland sugar belt has been divided into nine quarantine districts, and the removal or introduction of sugar-cane plants from or into any of these districts is prohibited unless a permit in writing has been issued by an inspector under the Diseases in Plants Act.

The boundaries of the quarantine districts so proclaimed are set out hereunder:—

1. Far Northern.—The area lying north of a line drawn due west through Cardwell.
2. Herbert.—The area lying between a line drawn due west through Cardwell on the north, and a line drawn due west through Townsville on the south.
3. Lower Burdekin.—The area lying between a line drawn due west through Townsville on the north, and a line drawn due west through Bowen on the south.
4. Proserpine and Mackay.—The area between a line drawn due west through Bowen on the north, and Alligator Creek on the south.
5. Plane Creek.—The area lying between Alligator Creek on the north, and a line drawn due east and west through Rockhampton on the south.

6. Bundaberg-Childers.—The area lying between a line drawn due east and west through Rockhampton on the north, and a line following the Burrum River to its junction with the North Coast Railway, near Howard, and thence due west, on the south.

7. Maryborough.—The area between the southern boundary of the Bundaberg-Childers district on the north, and a line drawn due west through Hook Point (on the southernmost end of Great Sandy Island) on the south.

8. Moreton.—The area lying between the southern boundary of the Maryborough district on the north, and a line drawn due east and west through Brisbane on the south.

9. Logan.—The area lying between a line drawn due east and west through Brisbane on the north, and the boundary of the State of New South Wales on the south.

It should be noted that in the event of unpermitted removal of cane plants from one district to another both the person forwarding the cane plants and the person receiving them are guilty of an offence under the Act, and are liable to prosecution.

Any grower desiring to remove sugar-cane plants from one district to another should apply to the Pathologist, Bureau of Sugar Experiment Stations, Brisbane, for the necessary permit, giving reasonable notice in order to permit of an inspection being carried out.

The existing proclamation which prohibited the sale of cane plants within the counties of Ward, Stanley, Canning, and March has been rescinded. No permits will now be required for the transfer of cane plants to farmers within these counties, but a permit will be required if it is intended to send the plants out of the particular quarantine district.

Mr. R. W. Mungomery, Assistant Entomologist, Bundaberg, has submitted the following report (22nd April, 1930) to the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby:—

Many varied opinions exist regarding the effects which the wet season rains have on the ordinary white grub, or cane grub as it is more commonly known in these parts, and some growers have opinions of an exaggerated nature concerning the benefits to be derived from the cyclonic rains and floods and the relationship of these latter towards the control of certain insect pests.

It is true that submergence in water has been a means of destroying many root-feeding insects, and the grape vine phylloxera is a notable example of a major insect pest being controlled in a large way by the periodical flooding of vineyards in parts of France. Again, artificial inundations have been in vogue for many years in Hungary for destroying white grubs and other insect pests in meadows, but, although the usual period of such flooding is about eight days, other investigators have shown that white grubs may remain in such flooded areas where the ground is impermeable for over a month without being destroyed.

For control to be efficient it is essential that the land should be almost level and of such a nature that, although not impermeable, water should not penetrate it easily, both of which essential conditions are not readily obtainable in our grub-infested fields. Usually land which is infested with grubs is a good friable natured soil, either red volcanic or sandy loam, and varying in contour from gentle slopes to hilly country. As a matter of fact, cane grubs are rarely found in level wet clayey situations such as would permit of easy flooding, and they certainly are not present in sufficient numbers to cause apperciable damage to cane.

To test the effect of submerging cane grubs in water, several normal healthy third-stage grubs were subjected to this treatment. When first submerged they gave several convulsive movements, and after an interval of about two minutes their movements gradually diminished until all action ceased after three minutes' immersion. To any one unaccustomed to their habits it would have appeared as if these grubs were dead, but this was not the case, as they remained in this state of suspended animation throughout the course of the experiment, and, as explained later, many of these eventually recovered.

At the expiration of one and two days respectively a number of these grubs were removed from the water and placed on moist soil, and it was surprising to note how quickly some of these recovered and commenced to dig normally into the soil. Others that were removed after three and four days immersion did not recover so quickly, and in some cases deaths occurred, but nevertheless a fairly high percentage recovered from this treatment. After five days' immersion only a small percentage

recovered, and it is considered that not many survive much greater periods than this. Seldom, however, do grub-infested fields remain under water for very long periods, and during the three weeks' continuous rainy weather in the early part of this year (January and February) some grub-infested blocks of cane were under observation, and in no case could dead grubs be found in water-logged soil that was not actually flooded.

When heavy rain falls grubs may respond in either of two ways, according to their position in the soil and the time of the year. In the one case they may retreat to a fairly clayey subsoil and enclose themselves in an impenetrable clayey cell, and in this position they are fairly secure. On the other hand, in the warmer months of the year, what usually does happen is that they approach closer to the surface of the ground, and though torrential rains may cause temporary inactivity on their part they soon become active again when a lull occurs in the rainfall. In a few cases rushing torernts may wash these pests out of the cultivation and carry them along the drains and on to the sides of the roads, where they are eaten by birds, but the percentage of control due to this factor is comparatively small. Wet weather may indirectly affect grubs by promoting a spread of fungous and bacterial diseases which are capable of causing their destruction. However, it is not so much in the death of the grubs themselves as in the general stimulating effect on the growth of the cane plant, where the main benefit of the rainy season is to be noticed.

In dry weather the plant has difficulty in maintaining its usual rate of growth, and when destruction of the roots by grub attack is added to this, a further handicap takes place. In the rainy season root development proceeds at a rapid rate of growth, and consequently the plant shows renewed vigour, all of this happening at a time when the grubs are full fed or fast approaching that condition, with the result that the grubs no longer harass the roots to any great extent and the growth of the cane plant is maintained. This recovery on the part of the plant should not therefore be attributed to the wet weather killing the grubs, but to the variety of favourable conditions operating at that particular time.

It will be apparent from this that it is futile to enjoy a false sense of security and imagine that the wet season is going to be the panacea of all cane grub worries. To allow grubs to remain undisturbed is only another means of heaping up trouble for future years. Grub-infested cane should be treated when grubs show their first signs of attack, and a clean-up campaign should be instituted, either by ploughing out the affected field and hand-picking the grubs or by fumigating the yellowing stools.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report for the month ended 12th April, 1930, from the Assistant Entomologist, Mr. A. N. Burns, Mackay:—

Review of the Past Greyback Beetle Flight.

Contrary to the expectations anticipated from the long and continued dry season of 1929, the flight of greyback beetles was reported as being unusually large, and in the Mackay district just on 24 tons of beetles were collected and destroyed at the various mills, &c.

It is usual after a prolonged dry spell to note that many beetles perish in the soil owing to being unable to escape from their pupal cells; a natural check is thus effected and the resulting flight lessened in point of number. It is therefore quite probable that the 1929-30 flight would have been even greater if the rains had fallen a month earlier than they did—i.e., at the end of November instead of the end of December.

Collecting of beetles appeared to be much more enthusiastically and systematically carried out this season than in the past; this would probably have a slight tendency towards over comparison of the magnitude of the flight as compared with previous ones.

In view of this heavy flight, many growers will naturally think that there is soon to be heavy grub infestation, and that it should be unusually severe because there was a large flight of beetles; this does not necessarily or invariably follow. It is a recognised fact that a scarcity of any particular insect is frequently followed the next season or generation by a great abundance of it, and vice versa. Insect and fungoid parasites are doubly responsible, which in reality is only the restoration of natural balance.

Greyback Grubs (*Lepidoderma albohirtum* Waterh.) near Sarina.

Early this month a visit was paid to some of the cane areas between Dawlish and West Plane Creek, and in one instance at the former place greyback grubs were observed feeding at cane roots. Damage was only commencing, and no indications had manifested themselves in the leaves of the cane. As many as five grubs were located at some stools; these were mostly still in the second stage, and a few newly changed third-stage grubs were also noted. Whilst in the first and second stages little actual root injury is done by grubs; they subsist chiefly on humus, &c., obtained by the continual ingestion of soil. Once the third stage is reached their diet becomes almost wholly vegetable, and it is in this stage, which usually occupies about four months, that the damage to cane is done.

By the end of the present month (April) the grubs will have all reached the third stage, and growers who are usually troubled with grubs will be well advised to dig alongside a few stools in areas usually subjected to attack to see if grubs are present or not. If they are found to be present in any numbers, fumigation should be immediately undertaken. If this is done before the root systems of the cane stools are almost totally destroyed, the chances of quick recovery are much better. It is therefore clearly advisable to try and ascertain if grubs are active at cane roots before waiting until such time as the cane commences to wilt or, in extreme cases, to topple over.

Greyback Grubs (*Lepidoderma albohirtum* Waterh.) at Mia Mia.

Parts of the Mia Mia district were very severely attacked by Greyback grubs in the autumn of 1929, so it was decided to visit the same areas again this month in order to see whether the damage here this season would be likely to approach the same extent as that of last season. One block which carried Badila last season, and which was very severely attacked, was carefully examined. This field has since been replanted with Clark's Seedling principally, and examinations made alongside stools show that it will possibly be free from attack this season. At one stool only of those examined were any grubs located, and then only one.

In a patch of Q. 813 growing across a roadway grubs were plentiful, and a few stools were beginning to show yellowing in the leaves, and were commencing to lose anchorage with the soil. Q. 813 is a very poor grub-resisting cane owing to its shallow rooting system. Three Greyback grubs are quite sufficient to eat out one stool of this variety. This particular block of cane was badly attacked last year.

Taking the area inspected as a whole, it appears from present indications that it will not suffer from grub damage to anything like the extent that it did in the 1929 autumn. It is reported that the beetles were very plentiful this summer, and that large numbers were collected in the Mia Mia district. Fig trees, as is usual, were mentioned as being the most favoured feeding trees.

Notes on Fumigation with Carbon Bisulphide.

When the presence of grubs is discovered at cane stools, a careful note should be made of the depth at which they are feeding. The reason for this is that the poison should be injected to a depth slightly less than that at which the grubs are situated, because the fumes of carbon bisulphide are heavier than air, and therefore tend to penetrate downwards. The footplate of the injector can be adjusted to suit this.

It is advisable, if possible, to have the spaces between the cane rows as free from grass and weeds as possible, because the roots of these are also attractive to grubs, which after fumigation, when the poison has dispersed, may ultimately migrate to the cane roots and cause another minor infestation. Ordinarily clean cane is all that is necessary—the above only applies to cane that is very dirty and where the inter-rows are choked with weeds. Do not fumigate immediately after heavy rains, because when the soil is water-logged the poison fumes are unable to permeate the soil particles and root system. Damp or very moist soil is all right to fumigate. It is usual to allow at least two days, preferably three, to elapse after a heavy downpour before attempting fumigation. Doses of fumigant may either be injected at both sides of the stools or else in the centres of the plants. The chief advantage in the latter method lies in a saving of time in that it is necessary only to traverse each row once, whereas by placing doses on either side of the stools each row has to be gone along twice. With side plant fumigation the doses are directed towards the cane roots, and the spear of the injector is injected about 2 in. or so (not further) away from the plant. On the other hand, with central stool injection, the dose aperture is directed towards the outside of the row, one dose is given, then the aperture is turned round without withdrawing the injector and facing the opposite side, and another dose is given. It is wise to always fill in the spear-hole by pressing the earth with the foot after doing a stool. Fumigant and injectors may be procured by application to the Secretary Mackay Pest Destruction Board, Shire Offices, Wood street, Mackay.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (16th May, 1930) from the Assistant Entomologist, Mr. R. W. Mungomery, Bundaberg:—

SOOTY FUNGUS ON SUGAR-CANE.

Inquiries frequently come to hand regarding the appearance of a dirty blackish discolouration of the older cane leaves at this time of the year. Some growers view this with more concern than is necessary, thinking their cane to be smitten by some new disease which will suddenly wipe out their crops; and what appears to add weight to their ideas on this matter is the fact that often only certain varieties are affected, which would give one the impression that this was the commencement of a serious disease.

Actually, this is only a minor trouble, caused as a result of aphids feeding on the cane leaves. Colonies of these very small insects, or plant lice as they are sometimes called, are most commonly found on the underneath side of the older cane leaves, where they are attended by ants. A very intimate association exists between aphids and ants, some colonies of aphids being unable to thrive unless ants are present to look after them. Ants frequently find suitable food plants for the aphids, and when these are overcrowded, the young aphids are transferred to other plants or to other portions of the same plant which are not so thickly populated; in addition, they also afford them a certain amount of protection from their enemies. In return for this attention, the aphids secrete a kind of honey dew, which is eagerly sought after by the ants, and from this peculiar relationship, aphids have sometimes been referred to as "ants' cows."

In the case of sugar-cane aphids, some of the honey dew secreted by them falls on the surface of the leaves immediately beneath where the colonies are feeding, and this gives the cane leaves a shining, sticky appearance. Later on, a fungus commences to grow on this honey dew, and gradually extends over the whole surface on which the honey dew has fallen. The fungus is blackish in colour, and this produces the dirty, sooty discolouration previously referred to as appearing on the leaves. Living as it does on the secretions from the aphids and not on the plant tissue, the fungus has little effect on the growth of the cane plant, and the only injury it does is to block up some of the breathing pores of the older leaves.

Aphids have a short life cycle, and during their adult stage produce a large number of young. They therefore are very prolific and this accounts for their sudden appearance in large numbers in places where formerly there were no signs of them. The number of natural enemies with which they have to contend is large, ladybirds and their larvæ, certain fly larvæ, and others, all exacting toll from their colonies. Weather conditions also have a big controlling effect, and a sudden increase in the aphid population is soon brought about under control by these several agencies. Therefore, artificial control measures are unnecessary.

From this it will be apparent that this sooty fungus is only a temporary visitation, and once the aphids disappear and the older leaves fall off, the cane soon assumes its former green appearance.

Readers are reminded that a cross in the prescribed square on the first page of this "Journal" is an indication that their Subscription —one shilling—for the current year is now due. The "Journal" is free to farmers and the shilling is merely to cover the cost of postage for twelve months. If your copy is marked with a cross please renew your registration now. Fill in the order form on another page of this issue and mail it immediately, with postage stamps or postal note for one shilling, to the Under Secretary, Department of Agriculture and Stock, Brisbane.

FLAG SMUT IN WHEAT EXPERIMENTS, 1929.

By R. B. MORWOOD, M.Sc., Assistant Plant Pathologist.

After the outbreak of Flag Smut in 1928 it was deemed advisable to conduct a test of the susceptibility of the varieties of wheat commonly grown in Queensland, and also of the effect of the usual seed treatments in preventing the spread of the disease. The experiments were designed by the Plant Pathologist (Mr. J. H. Simmonds) and the necessary arrangements for carrying them out were made by the Director of Agriculture (Mr. H. C. Quodling). In the field work the writer had the able co-operation of Messrs. C. S. Clydesdale (Instructor in Agriculture), S. M. Smith, and H. Lewis at Allora. At Roma, the experimental plots were located at the State Farm where the Manager (Mr. R. E. Soutter), assisted by Mr. Ball (Assistant Experimentalist), and the farm hands co-operated with the writer. Thanks are due to Messrs. Geitz Brothers, on whose property the experiments were conducted at Allora.

Thirty-one named varieties of wheat and nine Departmental crosses were tested for susceptibility to flag smut. Canberra, which was known to be susceptible, was taken as a standard of comparison. Eight seed treatments were tested. Experiments were conducted in two localities (Roma and Allora), and in the case of the susceptibility trials an early and a late planting was made in each locality.

Experiment I.—Susceptibility Trials.

In this experiment the seed of each variety was shaken with spores of flag smut (*Urocystis tritici*). The spore material consisted of heavily infected wheat which was dried and then fragmented in a mincing machine. Approximately 1 gram of the resulting mixture of spores and chaff was shaken with 20 grams of wheat. One row of each variety was planted in each planting at each locality. The rows were made 2 chains long and spaced 2 feet apart, with the grains planted about 6 inches apart in the rows. At the beginning, and again after every fourth row, there were placed a row of Canberra wheat free from spores and one infected in the same manner as the rest of the varieties. The dates of planting were:—

Allora (first planting)	9th May
Roma (first planting)	11th May
Roma (second planting)	11th June
Allora (second planting)	4th July

At Allora at the time of making the first planting there was good subsoil moisture, but the cultivated surface layer was somewhat dry. It proved too dry for germination, and only an odd plant came up till showers one month later brought the majority through. As a result the number of plants per row was very irregular, extremes being 15 and 155. This averages about a 50 per cent. germination. The plants subsequently developed into large stools in spite of dry conditions during August and September.

The second plant, at Allora, was made following good rains early in July and germinated immediately, growing into very uniform rows.

The first planting at Roma was made under conditions somewhat similar to those at Allora, but in a rather lighter soil. A fair germination was the result. The wheat grew well to maturity in spite of getting less than 1 inch of rain from sowing till ripening.

The second planting, at Roma, was made after 40 points of rain. Soil moisture was good and an excellent germination resulted. These plants made sufficient growth for the purposes of the experiment, but were eventually somewhat stunted by the dry conditions.

The first smutted plants were observed by Mr. Soutter at the beginning of August in the plot at Roma planted 11th May, 1929. The plants were examined at intervals, and all found affected with flag smut were removed and burned after carefully recording the number per row. The symptoms varied from a few dark lines on the leaves of one small tiller, the rest of the plant being normal, to a condition of severe infection in which, in addition to the presence of the characteristic symptoms, the whole plant was reduced to a grass-like habit. The infections showing up for the first time in the later observations were mostly light, usually only one tiller being affected. The final count was made in all sections after the early-maturing varieties were ripe.

Only one smutted plant was found in the rows of Canberra free This one was explained by the breeze blowing spores from an earlier planted adjacent infected row. The freedom of the remainder demonstrated the freedom of the soil and of the sample of Canberra seed used from flag smut.

The infection per 100 plants for each row of Canberra infected is given in Table I.

TABLE I.

Row No.	Variety.	Percentage Infections.			
		Roma.		Allora.	
		Early Planting.	Late Planting.	Early Planting.	Late Planting.
1B ..	Canberra infected ..	25·9	69·6	8·6	5·6
4B ..	Ditto	45·0	46·2	10·1	3·3
8B ..	Ditto	34·7	50·6	7·6	8·5
12B ..	Ditto	33·5	52·8	8·6	2·8
16B ..	Ditto	34·9	47·0	6·1	7·4
20B ..	Ditto	10·1	49·8	6·3	6·3
24B ..	Ditto	20·7	57·8	11·8	9·4
28B ..	Ditto	35·5	46·2	5·3	5·1
32B ..	Ditto	14·7	37·2	9·7	4·6
36B ..	Ditto	15·4	54·4	10·9	5·3
40B ..	Ditto	37·6	68·0	8·0	3·5
	Mean	28·0	52·7	8·4	5·6
	P.E.	± 2·31	± 1·95	± 0·42	± 0·43

Table II. shows the percentage infection of each row and also the amount of infection compared with the average of the rows of Canberra in the planting. The former figures varied with time and place of planting, so had to be expressed in a common standard. For this purpose the average percentage infection per row of Canberra for the first planting at Roma was called 100, and the percentage infection of the other rows in this planting raised proportionately. The other plantings were then dealt with in the same manner. By this means there were obtained figures for the infection of each variety relative to the known susceptible variety.

TABLE II.—SUSCEPTIBILITY TRIALS.

Row No.	Variety.	Per Cent. Infection.				Relative Infection on Scale Canberra = 100.				Average.	P.E.
		Roma.		Allora.		Roma.		Allora.			
		Early Planting.	Late Planting.	Early Planting.	Late Planting.	Early Planting.	Late Planting.	Early Planting.	Late Planting.		
1A	Canberra free	0	0	0	1·0						
1B	Canberra infected	25·9	69·6	8·6	5·6						
1	Pinto	20·8	13·1	3·0	0·4	74·7	24·8	35·7	7·1	35·6	± 10·04
2	Cedric	53·6	40·4	20·0	3·4	193·0	76·8	237·0	60·6	141·8	± 29·20
3	Warren	10·5	15·0	1·0	0	37·5	28·5	11·9	0	19·5	± 5·65
4	Warrior	34·9	12·6	1·2	0	124·0	23·9	14·3	0	40·5	± 19·04
4A	Canberra free	0	0	0	0						
4B	Canberra infected	45·0	46·2	10·1	3·3						
5	Merridan	26·6	52·2	5·5	1·1	95·2	99·2	65·5	19·6	69·9	± 12·63
6	Novo	17·1	3·6	2·5	1·9	61·0	6·8	29·8	34·0	32·9	± 7·48
7	Beewar	10·8	49·4	1·0	0·6	38·6	93·6	11·9	10·7	38·7	± 13·08
8	Caliph	25·2	9·5	1·4	0	90·0	18·0	16·7	0	31·2	± 13·51
8A	Canberra free	0	0	0	0						
8B	Canberra infected	34·7	50·6	7·6	8·5						
9	Currawa	4·4	3·9	4·1	0	15·7	7·4	48·8	0	18·0	± 7·26
10	Florida	56·4	37·8	4·8	1·5	201·0	72·0	57·2	26·8	89·2	± 25·83
11	Watchman	30·6	67·5	15·4	5·1	128·0	128·0	188·0	91·3	133·8	± 13·52
12	Barwang	10·2	20·0	10·7	1·0	36·4	32·3	127·0	17·9	53·4	± 16·84
12A	Canberra free	0	0	0	0						
12B	Canberra infected	33·5	52·8	8·6	2·8						
13	Flora	60·5	52·0	14·3	4·5	216·0	98·8	170·0	80·5	141·3	± 21·20
14	Amby	5·4	25·0	1·7	0·6	19·3	47·5	20·3	10·7	24·4	± 5·37
15	Booraloo	15·7	35·3	5·5	1·5	56·0	67·0	65·6	26·8	53·8	± 6·30
16	Waterman	6·3	0	0	0	22·5	0	0	0	5·6	± 3·79
16A	Canberra free	0	0	0	0						
16B	Canberra infected	34·9	47·0	6·1	7·4						
17	Roma Red	6·5	2·9	1·0	0	23·2	5·5	11·9	0	10·1	± 3·36
18	Gluyas	14·3	11·2	6·2	3·7	51·0	21·3	74·0	66·2	53·1	± 7·86
19	Warchief	4·1	0·3	0	0	14·7	0·6	0	0	3·8	± 2·45
20	Three Seas	32·6	32·3	1·2	1·4	116·0	61·2	14·3	25·0	54·1	± 7·01
20A	Canberra free	0	0	0	0						

TABLE II.—*continued.*

Row No.	Variety.	Per Cent. Infection.				Relative Infection on Scale Canberra = 100.				Average.	P.E.
		Roma.		Allora.		Roma.		Allora.			
		Early Planting.	Late Planting.	Early Planting.	Late Planting.	Early Planting.	Late Planting.	Early Planting.	Late Planting.		
20B	Canberra infected	10·1	49·8	6·3	6·3						
21	Clarendon	23·2	7·5	4·1	0	82·9	14·3	48·8	0	36·5	± 12·51
22	Bunge No. 1	12·8	2·1	1·0	0	45·7	4·0	11·9	0	15·4	± 7·01
23	Budd's Early	17·4	36·5	12·6	1·9	62·2	69·5	150·0	34·0	76·4	± 18·80
24	Florence	1·6	3·9	0	0	5·7	7·4	0	0	3·3	± 1·30
24A	Canberra free	0	0	0	0						
24B	Canberra infected	20·7	57·8	11·8	9·4						
25	Pusa	12·0	5·4	3·1	0	42·8	10·3	36·8	0	22·5	± 6·94
26	B.I.P.M. 2610	1·2	0·4	0	0	4·3	0·8	0	0	1·3	± 0·69
27	B.I.P.M. 2612	0	0·5	0	0	0	1·0	0	0	0·25	± 0·17
28	B.I.P.M. 2615	1·3	0	0	0	4·6	0	0	0	1·1	± 0·78
28A	Canberra free	0	0	0	0						
28B	Canberra infected	35·5	46·2	5·3	5·1						
29	Gem	21·8	25·4	10·0	0	78·0	48·3	119·0	0	61·3	± 16·90
30	Patriot	33·5	27·5	4·1	1·5	125·0	51·7	48·7	26·8	63·0	± 14·53
31	Cleveland	58·9	79·8	5·5	0·9	209·0	151·0	65·6	16·1	110·4	± 29·19
32	Piastre	67·2	77·6	9·5	4·6	240·0	147·0	113·0	82·0	145·5	± 23·02
32A	Canberra free	0	0	0	0						
32B	Canberra infected	14·7	37·2	9·7	4·6						
33	Duke of York	22·6	27·2	5·4	1·8	80·8	51·6	64·3	33·2	57·5	± 6·78
34	B.F.G. 2613	43·5	40·2	5·4	1·7	159·0	76·4	64·3	30·4	82·5	± 18·41
35	B.I.P.M. 2604	1·3	0	0	0	4·6	0	0	0	1·1	± 0·78
36	B.I.P.M. 2608	7 9	6·3	0	0	28·2	12·0	0	0	10·0	± 4·50
36A	Canberra free	0	0	0	0						
36B	Canberra infected	15·4	54·4	10·9	5·3						
37	B.I.P.M. 2609	5·5	5·9	2·9	0	19·7	11·2	34·5	0	16·3	± 4·90
38	Nabawa	1·5	1·2	0	0	5·4	2·3	0	0	1·9	± 0·86
39	Coronation	29·8	47·3	11·9	3·0	106·0	89·8	141·0	53·6	97·6	± 12·41
40	Pilot	18·3	20·7	2·6	0	65·4	39·4	31·0	0	33·9	± 9·09
40A	Canberra free	0	0	0	0						
40B	Canberra infected	37·6	68·0	8·0	3·5						

The only varieties which were definitely proved to be less than one-twentieth as susceptible as Canberra were the Departmental crosses B.I.P.M. 2612, 2604, 2615, and 2610. There were no significant differences between these crosses, though there were strong indications that they were more resistant than B.I.P.M. 2608 and 2609.

Nabawa and Florence proved to be less than one-tenth as susceptible as Canberra. Less than one-fifth as susceptible are Warchief, Waterman, and Roma Red.

The figures given for the susceptibility are only approximate owing to the limited number of trials and great variation of the figures in the trials. In arranging the wheat in groups, both mean and the extreme values are considered. Those placed in the moderately susceptible column are certainly less susceptibe than Canberra.

TABLE III.

Highly Resistant.		Resistant.	
B.I.P.M. 2612	0·25 ± 0·17	Warchief	3·8 ± 2·45
B.I.P.M. 2604	1·1 ± 0·78	Waterman	5·6 ± 3·79
B.I.P.M. 2615	1·1 ± 0·78	Roma Red	10·1 ± 3·36
B.I.P.M. 2610	1·3 ± 0·69		
Nabawa	1·9 ± 0·86		
Florence	3·3 ± 1·30		
Moderately Susceptible.		**Susceptible.**	
B.I.P.M. 2608	10·0 ± 4·50	Warrior	40·5 ± 19·5
Bunge No. 1	15·4 ± 7·01	Barwang	53·4 ± 16·84
B.I.P.M. 2609	16·3 ± 4·90	Three Seas	54·1 ± 15·47
Currawa	18·0 ± 7·26	Gem	61·3 ± 16·90
Warren	19·5 ± 5·65	Patriot	63·0 ± 14·53
Pusa	22·5 ± 6·94	Merridan	69·9 ± 12·63
Amby	24·4 ± 5·37	Budd's Early	76·4 ± 16·80
Caliph	31·2 ± 13·51	Bobs-Flo Gl. 2613 ..	82·5 ± 18·41
Novo	32·9 ± 7·48	Florida	89·2 ± 25·83
Pilot	33·9 ± 9·09	Coronation	97·6 ± 12·41
Pinto	35·6 ± 10·04	Canberra	100·0 ± 2·64
Clarendon	36·5 ± 12·51	Cleveland	110·4 ± 29·19
Beewar	38·7 ± 13·08	Watchman	133·8 ± 13·52
Gluyas	53·1 ± 7·86	Flora	141·3 ± 21·20
Booraloo	53·8 ± 6·30	Cedric	141·8 ± 29·20
Duke of York	57·5 ± 6·78	Piastre	145·5 ± 23·02

Experiment II.—Seed Treatment Trials.

Canberra wheat was used for this experiment, and with the exception of the seed for the Canberra free rows was shaken with flag smut spores at the same rate as in the susceptibility trials. Three pairs of Canberra free and three of Canberra infected were planted as distributed checks. Two rows of each of the following treatments were planted and in most cases a third row of treated seed subsequently reinfected.

Bluestone.—The seed was treated by immersion in a 1½ per cent. solution (1½ lb. to 10 gal.) of bluestone for three minutes. It was then allowed to dry before planting.

Bluestone Kept.—This was treated in the same manner as above, but the treatment was made on the 3rd of May and planting took place at Allora on the 10th and Roma on the 13th.

Bluestone Lime.—The bluestone treatment was the same as the two former and was then followed by immersion in 1 per cent. milk of lime for three minutes.

Formalin.—Ten minutes in a solution consisting of one part of commercial formalin in 400 parts of water.

Copper Carbonate—Tillantin R.—U.T. 685.—The seed was shaken with the various dusts at the rate of 2 oz. per bushel.

Hot Water.—The seed was soaked for five hours at room temperature and then maintained one lot at a temperature of 125 deg. Fahr. for ten minutes and the other at 129 deg. Fahr. for ten minutes.

Duplicate plantings were made at Allora and Roma each at the time of the first planting of the susceptibility trials and under the same conditions, except that, at Roma, the drills were watered to ensure germination. Two hundred seeds were planted per row, and the resultant plants counted so that the effect of seed treatment on germination could be observed. The final figures are given in Table IV.

TABLE IV.

PERCENTAGE GERMINATION OF EXPERIMENT II.

Treatment.	Roma.		Allora.		Mean.
	1st Row.	2nd Row.	1st Row.	2nd Row.	
Bluestone	97·5	96·5	58·0	60·0	87·3
Bluestone subsequently infected	97·0	..	61·0	..	
Bluestone kept	89·5	96·0	59·5	60·0	76·2
Free untreated	97·5	95·5	63·0	67·0	80·7
Infected untreated	93·5	97·5	69·0	62·5	80·6
Bluestone lime	96·0	98·5	67·0	74·0	83·8
Formalin	88·0	91·5	69·0	59·0	76·0
Formalin subsequently infected	95·5	..	53·5	..	
Free untreated	96·5	95·5	55·5	56·0	75·8
Infected untreated	94·0	95·5	63·0	77·0	82·3
Copper carbonate	96·5	97·5	68·5	59·5	79·8
Copper carbonate infected	95·0	..	62·0	..	
Hot water 125° F.	65·0	62·5	47·5	43·5	53·0
Hot water 129° F.	65·0	59·5	33·5	34·0	48·0
Hot water 125° F. subsequently infected	63·5	..	36·0	..	..
Free untreated	94·5	92·5	64·0	67·0	79·5
Infected untreated	94·0	97·0	63·5	56·5	77·7
Tillantin R.	96·0	97·5	52·5	63·0	78·5
Tillantin R. subsequently infected	97·5	..	64·5	..	
U. T. 685	95·5	94·0	63·5	68·0	80·6
U. T. 685 subsequently infected	100·0	..	63·0	..	
Average of infected untreated	95·6		67·3		79·4

Examination of the germination results shows no reduction from treatment of seeds with the dusts: copper carbonate, Tillantin R., and U.T. 685. With formalin and blue stone the difference is so small that considerably more elaboration would be needed to prove a reduction. Treatment with lime after bluestone may make a difference under some conditions.

With the hot water treatment there was a consistent reduction of germination capacity, particularly marked at Roma, where the distributed checks varied from 92 per cent. to 97 per cent., whereas the three rows of seed treated with hot water at 125 deg. Fahr. registered 65 per cent., 62 per cent., and 63 per cent. It is to be noted that in the treatment the seed was not immediately cooled after treatment. Small subsidiary experiments were later carried out at the Department which proved that when the seed is cooled by quenching in cold water immediately after taking from the hot then the reduction in germination is not significant. The effect of such procedure on the effectiveness of the treatment has not been demonstrated in this series of experiments.

The amount of infection found in the rows is shown in Table V.

TABLE V.

Treatment.	Percentage Infection.		Relative Infection on Scale Average Untreated Infected = 100.		Average.
	Roma.	Allora.	Roma.	Allora.	
Bluestone	0	0	0	0	0·7
Bluestone	0·6	0	2·8	0	
Bluestone subsequently infected	1·6	0·8	7·4	11·2	9·3
Bluestone kept	0	0	0	0	0
Bluestone kept	0	0	0	0	
Free untreated	0	0	0	0	0
Free untreated	0	0	0	0	
Infected untreated	15·5	5·7	71·6	81·5	81·5
Infected untreated	25·0	4·0	115·0	57·0	
Bluestone lime	1·2	0	5·5	0	3·9
Bluestone lime	0	0·7	0	10·0	
Formalin	0·6	0	2·7	0	0·7
Formalin	0	0	0	0	
Formalin subsequently infected	4·3	1·9	19·8	27·2	23·5
Free untreated	0	0	0	0	0
Free untreated	0	0	0	0	
Infected untreated	21·0	10·6	97·0	151·0	106·9
Infected untreated	24·8	4·6	114·0	65·8	
Copper carbonate	8·5	3·0	39·2	42·9	85·4
Copper carbonate	14·2	13·6	65·5	194·0	
Copper carbonate subsequently infected	33·5	12·1	154·0	173·0	163·5
Hot water 125° F.	0	0	0	0	0
Hot water 125° F.	0	0	0	0	
Hot water 129° F.	0	0	0	0	0
Hot water 129° F.	0	0	0	0	
Hot water 125° F. subsequently infected	33·6	9·7	154·0	138·0	146·0
Free untreated	0	0	0	0	0
Free untreated	0	0	0	0	
Infected untreated	20·0	12·0	92·5	171·0	112·4
Infected untreated	24·0	5·3	110·0	76·0	
Tillantin R.	12·1	6·7	55·8	95·8	90·4
Tillantin R.	16·9	9·3	78·0	132·0	
Tillantin R. subsequently infected	38·8	17·2	151·0	246·0	198·5
U. T. 685	23·5	8·7	108·0	124·0	120·5
U. T. 685	20·9	8·2	134·0	116·0	
U. T. 685 subsequently infected	27·6	16·0	127·0	228·0	177·5
Average infected untreated	21·7	7·0			

TABLE VI.

SUMMARY EXPERIMENT II.

Relative infection on scale average infected untreated = 100.

—	Infected before Treatment.	Subsequently Reinfected.
Untreated	100·0	*
Bluestone	0·35	9·3
Bluestone lime	3·9	*
Formalin	0·7	23·5
Hot water 125° F.	0	146·0
Hot water 129° F.	0	*
Copper carbonate	85·4	163·5
Tillantin R.	90·4	198·5
U. T. 685	120·5	177·5

*No rows with these treatments subsequently reinfected were included in the experiment.

Hot water treatment for ten minutes at 129 deg. Fahr. appears to be the only absolute control of seed infection of this smut, having the further advantage of controlling all wheat smuts when carried with the seed. It has the disadvantages of impracticability under the conditions prevailing on the majority of wheat farms and of not controlling subsequent contamination.

Bluestone and formalin almost completely controlled the artificially heavy infection used in the experiment. Such seed would never be planted by an intelligent grower. These treatments would probably give practical control of the lighter infection usually present. Bluestone seemed to be the only treatment giving reasonable control of subsequent contamination. This is important since flag smut infection can take place from the soil.

Bluestone followed by lime appeared to be less effective than bluestone alone. The dust treatments were ineffective. Whether or not they will control light infections is now being tested.

Summary.

The outstanding results of the year's work are the confirmation in Queensland of the high degree of resistance of Nabawa and Florence which has been demonstrated in other States, and the demonstration of a similar or greater degree of resistance in promising Departmental crosses.

It has also been demonstrated that dust treatment of seed wheat is ineffective against heavy infections of flag smut. Probably the recent outbreak of flag smut would have been prevented had growers all regularly used the bluestone seed treatment. Copper carbonate has also been found by several experimentors to be ineffective against heavy infections of bunt.

OBITUARY.

MR. E. T. BELL, M.L.A.

The death of Mr. E. T. Bell, member for Fassifern in the Legislative Assembly, on 2nd May, removed from our midst a very fine personality and one who rendered good service to the State, both in peace and war.

In the countryside particularly he will be greatly missed, for probably no public man commanded such general respect, or enjoyed more genuine popular esteem. Round about the district he represented in Parliament for seventeen years, his loss is most deeply deplored, for there his genial, kindly nature and his many acts of disinterested and neighbourly kindness, his loyalty to the things we value most highly in public and private life were widely known and appreciated, and will long be remembered. His standards were high and measured up to lofty ideals of public service. He was content to give of his best to his native State, both as a pastoralist and a Parliamentarian, and during the great war he served Australia as a commissioned officer in the Navy.

The late Mr. Ernest Thomas Bell was born at Camboon, on the Dawson River, on 31st March, 1880. He was a son of the late Mr. J. T. M. Bell, a native of the Hawkesbury district of New South Wales, who was one of the early pioneers of the pastoral industry in Queensland, owning Coochin Coochin, Wallabella, Camboon, and Combargno Stations. He was educated at the Ipswich and Toowoomba Grammar Schools. Following a period of training on Coochin Coochin he became manager of Combargno Station, in the Roma district, holding that position for about three years—until, in 1903, on the death of his father, he returned to the home station and administered the affairs of all the properties of the late Mr. J. T. M. Bell, to which Planet Downs Station was subsequently added. At the by-election for Fassifern in 1913 the late Mr. Bell, in response to a widely supported request, offered himself as a candidate, and won by no fewer than 1,566 votes. Since then he had been re-elected at each general election. In 1910 he married a daughter of the Hon. W. F. Taylor, M.D., of Brisbane, formerly a member of the Legislative Council of Queensland, who, with several children, survives him.

The Acting Premier (Mr. R. M. King), on behalf of the Government, expressed profound regret at the loss through his untimely death of so valuable a member of the party as Mr. Bell, who, he said, was held in the highest esteem by both sections of the House. His genial and kindly nature endeared him to everyone, political friends and Opposition alike. Mr. Bell was a very useful member of the House; his knowledge of land and pastoral matters was of the utmost assistance to the Government, and his broad grasp of matters generally affecting the welfare of the State was also most useful to members of the Government.

"I regret the passing of Mr. Bell, who was a personal friend of mine for many years. The public life of Queensland is much the poorer for his loss," said Mr. King, who added that he was conveying the sympathy of the Cabinet to the widow, family, and relatives.

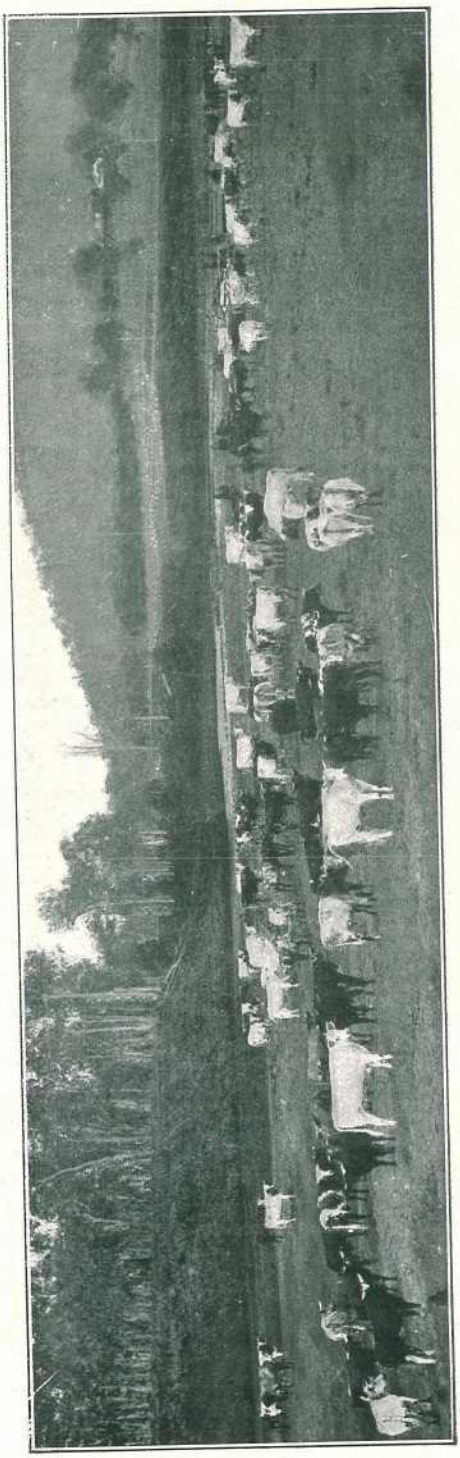

PLATE 76.—CATTLE COUNTRY, WEST MORETON, QUEENSLAND.

SHEEP ON THE COAST.

ADVICE TO FARMERS.

By J. H. HODGE, Instructor in Sheep and Wool.

AS a golden rule I would lay it down that the farmer must first learn that he has to choose a breed of sheep suitable for his country. It does not follow in the least that because a farmer in one locality has been successful with a certain breed of sheep, another farmer in a different place is going to do equally well with that breed. The right choice of a breed (possibly crossbreds) spells the difference between success and failure.

It may be taken in a general way that the pure merino is not suitable for farmers' sheep in the localities of which we are speaking, nor in districts where the rainfall is excessive.

Fat Lambs.

It must be borne in mind that the production of wool in farmers' flocks on the coastal areas is purely of a secondary consideration. Farmers should concentrate on fat lambs maturing at five and six months of age, and in this connection it is always advisable to have available some fodder crop so that the lambs come right away from the time of birth without a check.

It is desirable also that when choosing a breed the farmer should keep in mind the consequences of a bad season. That is, it may happen in a certain season that his lambs are not fit to market. In the selection of the right breed in this case the ewe lambs can be saved as future mothers in the flock, and the wether lambs (as wethers) fattened as opportunity offers.

The Right Flock.

Having selected the right breed, then (and in this case I would strongly urge the farmer to get the advice of the officers of the Department of Agriculture and Stock) it is essential to success that the prospective owner find the right flock. Here again official advice might be sought.

Having settled on a line and purchased, it is strongly urged that the sheep be drenched twice within eight days for stomach worms straight away. There are many prepared proprietary drenches on the market with full instruction as to dilution and application. If one of these drenches is proposed for use, it may be well for the farmer to write the Department, when advice will be sent as to whether such drench is suitable or otherwise. The Department recommends a drench, and full particulars as to ingredients, preparation, and method of application to the sheep can always be had on request. Let it be understood that the Department is on all occasions out to help the farmer with sheep, and let it be urged that the farmer make full use of the facilities provided.

Farmers' Wool.

With regard to the wool from the flock, the Department has an excellent scheme by which the farmer is assured of full value for his wool. All that is necessary at shearing time is for the farmer to send his clip unskirted to the Department, advising the Under Secretary of despatch.

Locks and bellies should be kept separate. All the rest of the wool may be baled and sent in as it comes off the sheep's back. A charge of 10s. per bale is made. It does not matter how small the parcel of wool is. Highest prices are assured, for under this scheme all small lots (or stars) are eliminated, as far as possible, and the wool is offered in the main catalogue. The scheme is available to all owners of 1,500 sheep and under.

The Cross Required.

In those parts of the coastal lands with a rainfall of over 45 inches, I would like to see farmers form their flocks with a Romney Marsh-Merino cross, the progeny of the Romney ram, on the big bold strong type of merino ewe. There is at present in Queensland great difficulty in getting the type of ewe required, but I have reason to believe that, in the near future, there will be available supplies of ewes (bred on the lines recommended) for the farmer.

Too much importance cannot be attached to this recommendation—i.e., the right ewe. In cases where farmers are already breeding with more or less success from the Merino, I would urge them to introduce a Romney Marsh ram with the idea of saving their ewe lambs as the basis of a future flock.

The Corriedale is a comparatively new breed, but has already proved itself an ideal general utility sheep where local conditions suit it. It grows a strong bulky fleece of commercial value, and the ewes are great mothers. I consider there is a great opportunity for some farmer to breed a pure flock of Corriedales in these areas, with the object in the near future of supplying other farmers with purebred stock.

If fat lambs are required with the Corriedale ewe as the basis of the flock, I would recommend the introduction of the Border Leicester or Dorset-horn ram. Both crosses throw fine early-maturing lambs, but in this case care would have to be exercised in seeing that the whole crop was ready as fat lambs.

The Main Handicaps.

The two main troubles in connection with sheep in these parts are likely to be stomach worms (already referred to) and dogs, both wild and domesticated.

If the paddocks where it is intended to run the sheep are not netted against dogs, yarding at night and a careful watch by day will have to be resorted to. Careful handling on all occasions is essential, and the sheep should be in the yard for as short a time as possible. It must always be remembered that although the breeding is a very fine thing, there is a true saying that "half the breeding goes down the throat." In choosing a position for the yard be careful to see that it is on high well-drained land, as well sheltered as possible. This advice refers, too, to the drafting yard, which in all probability would be part and parcel of the "sheep fold" or night yard.

Should ticks or lice appear in the flock, advantage should be taken, where possible, of any dip which has been freshly prepared and before any cattle go through it.

Dips.

The cattle dip is not ideal for sheep on account of the tarry substance contained, but the sheep will stand the strength, and in small lots, and with the exercise of care, sheep may be put through with advantage for the purposes mentioned. Should the flock be large enough to warrant a dip, or could neighbours combine for the purpose, it would pay well to erect a cheap dip. These can be purchased (metal) in different lengths at different prices. Where small numbers are handled the cost of yards and dip should not be great. The dips recommended are well known, and full instructions are given with the material. In this case, again, if in doubt, consult the Department.

A shower dip suitable for a small owner can be very economically erected. This consists of a cement base built with a suitable fall to one corner in which is a cement well sufficiently deep to allow a pump to be used for the purpose of pumping the liquid back again to the tank. The top is perforated and a hand pump of sufficient strength is used. The sheep are gently crushed into the dip under the shower and the pump set to work. This shower dip is quite successful even with large flocks, and has the great advantage that even ewes heavy in lamb can be operated upon without injury. The cost to a farmer should be comparatively small. About six minutes under the shower and four minutes draining should prove satisfactory.

Fat Lambs.

Where a crop of fat lambs is the object of the farmer the greatest care should be taken to see that the lambs suffer no check from birth to market. For this purpose a fodder crop is urged.

Where it is possible to grow lucerne, nothing can beat it, and the farmer is recommended to grow this on any well-drained area where it has been proved, or to try it in an economical way even if none has been previously grown.

Lamb-marking (or castration of the ram lambs) forms one of the operations. This should be done with the greatest care and cleanliness, and should be carried out when the lambs are from a fortnight to a month old. A recognised antiseptic should form part of the equipment at marking time, and the knives and earmarkers frequently dipped in same. The yard itself should be clean, and all old wools, refuse, &c., burned. This is a precaution against tetanus or lockjaw. The operation itself should be conducted by a man of experience, and here again the Department is prepared to send an officer to give a demonstration.

The farmer should register an earmark. After the testicles are removed (and it is recommended to draw them with the teeth) and the earmark put in, the tail is docked about two inches from the rump. Great care has now to be exercised in the application of a preparation to the wounds. The substance used should be both curative and antiseptic.

A good dressing may be made from Stockholm tar, fat, and dip. Heat the tar and fat in equal proportions together and add the dip. Apply the dressing with a swab (on a stick) to the purse and tail.

Care after Marking.

After lamb-marking the lambs should be carefully examined daily to see that they have not been attacked by blowflies. Should such be the case all maggots should be removed, wool shorn from the affected parts, and the wounds again dressed with a solution of sheep dip or some other preparation recommended for the purpose. When sending lambs to market drive as slowly and carefully as possible. Never load the lambs in a heated condition.

Lambing Time.

With regard to the time for lambing in these coastal lands, June, July, or August are recommended as the most suitable months. With no check in the lambs, this should insure marketable lambs towards the end of the year, when the price can generally be relied upon to be the best. This would mean mating the rams in January, February, and March. In this connection, it is interesting to note that the long-wooled English breeds are shy breeders except at their own particular season. Our Australian Merinos, on the other hand, will mate at any season of the year.

Over a period of two years fat lambs have sold excellently in Brisbane from 15s. to £1 7s. 6d. per head. With the fleece, and taking it on a basis of 75 per cent. lambs, I do not think I am unduly optimistic in saying that a farmer should nett at least £1 per ewe, and probably, at present prices for lambs, more.

It is advisable where the sheep are not doing well, or some soil deficiency is proved, that the sheep be given a lick. Nauru phosphates and salt (not too coarse) in equal parts with the addition of, say, 1½ oz. iodine to the 100 lb., is a suitable lick. In addition to toning up the flock generally, a proportion, in the form of phosphoric acid, finds its way back to the land with benefit to the pastures.

Fat lambs intended for market or export should never be weaned. Straight from the teat to the block is the maxim in this trade. The ideal weight for a lamb at, say, five months is from 33 to 37 lb.

CARE OF THE CAR.

MACHINERY MANAGEMENT.

THE traveller through country districts of Australia, who happens to have any knowledge of machinery, is invariably amazed at the rough treatment meted out to all forms of machinery used in the Australian country.

Many years ago, when the horse was the farmer's chief assistant, the farmer who was not a good horse boss was somewhat despised by his neighbours. Unfortunately there is no such feeling with regard to machinery, and it is the general rule to see all sorts of machinery badly abused in the country districts of the State.

Admittedly no discomfort is caused to any living thing because a tractor goes unhoused all through a wet winter, but it is a fact that the pocket of the owner is badly hit when machinery is abused or neglected.

The motor car together with other machinery on the farm, comes in for its share of abuse and neglect and since the car is both an expensive and comparatively delicate piece of mechanism, its abuse and neglect costs the owner very dearly.

The Garage.

Any car, no matter how cheap, is worthy of a weatherproof garage. A building with wooden walls and a galvanised iron roof can be erected for a few pounds and it will save its price in twelve months.

The garage should be a complete building, however, and not a half-built shed with only a roof and one or two walls. It is not at all unusual to see a good car stabled alongside a house or a shed with possibly a few sheets of iron above it to keep off direct rain but without walls, thus the car is continually

exposed to wind and moisture, and very often to the sunlight. If the owner of such a shed is approached and asked why he does not build a better one, he will almost invariably excuse himself with a story about shortage of cash for such improvements. The writer has no hestitation in saying that the man who cannot afford a decent shed for his car cannot afford a car.

The ill-effects of leaving a car in the weather continuously are that the paint-work perishes, the tyres perish, the woodwork shrinks, the upholstery and hood perish, the body rusts, and in fact, all steel parts rust, and the electrical wiring perishes. In short, the car quickly becomes a shabby wreck.

What has been said about the effects of neglect on the car applies also to the tractor, harvester, plough, or other farming machinery.

The reader who doubts the value of thorough care for machinery should do a little calculating as to the cost per annum of his machinery, motor-car included. He will readily see that by doubling the life of his plant he can save himself a few pounds a week.

To take proper care of the car a good supply of water should be available, and the bodywork should be washed at least once a week in order to remove mud and dust that might otherwise become almost a permanent portion of the car. Water supplied through a hose is the ideal supply for washing the car. Unfortunately many properties in country districts are lacking in a suitable source of water supply, but wherever there is a good well available a small pumping plant and a water reticulation scheme around the home is a wonderfully profitable investment.

The Repair Shop.

Many car owners to-day never touch their cars to do repair work, but prefer to leave it all to the local garage. This policy is probably a good one for the city man, but every farmer should be something of an amateur mechanic, as the modern farm has far too much machinery upon it not to require the care of an owner who knows something of machinery.

The first essential to a small workshop is a decent bench and vyce. The bench should be at least 6 feet long, 2 feet wide, and be supported by at least six legs of 3-inch by 3-inch or larger material.

The top of the bench should be made of timber at least 2 inches thick and to this top a good vyce should be screwed. A most serviceable type of vyce is one with 3-inch parallel jaws. The vyce should be arranged so that the top of the jaws are at about the same height above the floor as the elbows of the man who is going to use it.

A row of shelves at the back of the vyce, divided into compartments for nuts, bolts, screws, small tools, &c., is very useful. These shelves should contain the following tools:—Two 10-inch flat files, one rough, one smooth, a ½-inch round file, and a small triangular file, also an engineer's hammer with a 1¼-lb. head, together with a selection of cold chisels and punches is absolutely necessary.

An assortment of reliable spanners is essential. A full set of both box and block spanners suitable for car repair and general work should range from three-sixteenth inch to five-eighth inch. Larger nuts than this size are comparatively rare, and a big screw wrench should suffice for handling the few that are met with. When buying spanners it is always advisable to buy the best, as the jaws of an inferior article are always liable to spread or break. The tool kit should also contain a variety of good screwdrivers, a pair of footprints, a pair of snips, a medium-sized soldering iron, a hacksaw and blades, and, last but not least, a small breast brace, together with a set of drills and a small emery wheel to grind the drills.

The tools mentioned are only a nucleus for a much larger kit which the amateur mechanic will purchase soon after he begins to take an interest in his repair work. Such tools as a forge, an anvil, a blow lamp or a large drilling machine are extremely useful in the hands of those who have some idea how to use them.

It does not need a very keen observer to realise that farming has been mechanised, particularly wheat-farming. It follows naturally that the good farmer must be a good amateur mechanic, as he has a car and much other machinery to care for. On every hand one hears the slogan "grow more wheat." The farmer realises that he must have a reasonable profit and to obtain this the wheat must be produced economically. No doubt there are numerous ways of doing this, but at least one way is to take more care of the farm machinery and so reduce expenditure on plant.—"RADIATOR," in "The Farmer and Setttler."

CLIMATOLOGICAL TABLE—APRIL, 1930.

SUPPLIED BY THE COMMONWEALTH OF AUSTRALIA METEOROLOGICAL BUREAU, BRISBANE.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·94	85	..	86	23,26	..	..	190	11
Herberton	..	76	59	80	1,9	56	15,26, 27,28	129	9
Rockhampton	30·04	84	63	87	25	53	27	193	6
Brisbane	30·08	78	60	84	25	55	13	225	9
Darling Downs.									
Dalby	30·09	77	51	83	1	37	27	198	7
Stanthorpe	..	70	47	80	3	33	27	387	11
Toowoomba	..	68	50	78	3	39	27	258	7
Mid-interior.									
Georgetown	29·93	91	62	94	9,11	56	12,28	..	..
Longreach	29·99	89	62	95	4	53	11,12,26	3	1
Mitchell	30·07	80	52	86	1,7	38	27	99	4
Western.									
Burketown	29·93	91	68	96	2,9	59	13	..	..
Boulia	29·97	90	60	97	21	51	27	..	..
Thargomindah	30·05	82	59	94	22	51	25	10	2

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING APRIL 1930 AND 1929, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	April.	No. of Years' Records.	April, 1930.	April, 1929.		April.	No. of Years' Records.	April, 1930.	April, 1929.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	4·30	29	0·53	5·52	Nambour	6·25	34	3·61	19·42
Cairns	11·71	48	4·73	3·78	Nanango	1·92	48	0·72	4·47
Cardwell	9·15	58	1·01	2·37	Rockhampton ..	2·84	43	1·93	8·98
Cooktown	8·90	54	1·90	6·53	Woodford	4·56	43	1·66	8·84
Herberton	3·95	43	1·29	0·99					
Ingham	8·15	38	3·07	5·10					
Innisfail	20·41	49	5·81	4·32					
Mossman	9·02	17	1·15	4·29	*Darling Downs.*				
Townsville	3·54	59	0	2·50					
					Dalby	1·30	60	1·98	2·96
Central Coast.					Emu Vale	1·26	34	1·29	2·31
					Jimbour	1·32	42	0·65	2·24
					Miles	1·43	45	1·04	4·59
Ayr	2·68	43	0	6·23	Stanthorpe	1·68	57	3·87	3·80
Bowen	2·88	59	0·12	10·08	Toowoomba ..	2·54	58	2·58	4·96
Charters Towers ..	1·63	48	0·11	2·17	Warwick	1·65	65	0·61	3·53
Mackay	6·62	59	2·90	14·10					
Proserpine	6·25	27	2·28	12·29					
St. Lawrence.. ..	2·98	59	0·39	9·55	*Maranoa.*				
					Roma	1·33	56	2·67	5·84
South Coast.									
					State Farms, &c.				
Biggenden	2·19	31	0·76	9·05					
Bundaberg	3·17	47	0·98	7·25					
Brisbane	3·75	78	2·25	9·84	Bungeworgorai ..	1·28	16	2·02	6·42
Caboolture	4·37	43	1·63	10·25	Gatton College ..	1·80	31	2·71	4·37
Childers	2·89	35	1·93	7·65	Gindie	1·25	31	0·40	2·05
Crohamhurst ..	6·65	37	3·42	16·66	Hermitage	1·36	24	..	3·44
Esk	3·05	43	2·11	8·27	Kairi	4·28	16	0.12	0·90
Gayndah	1·41	59	1·20	5·23	Mackay Sugar Experiment Station ..	5·26	33	1·14	15·45
Gympie	3·44	60	1·06	9·92	Warren	1·84	15	..	9·36
Kilkivan	2·23	51	2·22	8·41					
Maryborough ..	3·77	58	2·70	12·75					

GEORGE G. BOND, Divisional Meteorologist

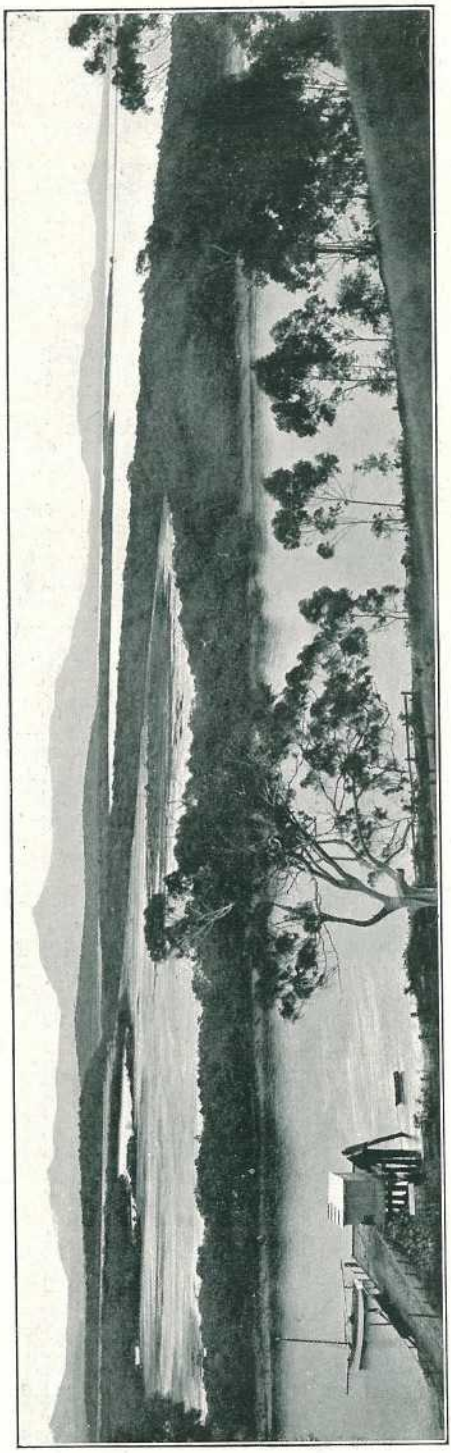

PLATE 77.—THE NARROWS AND MOUNT LARCOMBE, NEAR GLADSTONE, QUEENSLAND.

RURAL LIFE IN OTHER LANDS—XIII.

By the EDITOR.*

RAMBLES IN RURAL ENGLAND.

THESE notes are in the nature of a very brief review of experiences, impressions, and some observations gathered in the course of an unforgettable tour through some of the stock-raising and agricultural counties of England. The object of the tour was to continue a study, at first hand, of the principles, practice, and progress of pedigreed stock-breeding in the United Kingdom, as well as to observe British methods of general farming.

Though there was no lagging by the way, plenty of time was taken for careful observation and the sifting and assimilation of noteworthy facts. Each breeder visited was met amid his own herd or flock and his stock studied at close quarters on their home pastures.

While the tour was, primarily, one of observation and inquiry, one's happy experience was the meeting with farmers of the Old Land socially, as well as otherwise, and the resultant mutual removal of many misconceptions regarding personality, climate, stock breeding and rearing methods, and farming practice of our respective countries.

The Charm of the Old Land.

The good will and hospitality of English people encountered daily made one's comings and goings in beautiful rural England extremely pleasurable as well as profitable.

Perhaps one of the most useful experiences, apart from those of technical value to one hitherto unfavoured, was what one might call the "discovery" of England. Early impressions are gathered, as we all know, from what we read and hear. One had heard, for instance, that England was just a little wet island poked away somewhere up in the North Sea. England can be wet and England can be cold. England can also be warm and sunny and the year I spent there was one of a wonderful summer. It was a year in which one saw the splendid procession of the seasons, the clear definition of the one merging into the other; Nature's reawakening in the spring after her long sleep through the snows of winter, her arraying herself in the raiment of a glorious summer, and then the golden autumn and her triumphant progress through the time of harvest—a harvest that ripened that year into a generous fulfilment—to rest once more after the labour of her reign.

That year one was able to feel the charm of the Old Country in every seasonal mood, in the Cornish Riviera as well as on the bleak uplands of Northumberland; on the Sussex Downs and Surrey Hills as well as in the wolds of Yorkshire and the dales of Durham, and one learnt to appreciate profoundly the depth of the Englishman's love of England, equalling, perhaps, that of the Australian's love of Australia.

That year one was to meet for the first time, perhaps, the country Englishman of every social grade—the old time lord of the manor, now giving place to men of a new regime, and whose passing is not entirely unregretted by those who appreciate the part he has played in building up British agriculture; then there was the yeoman; and lastly the farm labourer, usually a very good man at his job. Their generous hospitality, friendliness, straight-forwardness, and all-round fine character made our temporary association, for us, one of the utmost pleasure.

Through Lincolnshire.

Our first halt was at an exceptionally well-managed property of 1,000 acres about 2 miles from the city of Lincoln. There was seen a noted herd of Lincoln Reds, a very fine breed of cattle already well known in Queensland. It seemed, however, that the breeder had to some extent sacrificed body in order to maintain his herd's milking characteristics. All had been bred true to colour and type, and, of the females, over 50 per cent. were 1,000-gallon cows.

After some time visiting places of historical interest and some famous industrial plants in and around the city of Lincoln, steps were turned northward through Market Rasen, Brocklesby, Coxhill Ferry, and across the Humber to Hull, where one had an opportunity of seeing something of the commercial greatness and the shipping facilities of that important seaport. It was interesting to learn that Australian wool is now conveyed through Hull direct to Bradford and other manufacturing

* In a Radio Talk from 4QG.

centres by water, and that, generally, docking and shipping facilities had been designed towards stimulating oversea Dominion trade.

The way through Lincolnshire provided many delightful scenes in a typically English countryside. There were many views of level lands well cultivated; of hills and dales interspersed with woods and fields of richest green. Shorthorns as well as the county breeds were running on many pastures.

In Yorkshire.

Continuing northward from Hull, Leconfield was visited. There mixed farming, of which the breeding of the famous Lincoln sheep was the main feature, was followed. The flocks were distinguished by big frames carrying heavy wool and would be a picture and a delight to the classer, freezer, and fancier. The rams for growth, conformation, and constitution were fit to be shown anywhere.

Two-year-old stud rams clipped, one was informed, an average of 30 lb. at the previous shearing. The ewes were true to type, well-grown and well-culled. The lambs were well-covered and, as a result of scientific feeding, lambing returns showed a remarkably high percentage. Altogether the outstanding qualities of Lincolns and Leicesters were very evident, the breeders' efforts being directed to meeting the requirements of the South American market for stud sheep.

On one farm one point in rearing calves, all fashionably bred of course, was especially noted. The breeder had made it a practice to keep in three cows in full milk, and on each of these cows three calves were reared. This was claimed to be a profitable plan from the point of view of the stud breeder catering for a strong oversea demand for his yearly crop of calves.

Horses, like every other animal on these holdings, showed blood. Shires were favoured in the heavy class and the two-year-olds and yearlings, all fashionably fathered, showed quality in every feature.

Pig-breeding was only a side line with some farmers but great care, so characteristic of English stock management, was extended also to this branch. Berkshire-British Black was the favoured cross and the progeny, as shown on farm records, proved most profitable at prices that, to the Australian, would seem only possible in the pig-raisers' paradise. Of the 640 acres in one farm seven-tenths were under fodders and cereals, and the balance laid down to pasture. The carrying capacity was rather more than an animal to the acre—a triumph, surely, of good farming. The improvements were modern. Seventeen hands were employed on the place and every labour-saving device, both in machinery and farm lay-out, from easy gate fastenings to motor tractor, was used.

This farm showed, further, that social amenities need not be sacrificed for a life on the land. The homestead, tree-embowered, ivy-clad, and set in velvety lawns proved also a centre of hospitality—genial, generous, and genuine—an impressive characteristic of so many homes in rural England.

Near Driffield, in the East Riding of Yorkshire, one was to meet with a hearty welcome from an enthusiastic Leicester flockmaster. In his sheds every beam and partition was adorned with prize certificates of every important agricultural and stock society in the United Kingdom. His sheep were excellent types of an excellent breed. The ordinary flock, noted descendants of Scarborough flocks, showed every characteristic of type more or less marked, but seemed light in shank for their great weight.

It was the practice on this farm to yard lambing ewes at night prior to lambing. They lambed in the yards where each ewe (they were valuable breeders, of course) received individual attention. The ewes and lambs were put on grass, those with two lambs being hand-fed, in addition, on roots. On this and other farms visited the usual practices necessary where winter conditions are rigorous were followed. Housing and hand-feeding were naturally included in the annual routine. What impressed one forcibly was the utmost care and attention given to the live stock generally. Farm animals, particularly sows, were given individual attention during their hours of trouble.

Our more genial climatic conditions in Queensland make it unnecessary at the moment to go into detail in regard to this aspect of English stock-raising practice. The careful and scientific feeding of stock was, however, an outstanding feature and, in this connection, I heard breeders both in England and Scotland, declare again and again that half the breeding of an animal goes down its neck. What struck one particularly was the immense carrying capacity of these English farms. On this holding of 1,100 acres were carried 1,100 sheep and 150 head of cattle. Of that area 800 acres were under the plough or in fallow. The farm was self-contained and the rotation usually followed was:—Seeds, wheat, barley, and manure; then roots, oats, seeds, top-dress.

In a wonderful old-world garden the preparation of soil scientifically was demonstrated and in an adjacent hothouse one found a home reminder in a healthy Australian blue-gum sapling strongly scented.

A Stock Farm in Durham.

At another place in Durham, Shorthorn cattle held pride of place, followed by Leicester and Oxford Downs sheep. This breeder's stock held an unbeaten record and many are numbered among Herd Book classics. His exports of both cattle and sheep to Canada and Australia have sustained that record, and their progeny are known in the principal show rings of both Dominions. The best cattle families in the United Kingdom were represented in the herd, though the Scottish blood predominated. Booth and Duthie blood was particularly noticeable, and the bulls looked equal to surviving any critical test. The youngsters particularly showed strongly every point of their breed and it was noticed that yearlings were still sucking. One already sold for 2,000 guineas was still drawing nourishment from its mother. The principle followed in this respect is that calves (that is for stud animals) should be allowed to suck while they will. The chief herd bull was a magnificent white of the "Myrtle" family, a particularly fine animal and his stock was in great demand. All the bulls, in fact, would arouse any stockman's enthusiasm. One animal had been sold as a yearling to a New South Wales buyer for 1,000 guineas. Another 15-months-old animal seen had already been sold to America for 2,000 guineas, while the whole herd had produced a long line of champions and 2,700 prize winners. On this farm were seen some of the finest stock, judging by show records, in Britain—good coloured typical Shorthorns built close to the ground and perfect in top and under lines. This breeder believed in family variety, and generally retained two animals or more of each family in order to keep the continuity of each in his herd. Fresh infusions were drawn largely from the famous Collynie Stud at Aberdeen.

Running calves with their mothers was not practised by this breeder. They were kept away from the cows except at feeding times, when they were allowed to obtain nourishment from their mothers or foster mothers. If the calves did not take all the milk, the cows were stripped to secure an even milk flow and retain their shape of show. The cattle were not rationed, but a sufficiency of artificial food—crushed oats and linseed cake—was always available. This breeder regarded milk as the cheapest food, for no labour is required in its feeding, and his idea as a stud breeder, of course, was that calf-rearing is more profitable than dairying. He aimed to rear five calves on a single cow, regarding this as possible. That, he told me, was a long way better than bucket-feeding, and the youngsters never go back in steady development.

He never picked his animals until they were seven or eight months old, for his experience was that the youngsters' critical period, or the time when their good points are not likely to be evident plainly, is from three to eight months.

A small flock of Leicester sheep on this place also aroused admiration. Strong in bone, they bore their very great weight somewhat better than those previously seen.

Here again was an object lesson in sound farm management and practice. Every acre of the 230 comprising the holding was returning a profit. Prosperity was evident and all the comfort of an English yeoman's home was apparent. Economy was the keynote. To each member of the household had been allotted the care of a particular department. Pigs and poultry, though sidelines only, also received as much care relatively as the pedigreed cattle.

[TO BE CONTINUED.]

INCUBATION.

By P. RUMBALL, Poultry Instructor.

SEASON TO INCUBATE.

This is perhaps the first phase that should be considered. Although incubation may be successfully practised throughout the year, the results obtained from the birds hatched is not always satisfactory. About the best months for hatching are July, August, and September. Heavy breeds hatched in June and light breeds in the early part of October will in some people's hands prove satisfactory. Chickens of any variety hatched in February or early in March also thrive, but unfortunately they commence producing during the period of plenty and generally moult at about the same time as birds which have done twelve months heavy lay.

The frequent fault of poultry raisers is to hatch in the latter part of October and sometimes November. Stock hatched then rarely thrive, and also take longer to mature than early hatched birds, with the result that their production period commences with the fall in prices of eggs.

Selecting Eggs for Hatching.

Care in the selection of eggs which are to produce the future layers should be exercised. They need to be selected for (*a*) size, (*b*) shape, (*c*) texture of shell, and (*d*) colour.

Although like does not produce like with any degree of certainty, constant selection along these lines tends to fix the qualities aimed at. Size is undoubtedly an inherited quality and one of the features which has an important bearing on successful poultry raising. Breeding birds should be selected early in life for size of egg, as it is only by this means that a strain of fowls can be built up which will lay a good marketable egg early in their pullet year. Do not be content with just using 2-oz. eggs. Aim at eggs which will average about 26 oz to the dozen. Although shape does not materially affect the value of eggs, a uniform article is desired for marketing. Shape, however, has a certain influence on successful incubation. With incubators, as a general rule, the higher the tray or eggs the greater the heat, therefore, if some plump eggs are set at the same time as rather long thin ones the hatching would be irregular owing to the greater heat received by the roundish eggs, they being higher on the tray. Texture of shell varies considerably with the feeding and general conditions of the stock, but it is also possible for this feature to be hereditary. Apart from this, uniform shell structure makes for improved hatches. Colour is not an important feature in Queensland in regard to sales, but from light breeds white-shelled eggs should be produced, tinted eggs being an indication of impurity of breed.

Keeping Eggs for Hatching.

Eggs for hatching purposes should not be kept for a longer period than ten days. If they were set when five days old better results could be expected than when ten days old. It is, however, necessary to keep them sometimes longer than five days and sometimes even longer than ten, therefore they need to be kept under the best of conditions. A uniform cool temperature is desirable, slightly under 60 degrees if possible. The room where they are stored should be dry and not moist. Although fresh air is desirable, direct currents with their drying effect are detrimental to good results. They may be stored on racks or in straw board filters. Where any numbers are to be kept they could be held in egg cases similar to those used for market purposse. The turning of them daily is essential when they are to be retained for any time. This is a simple matter if stored in cases, it being merely necessary to turn the case one side one day and the other the next.

Period of Incubation.—Hen eggs 21 days, English ducks 28, Muscovy ducks 34 to 35, geese 28 to 30, and turkey 30.

METHODS OF INCUBATION.

Incubation may be practised either by natural or artificial means. The necessity of having birds hatched at the most remunerative period and the constant improvement in our commercial breeds of poultry makes it increasingly difficult for the poultry raiser who desired to keep a 100 or so good laying hens to use the broody hen.

Natural Incubation.

The Sitting Hen.—Generally, when the hen is used for incubation she finds her own nest. The best plan is to allow her to continue using it, merely protecting her from rough weather. Her eggs, however, should be removed and replaced with eggs

which come from the best of your stock. As she is expected to remain on the nest for a period of three weeks and will not make full use of dust baths, she should have a good dusting with some insect powder to destroy any lice. She should also have another dusting a few days before the chickens are due.

Red mite are possibly one of the most common and irritating parasites which trouble poultry. They multiply very rapidly when unchecked, and a sharp lookout should be kept for their presence, for if allowed to infest a broody hen the irritation will often cause her to leave her nest. Scaly leg is also a condition which is undesirable in the broody hen. The number of eggs to be used will naturally vary according to the size of the hen. The hen turns the eggs under her at frequent intervals, and when there are too many for her to cover properly those that get on to the outside of the nest will become chilled, resulting in the destruction of the embryo. The hen should be fed exclusively on a grain ration and have plenty of grit and water available. The best results will then be obtained by leaving her as much as possible to herself after giving attention to the foregoing particulars.

Artificial Incubation.

There are many reliable makes of incubators on the market which are sold with instructions for working. These instructions should be followed by the operator as they are prepared after tests made by the manufacturer. There are, however, features which apply in a general way to most makes.

Location of an Incubator.

The incubator should be set up in a room in which there is as little variation in temperatures as possible. If a special room is to be built it should have two roofs with a space of 5 inches or 6 inches between them. The outer overhanging several feet on all sides. This is better than a good ceiling as it allows of a constant current of air and at the same time keeps the direct rays of the sun off the walls. Ventilation should be provided by windows in the walls and vents in the inner roof. These can be operated according to the number of machines working in the room and the outside temperatures. Direct drafts, however, should be avoided. Where it is not desired to go to the expense of building a special incubator room, an enclosure can be made under the majority of the dwelling houses in Queensland. If it is situated under the centre of the house it is well protected from the sun, and the temperatures are therefore fairly uniform.

Heating of Incubator.

The majority of incubators are heated by kerosene lamps. The lamp should always be thoroughly cleaned, the burner boiled in soda water, and new wicks used for every hatch. In starting do so gradually. If a large flame is used for a start with the idea of heating the machine quickly it frequently leads to the smoking of the lamp. A good grade oil should always be used, and in adjusting the flame turn a little higher than required and then reduce to the desired height. This ensures that there will be no running up of the wick.

The lamp should be cleaned and filled early in the afternoon. By doing this all char of the wick is removed, giving greater heat during the cold night and at the same time it gives the operator the opportunity of making sure that the lamps are correctly adjusted before retiring for the night. Do not trim the wick with scissors, use a match to rub off the charred crust, and thoroughly clean the hands before handling eggs, otherwise the eggs may become smeared with oil with the resulting injury to the growing embryo.

Beginning of Hatch.

Heat up the machine a couple of days before it is desired to set eggs, and after the machine is thoroughly warmed up commence to adjust the regulator until the temperature remains steadily at 102 degrees Fahr. with the bulb of the thermometer on a level with the top of the eggs. When the operator is sure that the regulator is correct the eggs can be set. This is better done in the morning so that the eggs will become warm and the machine again regulated before retiring. When the eggs are placed in the machine the temperature will drop, but the regulator should not be interfered with. All subsequent regulation should be done by the adjustment of the flame. Do not place too much work on any system of regulations; it has its limit of capacity to adjust temperature.

Thermometers.

All thermometers should be tested at convenient intervals. This can be done by any person having a clinical thermometer by placing the clinical and incubator thermometers in a basin of warm water gradually increasing the temperature until the clinical thermometer registers 102 degrees and observe the temperature of the incubator thermometer. If the latter registers a degree or so either way, allowance should be made by the operator for this discrepancy. Incorrect thermometers have been responsible for many poor hatches, and even though a new machine is just purchased do not take it for granted that the thermometers supplied are correct.

Temperature.

Temperatures are controlled by capsules or thermostat. Occasionally these get out of order by the former leaking and losing some of the liquid content or by the latter becoming bent. These should be examined particularly when regular temperatures cannot be maintained to ascertain if they are in correct working order. The temperature should stand at 102 to 102½ during the hatch when the bulb of the thermometer is hung as previously stated. During the latter period of the hatch (the last two days) the temperature may run up to as high as 104 degrees. This need not worry the operator as it is caused by the additional animal heat from the live embryo.

Turning.

Begin turning the eggs at about forty-eight hours after setting, and continue to do so twice per day until the nineteenth day unless the eggs are starting to pip. When the eggs are placed in an incubator tray, they should be placed on an angle of about 45 degrees large end up. To turn these it is necessary to handle every individual egg, but after testing and the infertile eggs are removed, they can easily be gently rolled around with the hand. A complete turn is not necessary, it being sufficient only to alter the position of the egg to prevent the germ sticking to the inner lining of the shell.

Cooling.

The cooling of the eggs is merely another method of giving the eggs a thorough airing with the consequent strengthening of the embryo. The necessity of airing varies with the make of the machine owing to the variation in the supply of ventilation. It is, however, important to remember that for the first seven days very little airing is required. The time taken in turning the eggs from the third to seventh day is usually enough airing. After this period the eggs can be kept out of the machine until all burning heat has left them. The period necessary will vary according to the length of time the eggs have been in the incubator, but after returning the eggs to the machine the temperature should have reached the desired height within an hour. In airing, place the tray of eggs on a table. Do not allow a portion of the tray to overhang, otherwise some may become chilled owing to the greater circulation of air. Airing should be practised up until the nineteenth day, but if eggs are then chipping they should not be aired.

Testing.

This should be done on the seventh day. It can be done at an earlier stage but the time necessary to do this work may result in chilling, and also the germ is not so easily distinguished particularly in dark-shelled eggs as on the seventh day. All infertile eggs and dead germs can now be removed. To test, a piece of cardboard having a hole in it similar in shape to that of an egg but a trifle smaller should be held between a lamp and the egg to be tested. An infertile egg will be perfectly clear, a fertile egg will have a dark movable spot about the size of the head of a match with numerous blood vessels radiating from it, while a dead germ will show as a blood ring or streak and generally stationary.

Ventilation and Moisture.

These are both interlocked. If a machine has a rapid circulation of air through it, it will require more moisture than a machine in which the circulation of air is slow. The reason why moisture is supplied is to prevent a too rapid evaporation of the moisture content of the egg. Undue evaporation of the egg content is detrimental to good hatches and to correct development of the embryo. Enlargement of the

air cell naturally takes place due to evaporation of the moisture content and the escape of carbon dioxide through the shell. This enlargement can easily be judged when testing, and if too great restrict the air circulation or increase the moisture content of the air. Many machines are supplied with moisture trays. These trays should be filled from the first of the hatch and refilled at frequent intervals. Where moisture trays are not supplied the air which passes into the machine is charged with a certain amount of moisture. To charge the air with moisture for this variety of machine the floor should be well wetted daily. Good ventilation is equally essential for the growth of the chicken within the egg as it is for the development of the chick when hatched. Without oxygen the changing of the egg content into a lusty chicken is impossible. If a fertile egg is examined on the seventh day a network of blood vessels can be seen near the shell and near the air cell. The blood stream not only converts the food into the embyro but it carries off the waste product (carbon dioxide), and without a good circulation of air this poisonous gas is not removed sufficiently fast, and consequently has a weakening effect on the developing embryo. It will be understood that the more advanced the embyro is the greater is the need of oxygen and the greater will be the amount of carbon dioxide given off; therefore, what will be the correct ventilation for eggs, say, a week old will not suffice when the eggs are in the third week of development. The increasing of the ventilation at this period will also assist in the regulation of the temperature of the incubator. Again, when the chicks hatch the ventilation should be increased, and if the chicks still pant the door of the machine could be slightly open and fixed in that position.

The Hatch.

After the last turning, on the nineteenth day, close the incubator and do not disturb it until the hatch is over. When the chicks have dried off give all the ventilation possible, darken the doors to prevent them picking at droppings or the toes on one another. It is as well to let them remain under this condition for about twenty-four hours, when they should be removed to the brooder. In doing so take every precaution to prevent them being chilled, as chills at this stage would prove disastrous.

Disinfection.

Immediately the chickens have been removed from the machine it should be thoroughly cleansed and disinfected. A good disinfectant is formalin. Any other good coal tar disinfectant may be used. The machine should then be closed up for a while to induce the fumes to penetrate every crack and corner, then allowed to dry and aired thoroughly before being used again.

RICE FOR POULTRY—SOME FEEDING EXPERIMENTS.

A five months' test of feeding paddy rice to poultry has just been concluded at the Government Poultry Farm, Seven Hills, New South Wales. Three groups, each of thirty White Leghorns as even as possible as regards age, condition, and general conformation, were fed for the evening ration as follows:—No. 1 Group, all rice; No. 2 Group, 50 per cent. rice and 50 per cent. wheat and maize in the proportion of two of wheat to one of maize; No. 3 Group, 75 per cent. wheat and 25 per cent. maize.

While the experiment could not be continued long enough for conclusive results to be obtained, the indications were that no harmful results followed feeding rice to the extent of 50 per cent. of the evening grain ration, and that the feeding of all rice for the evening feed had no ill effects on the health of the birds, though egg production suffered to some extent. The actual figures for the three groups for the five months of the test were:—All rice pens, 2,093 eggs; 50 per cent. rice pens, 2,322 eggs; wheat and maize (check) pens, 2,390 eggs.

Commenting on the results, the New South Wales State Poultry Expert writes that rice appears a fairly safe substitute at times of high feed costs, though at the present time all supplies have been used. Only a limited quantity of rice is likely to be sold as stock food, though larger supplies are likely to be available towards the end of the year.

MORTALITY IN YOUNG PIGS.

By E. J. SHELTON, Senior Instructor in Pig Raising.

The use of crossbred or mongrel boars and of breeding sows indiscriminately selected without any reference to their capacity to breed healthy, well-developed stock, is referred to fully in the following reply to an inquiry relative to a farmer who had suffered considerable losses from pigs dead at birth or born too weak to survive, and from sows that failed to breed or if they bred failed to make a satisfactory job of rearing their litters. The reply being of general interest is published in full.

It is evident that the breeding of your pigs is largely at fault. We do not recommend the use of crossbred boars at all at any time, for the results are invariably unsatisfactory, particularly where the boar and sows are closely related; especially is this the case where records of breeding are not kept and where the business is carried on on other than up-to-date lines. At any rate, there would be every possible advantage in culling your crossbred boar and replacing him with an animal of up-to-date type from a reliable stud. If we can assist you in securing quotations or in selecting a suitable boar, we shall be only too pleased to do so on receipt of your advice. We think that you would be well advised to cull the sows also, for they have evidently weakened as a result of the severe climatic conditions recently experienced in your district.

Possibly the feeding of your stock may be at fault, consequently in any treatment recommended we would suggest a change of food, and that attention be given to improving the quality and possibly the quantity of food used.

Faulty Feeding.

We have no record of green bananas having caused trouble with breeding sows, but would not recommend that the bananas be given too freely at any time. It would be better to allow them to ripen somewhat before use and give them in conjunction with concentrated feeding stuff. Perhaps some of the pumpkins may have decayed and possibly the skim-milk tank may be in a filthy condition, carrying a coating of decaying protein matter that is poisonous and likely to cause severe trouble, particularly among breeding sows close to farrowing. Then, again, the sows may have been chased by a dog and may have been injured internally by jumping over logs or crushing one another in an attempt to rush through a narrow gateway. We have no record of the milk from cows inoculated for redwater having caused trouble among pigs and do not think this is a likely cause. We presume there are no poisonous weeds about the pig paddock that will be likely to cause trouble, though now and then we have records of "ergotised" grasses and crops causing trouble. Ergotised rye has, on numerous occasions, been reported as a probable cause of abortion in stock.

Pigs Dead at Birth.

It is evident this trouble is entirely due to faulty diet and to improper handling of the sow.

It is quite unnatural for a breeding sow to produce dead pigs at birth and there must be a cause for this trouble, hence we look to faulty feeding as the most probable cause. Many sows, for instance, receive no other food than skim milk, and this is often diluted with water. This ration is quite unsuitable and inadequate. Skim milk should never be diluted with water, for its feeding value is certainly not increased, and the feeding of a large quantity of weak swill only creates digestive disorders and leads to an intense craving for bulky foods.

Many sows are compelled to run in a bare yard in which there is no grass or succulent herbage, nor any suitable mineral matters (lime, phosphates, and other bone-forming materials). Again, other sows are turned out into lucerne paddocks and have no concentrated (heat and energy-producing) foods; and in other instances, though there is good variety in the ration, the sow is unable to provide the necessary sustenance for her young owing to a lack of vitamins.

The various Departments of Agriculture publish a number of valuable pamphlets on the breeding and feeding of pigs, which may be procured by writing to the Department at any time.

In a general way it does not pay to retain sows as breeders that fail to give satisfactory results; it is quicker and better to cull them and introduce better and more reliable strains.

Good reliable breeding stock can be purchased almost anywhere in the pig-raising districts throughout Australia at prices well within the reach of farmers, and no attempt should be made to continue on with unprofitable stock while better stock can be procured at these rates. The old rule of "Do it now" is well worth serious consideration.

THE MILKING MACHINE—THE CUP AS "HEART AND BRAIN."

A writer in the "New Zealand Exporter" states that what a large number of farmers fail to realise is that the cup is the heart and brain of the plant; it is, in fact, the milking machine, and on it alone depends the success or failure of the plant.

The writer considers that the use of cups fitted with air admission mouthpieces should be made compulsory.

Metal mouthpieces, he says, can be fitted to almost any standard make of cup, and the air admission can be put in by the farmer himself. Only a pinprick is required, and can be made by driving the point of a darning needle through the side of the mouthpiece, or by the use of a fine watchmaker's drill.

The effect of this is to cause a small rush of air down the cup, driving the milk clean away from the teat as it is drawn out, and also, it practically releases all pressure in the teat between pulsations. When the cups are removed the teats will be found soft, dry, and in their natural colour.

With this form of cup the pressure must be raised to 17 lb. to the inch, and cups with air admission, working at as high as 19 lb., are far and away easier on the cow than ordinary cups working at 13 lb. or 14 lb.

Air admission cups will not hang on the average cow of their own accord. During the period when the pressure is released they will fall off unless supported on a stool or hung to an overhead wire.

Many dairymen boast of the fact that their cups never fall off, but did they know the extra strain imposed on their cows by this type of cup, and the extra necessary amount of stripping they have to do, they would in most instances go to the little extra trouble entailed in supporting the cups.

Another very important point is to remove the cups immediately the flow of milk ceases. To leave the cups dragging away at empty teats is simply asking for trouble, and trouble in plenty will follow.

Inflations should be changed at the least three times a season, and tightened once every month or six weeks. Trying to make stretched half-rotten inflations last out another month is the very worst type of false economy, especially towards the end of the season.

It should always be borne in mind that the more milk a cow gives out the bigger her flow, the more efficient the cups have to be to handle their job. Any old "half-pie" machine will milk heifers or poor cows, but after the second or third calving some of these animals will start holding up their milk. Generally the farmer will blame the cow, whereas ninety-nine times out of a hundred the fault lies in his cups.

Through the milk not being taken freely from the teat the lacteal passages in the udder become numbed and the flow of milk ceases. If stripping be prolonged for a minute or so the numbness wears off and the milk comes away again. If this sort of thing continues for long the cow will develop the habit of holding up her milk, and it will take a good machine and a very patient operator to break her of it.

There are odd cases where, owing to some peculiarity of the udder, numbness will be cured by the squeezing tendency of the mouthpiece, in which case a different shaped cup may be tried with good results.

There is some difference of opinion as to whether the air inlet in the claw should be retained along with the air admission mouthpiece. Personally, I do not think it matters greatly one way or the other, but for safety's sake would advise that both be used.

Pulsator speed should be absolutely regular if possible, with no variation from the beginning until the end of the season. With heavy milkers it is better to err on the slow side, for forty to forty-two pulsations a minute being most satisfactory.

The time some farmers take to put through their herds is scandalous. I have heard of three milkers taking two and a-half to three hours to milk sixty cows, using a four-cow plant. The writer with one youthful assistant has put through seventy-five cows in one hour thirty minutes, engine running time, and no skimping the job at that!

If we get over three gallons of strippings off the lot we go looking for the reason, and it is never hard to find. Air holes blocked, inflation slack or engine gaining speed—one of these three will generally be found to be the cause of the extra strippings.

THE BUSINESS OF DAIRYING—A FARMER'S VIEW.

"Dairy farming to-day is a business, and to be successful the farmer has to conduct his operations on business lines." With the foregoing as preface, Mr. A. S. Pankhurst, of Singleton, New South Wales, at a recent Agricultural Bureau conference, drew attention to what experience had impressed him as some of the most important points.

The holding having been acquired, the site for the farm buildings should be chosen. It was commonly believed that small holdings were essential, and it was safe to assume that half a mile from grazing to milking bails was a maximum. The cow was one of nature's machines for distilling milk—not a working bullock—and excessive travelling lessened the milk yield, and probably the cream yield also. However, by judicious placing of the buildings on flat land it was possible to occupy 1,000 acres as one dairy; the area should be split across each way to make four 250-acre paddocks, and the buildings placed centrally, with access to each paddock.

In hilly country it was unwise to build the bails at the top of the hill. Cows grazed up hill, and used less energy when driven down hill to the bails than up hill, and exhausted cows did not give all their milk.

It was not always advisable to place the buildings in the most convenient position in relation to the road, as was sometimes done. They should be located in the position most convenient for the cows, even if not convenient to the road.

The matter of breeds was too big to be discussed in the time available, but really did not matter so long as testing and improvement were carried out. Cows were only given by nature sufficient milk to rear their young, and there was always a tendency to throw back. To maintain the present standard of development and to improve it, testing and selection were essential.

To a young man starting, Mr. Pankhurst offered the advice "breed your own heifers," and rear them only from cows of high production capacity. Select the sire as well as the dam from high-producing families, caring also for constitution. High production as well as other things seemed to go in families.

He had had experience with a strain that had always shown six teats; four were enough, and the two extra were superfluous, and were troublesome to dry off. He had snipped them off with distinct advantage, and had never known an animal to get a hard lump in the udder as a consequence.

Discussing the age at which to breed, Mr. Pankhurst said that quality of country affected development. If, under normal conditions, the animals were allowed to go to three and a-half years before breeding, a magnificently developed animal resulted, but there was a tendency to throw towards beef, especially if carried on for several generations. His experience had been that the best age to breed was at two years of age or a little under.

"Feed heavily," the speaker advised. "You must put in to take out, and do not dry the cows off too early." It was wise to get them into the habit of long lactation periods early in their lives. He was not in favour of never drying off, as was practised by some, for it weakened the calf.

When the heifers came in, it was not wise always to assume that, because they were of a good strain, they would be good producers. In these days there was no room for "boarders" on the dairy farm, and the only way to detect them was to join up with a herd-testing unit and test every heifer.

Discussing some aspects of general management, Mr. Pankhurst said he had always found it better to take the "raw edge" off the cows' appetites before putting them on to lucerne, but if that was not possible he had prevented "bloat" by cutting the lucerne twenty-four hours ahead of feeding, and stacking, tramping, and sweating to get rid of the gas. The cows should be fed as soon as they were turned out of the bails. He had experimented and found that by waiting an hour and a-half before feeding the yield was 2 or 3 gallons less out of a total of 200 gallons. In winter the cows had to lie down and wait, cold and empty, and even in summer time was lost, while later in the day the dew was off the grass and the sun was hotter.

The highly-developed modern cow was a lazy animal and wanted lazy conditions. Unless a cow came to its full potential production within four weeks of calving it had been his experience that she never would get to it. The cows should be fed well when they first came in and before they calved, so that they could store supplies for subsequent milk production.

THE ROYAL SOCIETY OF QUEENSLAND.

The Ordinary Monthly Meeting was held in the Geology Lecture Theatre of the University on Monday, 28th April. Dr. Herbert was in the chair, and about twenty-five members were present. The following were proposed for ordinary membership:—Messrs. E. A. O'Connor, M.Sc., and M. White, M.Sc., proposed by Dr. Jones and Mr. Perkins; Dr. W. H. Steel, proposed by Mr. Perkins and Prof. Lowson. Misses F. E. Scott and E. M. Ferricks were proposed for associate membership by Messrs. Perkins and Cayzer. Messrs. A. J. Stoney, B.E.E., and E. M Shepherd and Dr. J. M. Roe were unanimously elected ordinary members of the Society.

Mr. H. A. Longman exhibited two somewhat abraded otoliths of a freshwater catfish, *Tandanus* sp., which had been found in alluvium at Lakes Creek, Rockhampton, by Mr. F. Jardine, who had sent them to the Queensland Museum. Generic identification was established by direct comparison with otoliths or "ear-stones" taken from recently captured catfishes.

Dr. E. O. Marks exhibited the anterior half of a stone axe, found near the junction of Ewen Creek and Stanley River, near Peachester. The cutting edge had been fashioned entirely by chipping. All other recorded stone axes from Queensland have been formed by grinding. This exhibit was commented on by Mr. Longman.

Dr. W. H. Bryan read extracts from a paper by E. C. Tommerup, B.Sc., A.A.C., entitled "A Geological Reconnaissance of the Linville-Nanango District."

This paper deals with the geology of a large area situated between Linville and Nanango, Queensland, the information being gathered during numerous journeys made by the writer while engaged in making traverses of the district as an officer of the Queensland Forest Service.

The writer has attempted to correlate and classify the various rock formations of the district, but does not regard the classification as either complete or final.

The oldest rocks in the area are representatives of the Brisbane Schists which occur between Yarraman and Wondai. Next in succession (between Yarraman and Esk) there are several outcrops of slates which probably belong to the Gympie Series. Whether these were deposited *in situ* or were faulted into their present positions is not clear.

These were followed by the Andesitic Stage of the Esk Series, which is typically developed near Marbletop, east of Nanango. The writer was able to follow the massive andesites and andesitic agglomerates of this stage from Goomeri to the head of the Brisbane River and beyond Mount Stanley at least as far as the junction of Avoca Creek with the Brisbane River.

The overlying Shale Stage of the Esk Series was examined by the writer at a number of different localities within the area described, among them being Upper Yarraman Creek, where a small seam of coal is included in the section. Many of the conglomerates associated with the shales contain numerous pebbles of milky quartz, jaspers, and other representatives of the Brisbane Schists, together with others, derived apparently from the Gympie Slates.

The igneous rocks of the area fall naturally into three groups—viz.: (*a*) Granodiorites, (*b*) Porphyrites, (*c*) Basalts. The granodiorites are younger than the Gympie Series, which they intrude, but are older than the overlying Esk Series. The age of the porphyrite intrusions is not clear. They are apparently closely associated with the granodiorites, although they are probably somewhat older. On the other hand, they may possibly prove to be related to the Andesitic Stage, which is restricted to the eastern part of the area. The basalts outcrop along the Cooyar Range and elsewhere, and overlie the Shale Stage of the Esk Series.

The paper is illustrated by a sketch-section from Tarong to Taromeo, and by geological and contour sketch maps.

Miss Dorothy Hill, M.Sc., read a paper entitled "The Development of the Esk Series between Esk and Linville, with Reference to the Possible Occurrence of Workable Coal."

In the Brisbane Valley, between Esk and Linville, a series of Triassic rocks is trough faulted along the north-westerly grain of the country into the Palæozoic (including Permo-Carboniferous) formations. These Triassic rocks, the Esk Series, are freshwater basin deposits laid down by rapidly changing currents, with intensive contemporaneous volcanic activity. The Lower Esk Series is typified by very intense andesitic activity, with the formation of a great thickness of peculiar andesitic boulder beds, with sedimentary deposits being formed during periods of temporary cessation of volcanic activity. The strictly conformable Upper Esk Series, however, is typified by a thick development of rapidly varying sedimentary deposits, with interbedded flows and tuffs resultant from intermittent trachytic activity. Above the Upper Esk Series the Bundanba sandstones, now all eroded

away except from the southern part of the area west of Esk, were deposited without angular unconformity.

In addition to the trough faulting, the Esk Series has been strongly affected by sharp north-westerly directed anticlinal fracturing, accompanied by the intrusion of an important series of hypabyssal rocks, the Brisbane Valley Porphyrites, closely related in mineralogical type to the flows and tuffs of the period of sedimentation. The time relations of the trough faulting and anticlinal fracturing are unknown, but they both occurred before the extrusion of the Tertiary rhyolites.

The conditions of deposition and the type of folding of the Esk Series do not promise well for the occurrence of a large field of workable coal, but some of the synclinal areas are worth more detailed mapping on the chance of the discovery of a deposit large enough to support a small colliery.

These papers were discussed by Prof. Richards, Drs. Bryan, Whitehouse, and Marks, and Messrs. Denmead, Bennett, and Dunstan.

A paper, "Essential Oils from the Queensland Flora, Part 1, *Baeckea virgata*," by T. G. H. Jones, D.Sc., and M. White, M.Sc., was laid on the table.

1,560 ccs. of oil, representing a yield of .88 per cent., were distilled from 353 lb. of the leaves. The constants recorded for the oil are—

$[d]_D = +16.5$; $N_D^{20} = 1.4742$; Acetyl No. = 41; Ester No. = Nil; Density = .9021.

Examination of the oil showed the presence of d α-pinene 50-60 per cent., cineol 30 per cent., with pino-carveol, aromadendrene, and sesquiterpene alcohol in smaller quantities.

Prof. H. C. Richards communicated a short paper, "A Record of Graptolites from Mount Isa," by R. A. Keble.

A sample of fine, thinly-bedded sandstone with some of the laminations completely silicified and showing galena, and with some of the others more or less stained with ferric oxide, was found last summer on a spoil dump at Mount Isa by Mr. J. O'M. Lyons, and was subsequently handed to Mr. R. A. Keble by Mr. E. Broadhurst.

Mr. Keble regards the face of the specimen as showing graptolites preserved either as impressions or as films light-red in colour.

There are about fifty polyparies in all, poorly preserved, but many showing both proximal and distal extremities, and one or two showing thecal details.

They all belong to the Monograptidæ, and, although absolute specific determination is unwise, Mr. Keble has no hesitation in citing *monograptus cf. halli*, Barr and *Monograptus cf. undu'atus* E. and W.

On this evidence he regards the age of the Mount Isa beds as being Silurian, and mentions that M. cf. halli occurs in shale approximately 1,000 ft. above the base of the Silurian in Victoria at Jackson's Creek and on the Wood's Point Goldfield. He also regards the European equivalent of the Mount Isa beds as approximately zone 21 near the top of the Llandovery.

Especially since the finding of the Cambrian trilobites at the Templeton River the Mount Isa beds have been regarded very generally as Pre-Cambrian in age. On this account, and owing to the association of ore-bodies of much importance, the determination is of considerable interest.

In communicating the paper Professor Richards summarised the evidence for the existing general idea as to the Pre-Cambrian age of the Mount Isa beds, and especially considered the relationship between these steeply dipping beds and the gently undulating fine grits of Middle Cambrian age at the Templeton River a few miles to the west of Mount Isa.

The results of the traverses made by Messrs. Shepherd and Ridgway, of the Queensland Geological Survey, and of Mr. J. B. Wadley in the same region were considered, and possible interpretations of these in terms of a Silurian age for the steeply inclined Mount Isa beds were put forward.

Considerable discussion took place, and general disagreement with the determination of the specimen as graptolitic in character was expressed by several members, especially Dr. F. W. Whitehouse, Mr. B. Dunstan, and Mr. E. C. Saint-Smith.

The firstnamed considered the specimen organic, but he could not believe it to be a graptolite, particularly a species of *Monograptus*. Messrs. Dunstan and Saint-Smith regarded the specimen as purely inorganic, and pointed out that much search had been made for graptolites and other fossils at Mount Isa, and, although material similar to the specimen under discussion had been seen, the structures were considered to be purely inorganic.

Answers to Correspondents.

BOTANY.

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

Clover *(Desmodium triflorum).*

T.F.D. (Beaudesert)—

Your clover specimen is *Desmodium triflorum*, a species of Tick Trefoil common in many warm countries and of recent years found in Australia. It is probably introduced and seems to be on the increase. In the pastures of coastal Queensland, to which it makes a valuable addition, stock are very fond of it and it is nutritious. The only disadvantage is that it grows so close to the ground. The name Tick Trefoil as applied to species of the genus refers to the pods breaking off and being carried about, thus disseminating the plant.

Fish Weed. Peppercress. Yellow Weed.

A.M.D. (Boonah)—Your specimens are:—

1. *Chenopodium triangulare.*—Fish Weed. A native plant generally looked upon as rather a useful herb in the average mixed native pasture. It gives rather a weedy or somewhat "fishy" flavour to milk and butter, hence the vernacular. Apart from this it is a useful plant and makes good hay.
2. *Lepidium ruderale.*—The Peppercress. Gives a strong mustard or turnip flavour to milk, otherwise a useful pasture herb.
3. *Galinsoga parviflora.*—Yellow Weed. Generally looked upon as a useful fodder, especially as green feed for poultry.

Grass *(Chloris virgata).*

E.G.H.C. (Grandchester)—

Your specimen is *Chloris virgata*, a vigorous grass, closely allied to the ordinary Rhodes grass. It is of annual duration, however, and does not seem to compare with the ordinary Rhodes grass as regards palatability. It is moderately common in Queensland and is mostly seen as a stray along railway lines, on the edge of cultivation paddocks, and so forth. It has no advantages over the ordinary Rhodes grass. In fact this latter is generally regarded as far preferable as a fodder.

"Bindy-Eye."

B. (Brisbane)—

The term "Bindy-eye" was originally applied to several plants of the genus *Calotis* on the Darling Downs, particularly to *C. lappulacea*, *C. scapigera*, and *C. cuneifolia*. These are plants belonging to the large family Compositae and the flower heads die off leaving the "seeds" or fruitlets to ripen into burrs. Each little "seed" or fruitlet is provided with its own bristles. The name, however, is now applied to quite a number of burr plants in Western Queensland and in Central Queensland about Barcaldine, Longreach, &c.; the term is mostly applied to a tall-growing plant, *Bassia quinquecuspis*, which breaks off at the base and rolls about in the ordinary "roly-poly" fashion when ripe. With regard to the spelling of the name this is doubtful. In Angus and Robertson's Encyclopaedia you will find a note under the heading *Calotis* in which it states: "'Bindi eye' or 'Bindei'—the spelling is doubtful."

A Native Orchid.

INQUIRER (Brisbane)—

Your specimen of native arrowroot forwarded represents the pseudo-bulbs of a native orchid, *Cymbidium albuciflorum*. These are sometimes chewed by people in the bush as a cure for diarrhœa and dysentery, and were used in the early days by the aborigines as food. We have nothing to say about the properties of the plants except that the pseudo-bulbs seem rich in starch.

Grass—*Eremochloa bimaculata.*

G.S. (Toowong)—

The specimen has no seed head and it is rather difficult to name it from leaves only. The grass you sent we should say, however, is *Eremochloa bimaculata*, a species fairly common at this time of the year on dry, stony ridges where it provides a certain amount of fodder in such barren places. In addition to the stony country it also grows in sandy lands, such as Bribie Island and Maroochy River. Though comparatively common we have not heard a local name applied to it. If possible it would be as well for you to send a seed head to verify the determination.

Glycine Pea.

J.B.K. (Kilcoy)—

No. 1 is *Glycine tabacina*, the Glycine Pea or Glycine Vine. A very common legume in the general mixed native pasture in Queensland and usually regarded as a very good fodder. Though fairly common we have not heard a common name applied to it, and have adopted the generic name as the local one.

No. 2 is a species of *Desmodium* or Tick Trefoil. The specimen is not in flower but we should say it is *Desmodium triflorum*, a species fairly common in coastal Queensland extending to New Guinea and the Malayan region. Though a native plant it seems to have been on the increase during the last few years. We should say its presence would improve the general value of the pasture.

Barb Wire Grass

J. H. McC. (Dalby)—

Your specimen is *Andropogon refractus*, commonly known as Barbed Wire Grass on account of the barbed wire-like appearance of the seeding spikelets. The grass grows mostly in fairly dry forest country and provides a certain amount of rather coarse forage.

DAIRYING.

Selected from the outward mail of the Supervisor of Dairying, Mr. Chas. McGrath.

Ropey Milk—Stringy or Curdled Milk.

C.J.C. (Montrose)—

Ropey milk is caused by bacteria which find their way into milk from various sources and are hard to eradicate. The specific micro-organisms consume the sugar of milk, using it to construct large slime capsules around their cells.

One of the sources is stagnant water, and cows which are allowed to wade therein often produce ropey milk. Should there be cause to suspect this source of infection the cows should be prevented from having access to the water, and their flanks and udders should be washed with a suitable disinfectant.

Some diseases of the udders of cows are a source of infection of the milk. Milk from cows suffering from any abnormal condition of the udder should not be used for human consumption. If there is any indication of udder derangement or ill-health of a cow a sample of the milk should be forwarded for bacteriological examination.

The organisms may be carried into the milk by use of unsterilised utensils, and the milk may in turn infect all other utensils with which it may come in contact. In such cases it will be necessary to sterilise all utensils in use including buckets, strainers, cans, separator parts, &c., by placing them in boiling water for at least ten minutes.

Should a milking machine be in use it will be necessary to thoroughly cleanse and scald each part and then sterilise by passing a suitable disinfectant through it. A suitable disinfectant for the above purpose may be made as follows:—

Stock Solution.—12 oz. chloride of lime in one gallon of water. Keep in a covered glass or stoneware jar until settled.

Solution for Use.—1 oz. of the above solution to three gallons of water.

PIG RAISING.

Replies selected from the outward mail of the Senior Instructor in Pig Raising, Mr. E. J. Shelton, H.D.A.:—

Salt for Pigs. Lung Trouble.

R.J.R. (Monto)—

There is no danger associated with a reasonable use of salt in the feeding of pigs, but an oversupply would be very harmful in much the same way as would be the case if human beings were given an excess of salt in their food. A mixture of charcoal, ashes, salt, bone meal, and lime should be kept before the pigs at all times so that they can use same as they desire.

We would certainly not recommend the heavy dosing of pigs with medicine while they are suffering from lung troubles, but if you can induce them to take a mixture, such as one teaspoonful of turpentine with thirty drops of laudanum in a small quantity of food and then follow on with about two or three times the quantity of food without the mixture, good will result. Turpentine is a stimulant and would be effective in getting rid of internal parasites, worms, &c., for pneumonia is very often exaggerated by the presence of intestinal worms, especially in young pigs.

Pigs affected with worms cough a good deal, this being the result of internal irritation. Pigs are not usually condemned at the bacon factories for pneumonia provided the carcasses are otherwise normal, but badly affected animals in low condition would certainly not pass the inspector.

If you pay additional attention to the feeding of your pigs and keeping them under hygienic conditions, your future losses will be considerably lower.

Open Air Pig Breeding.

A beginner in the pig business asks the following question:—

Can pig-breeding be carried on profitably on the paddock system, using natural grasses as the food, perhaps with a little Sudan or Elephant grass given in during the summer time?

Answer.—No; pig-breeding cannot be carried on successfully on natural grasses. Pigs require ample supplies of succulent, nutritious food, and they must have some grain or concentrated meal in addition. Grasses and fodders such as Sudan grass, lucerne, sorghums, milo, clovers, maize, and Kaffir corn, pumpkins, wheat, oats, barley (as greenstuff), artichokes, and potatoes, all provide suitable green foods, and wheat, oats, barley, peas, maize and grain sorghums are all excellent grain foods. The best summer food is undoubtedly lucerne and clover, but you have a good variety among the crops mentioned to provide a good rotation of crops; these, with a light grain diet and ample supplies of clean cold water, should fill the bill.

Don't forget also that pigs need charcoal, wood ashes, and bone meal in the building up of the bony structure of their bodies, and in addition pigs should be given the opportunity of exercising freely over succulent pastures, where they pick up quite a lot of their living and benefit in the health-giving sunshine.

It certainly does pay to grow as much of the food as can be produced on the farm, and its utilisation right on the spot should be the objective. Concentrated foods used judiciously are a payable proposition too, and in many instances it could be shown that it pays a good deal better to purchase these concentrates than to attempt to grow them. As an instance it does not pay the pig farmer to attempt to grow wheat unless he is resident in a district where wheat can be profitably produced. Similarly there are many districts where it pays better to buy maize than to grow it, also peas, or the meals resultant from the grinding of these grains. Balanced rations should be fed in order to produce the most profitable returns, and these rations must combine all the elements necessary to produce flesh, fat, bone, heat, energy, and the store of fat for future use as required either before or after slaughter.

What is Tankage?

An inquirer of a scientific turn of mind who has been reading up the subject of feeding pigs stumbled across the term "tankage" in quite a lot of the references to protein foods and asks just what tankage is.

In general the term "tankage" is an American one, and indicates that the material referred to has been prepared from residues of meat trimmings and similar materials which, in process of manufacture, are placed in steam pressure tanks where a temperature of around 245 degrees F. is maintained for several hours. This high temperature releases most of the fats which are then drained off and sold under various trade names, after having been suitably prepared. The tankage is then dried to a point where it can be handled and stored for an indefinite period. After going through the drier the tankage is run through a mill (the dessicator) and from there to a grinder and screening machine, and is screened to a proper mechanical condition, in other words to the mechanical texture or degree of fineness of ordinary corn meal. It is usually sold under a guarantee of something like.

Crude protein	.. ..	50 to 60 per cent. minimum
Moisture	.. .. ..	7 to 8 per cent. minimum
Crude fat	.. .. ..	8 to 10 per cent. minimum
Crude ash	.. .. ..	5 to 10 per cent. minimum

In Australia most of this class of product is sold under the trade name of "Meat Meal" as stock foods regulations do not recognise a term such as tankage which does not indicate the origin of the product. Meat meal resembles tankage in appearance, but some grades carry a protein content lower than that referred to above. In fact the composition of quite a number of packing house or meatwork products varies in accordance with trade guarantees. It should be the regular practice of buyers of these products to study the chemical analyses which always accompanies the delivery per bag, for only in this way can satisfaction be assured.

In a good many instances meat and bone meal are combined and sold as such, and in others blood and bone are combined.

It is worthy of note in passing that under modern methods of manufacture there is no risk of the germs of disease being transmitted to live stock per the use of meat meals, as the products are thoroughly sterilised in treatment and rendered germ free and the high temperature to which they are subject effectively destroys any germs present. Government inspection does not permit any diseased animals or portions thereof being used in the preparation of meals for feeding to live stock, but even if such animals were used, all danger of transmitting these diseases would be overcome by the sterilising processes which this class of material undergoes.

TO NEW SUBSCRIBERS.

New subscribers to the Journal are asked to write their names legibly on their order forms. The best way is to print your surname and full christian names in block letters, so that there shall be no possibility of mistake.

When names are not written plainly it involves much tedious labour and loss of valuable time in checking electoral rolls, directories, and other references. This should be quite unnecessary.

Some new subscribers write their surname only, and this lack of thought leads often to confusion, especially when there are other subscribers of the same surname in the same district.

Everything possible is done to ensure delivery of the Journal, and new subscribers would help us greatly by observing the simple rule suggested, and thus reduce the risk of error in names and postal addresses to a minimum.

General Notes.

Staff Changes and Appointments.

Messrs. R. J. Rollston, J. Macfie, and H. Lambert have been appointed Assistant Inspecting Cane Testers for the forthcoming sugar season, with headquarters at Cairns, Mackay, and Bundaberg, respectively.

Mr. W. Benham, of Byrnestown, Gayndah Line, has been appointed an Honorary Inspector under the Diseases in Plants Act.

Mr. H. W. Chambers, of Westgrove Station, Injune, has been appointed an Officer under the Animals and Birds Acts.

Constable S. Renton, of Yaraka, has been appointed an Inspector of Slaughter-houses.

Mr. R. M. Macdonald, of 151 Miles 65 Chains, Southern and Western Railway, has been appointed an Acting Inspector of Stock.

Mr. K. V. Henderson, Junior Field Assistant, has been appointed Field Assistant, Cotton Section, Department of Agriculture and Stock.

The Officer in Charge of Police at Pomona has been appointed an Acting Inspector of Stock at that place. Mr. H. J. Walker has been appointed an Inspector of Slaughter-houses on probation.

Mr. W. Ellison, Sub-manager, Committee of Direction of Fruit Marketing, Brisbane, has been appointed an Honorary Inspector under the Diseases in Plants Act.

Mr. C. P. Power has been appointed a Temporary Ranger under the Animals and Birds Acts. Messrs. A. Nagle, N. E. Goodchild, R. E. Haseler, E. Widdup, and W. J. White, Officers of the Cotton Section, Department of Agriculture and Stock, have been appointed also Rangers under the Animals and Birds Acts.

The resignation of Mr. J. R. Collier as Inspector of Slaughterhouses, Cairns, has been accepted as from the 12th April, 1930, as tendered.

PIG SCHOOL AT GATTON—ALTERATION OF DATES.

The dates for the School of Instruction for Pig Raisers at the Agricultural College at Gatton chosen originally were 9th to 19th June, but it has now been found necessary, in order to fit in with College arrangements, to rearrange these dates, and those finally decided on are 30th June to 11th July, 1930.

Banana Planting.

The planting policy of the Banana Industry Protection Board for the coming season is based upon the opinion that under existing circumstances the complete eradication of "bunchy top" from the State is not practicable. In dealing with the disease, the aim should be to prevent its spread to those districts which are at present free from infection, and its reduction in areas already infested. In effect, permits for planting during the coming season in that part of Queensland outside the quarantine area declared between the Maroochy River and the main Caloundra-Landsborough road will be issued on the recommendation of the agent, with these restrictions:—No permit shall be issued to the occupier or owner of a neglected or abandoned plantation, nor for planting in proximity to a plantation badly infested with "bunchy top." Within the quarantine area defined as starting from the mouth of the Maroochy River on the north-east, and following the northern bank of the said river to its point of contact with the eastern boundary of State Forest Reserve No. 292; thence directly west to the boundary between the parishes of Maroochy and Kenilworth, following this boundary south to the township of Mapleton; thence continuing south along the main road to Montville; thence along such lastmentioned main road to the main Maleny-Landsborough road, following such lastmentioned main road to Landsborough; thence by the main road from Landsborough to Caloundra; and thence by the Pacific Ocean to the point of commencement, no permits for planting will be issued.

Queensland Wins Australian Cheese Championship.

The following principal awards in the Victorian butter and cheese competitions were announced on 21st May:—

BUTTER (FEDERAL CLASSES).

Australian Championship—

Grafton (New South Wales)	1
Upper Maffra (Victoria)	2
Maffra (Victoria)	3

Sheffie'd Shield (given by butter merchants of London)—

Bega (New South Wales)	1
Cobden (Victoria)	2
Maleny (Queensland)	3

CHEESE.

Australian Championship—

Cooranga North Dairying Co. (Queensland)	1
Downs Co-operative Co., Unity Brand (Qld.)	2
Moola (New South Wales)	3

World's Poultry Congress—Queensland Representation.

Mr. P. Rumball, Poultry Instructor, left by the "Largs Bay" for England on 20th May. Mr. Rumball has been granted five months' leave of absence by the Department for the purpose of enabling him to attend the Fourth World's Poultry Congress, to be held at the Crystal Palace, London, from 22nd to 30th July, 1930, and the post-Congress tour to be held in connection therewith.

The Department is not directly interested in Mr. Rumball's tour, and accordingly any business transactions which Mr. Rumball may engage upon while away from Queensland will be entirely between him and those who may entrust him with commissions.

The organisation of the Congress is being undertaken by the English Ministry of Agriculture and Fisheries, in conjunction with the Department of Agriculture, Scotland, and the Minister for Agriculture for Northern Ireland. There will be forty-five nations participating in the Congress, and it is expected there will be at least 4,000 delegates from Europe, North America, South America, Africa, Japan, and Australia.

At this Congress, there will be Sessions devoted to papers, an exhibition of poultry, poultry appliances, and the general methods of raising poultry and eggs in different parts of the world. It is anticipated that a special feature will be made of marketing. English will be the official language of the Congress.

After the Congress, the delegates will make a tour of Great Britain and Ireland. The English tours will be planned to show, first, the poultry education and research work conducted by the National Poultry Institute—namely, at Harper Adams Agricultural College, Shropshire, Cambridge University, South Eastern Agricultural College, Kent, Roseheath School of Agriculture, Cheshire, and the Government Veterinary Laboratory, Surrey, as well as the work of other eductional institutions.

In Scotland, visits will be made to the Genetics Department of Edinburgh University, the Rowett Research Institute, Aberdeen, the experimental farm of the North of Scotland College of Agriculture, and the official egg-laying test of the Department of Agriculture for Scotland. There will also be an inspection of commercial poultry farms and plants illustrative of Scottish poultry keeping.

In Ireland, visits will be made to the chief poultry centres, as well as to the Northern Island Poultry Research Station at Hillsborough.

Generally, the whole object of the Congress and subsequent tours is to bring together those concerned with the development of the poultry industry; pooling the best and most recent knowledge concerning the various aspects of the poultry industry in all parts of the world; improving and developing poultry research, education and economics; encouraging, through displays on an international basis of purebred poultry, the improvement of poultry stocks in all countries; and stimulating, through commercial exhibits, trade in all the requirements of the poultry industry.

The Congresses are held triennally, the first being held in Holland in 1921, the second in Spain in 1924, and the third in Canada in 1927, and the fourth in London in 1930.

Australian Thrift.

The Australian life insurance companies, according to last year's official figures, have funds totalling £180,000,000, and have entered into contracts to pay to widows and orphans no less than £320,000,000, on behalf of some 2,000,000 policy-holders. With the added assurance from reversionary bonuses the total to be paid under the abovementioned contracts will exceed £400,000,000 to be paid to people at a time of greatest stress. If one unites with this evidence of Australian thrift the actual savings in the savings banks, which total £216,000,000, and the fact that 60 per cent. of Australian householders are on the way to owning or actually do own their own homes, the stability of the national character of our people is apparent.

Radio Lectures on Rural Topics.

Following is the June list of radio lectures arranged for officers of the Department of Agriculture and Stock, Station 4QG., Australian Broadcasting Company, Limited:—

Monday, 9th June—"Educational Particulars for the Pig Farmer." Mr. L. A. Downey (Instructor in Pig Raising).

Wednesday, 11th June—"Country Topics." Mr. J. F. F. Reid.

Monday, 16th June—"Talk on Dairying." Mr. C. McGrath.

Thursday, 19th June—"Talk on Fruit Culture." Mr. L. J. Freeman.

Monday, 23rd June—"Housing of the Pig." Mr. L. A. Downey (Instructor in Pig Raising).

Thursday, 26th June—"Country Topics." Mr. J. F. F. Reid.

Thursday, 3rd July—"Talk on Sheep and Wool." Arranged by the Department of Agriculture and Stock.

Cheese Board.

An Order in Council has been passed amending the constitution of the Cheese Board. The amendment applies only to the constitution of the Board itself. The amended constitution provides:—

(*a*) That the Cheese Board shall consist of five (5) members elected by growers, together with the Director of Marketing or a Deputy appointed by the Minister.

(*b*) For the purposes of the election Queensland is divided into five districts, with one representative for each division; the electors of each division shall be: (1) Cheese Manufacturers in that division who produce or produced cheese for sale during six (6) months prior to the election, and (2) dairy farmers who during six months prior to the date of election supplied or supply milk to cheese manufacturers operating in that division.

The cheese factories in each division are as follows:—

Division No. 1.—Cooranga North, Daredale, Koondaii, Highgrove, Maclagan (Kulpi), Maclagan, Maclagan North, Rangemore, Yamsion, Malling, Moola, Quinalow, Rosalie, Rosemount, Sunnyvale, and Woodleigh Cheese Factories.

Division No. 2.—Biddeston, Boodua, Gowrie Junction, Hodgson Vale, Jondaryan, Lilyvale, Westbrook, Wyreema, Crosshill, Kelvinhaugh, Kingsthorpe, Wellcamp, and Barnesmore Cheese Factories, and C. M. Hitchcock, Gomorran.

Division No. 3.—Aubigny, Captain's Mountain, Irongate, Kooroongarra, Mount Tyson, Brookstead, Linthorpe, Pittsworth, Scrubby Mountain, Springside, Yarranlea, Rocky Creek, and Yargullen Cheese Factories.

Division No. 4.—Mount Sibley, Felton, Greenmount, East Greenmount, Mount Sibley (Ascot), Ramsay, Southbrook, Bony Mountain, Elbow Valley, Greymare, Lord John Swamp, Pratten, Talgai, and Victoria Hill Cheese Factories.

Division No. 5.—Braehead (Peeramon), Coalstoun Lakes, Dundarrah, Glen Allyn (Malanda), Silvermist (Malanda), Cheese Factories, and the Queensland Agricultural High School and College, Gatton.

Nominations will be received by the Returning Officer, Department of Agriculture and Stock, Brisbane, until 5 p.m. on the 25th June, 1930, for election as growers' representatives on the Cheese Board.

Five such representatives are to be elected by the growers, as defined in the Order in Council dated the 22nd May, 1930, as mentioned above.

Each nomination is to be signed by at least ten growers as above, in the division concerned, in accordance with the Order. The elected representatives will hold office for the period from 1st August, 1930, to 31st July, 1933.

Dairying at Mackay.

Thus "W.M." in the "Live Stock Bulletin:—

In previous issues we have referred to the progress being made with the development of dairying at Mackay, Queensland. On the 1st March last, Mackay's butter factory began operations and although the people of the sugar centre were inclined to doubt the success of the venture, the first day's operations brought forth thirty-eight suppliers with a total of 1,269 lb. of cream, which produced 637 lb. of first-grade butter. Progress right through the month has been steady, the figures for the first three weeks of March being 4,255 lb., 3,951 lb., and 4,001 lb., the corresponding output of butter being 2,237 lb., 2,077 lb., and 2,070 lb. It will thus be seen that the average weekly output of first-grade butter for the first months of the factory's history was a little less than a ton. As the consumption of butter in Mackay and district is approximately 7 tons a week, the factory has an "open go" to reach and overtake this local consumption.

The quality of the butter is of the best, and is in demand by merchants and the general public. In addition, the whole district is very enthusiastic over the factory, and dairying is making great strides.

Cattle of the best quality are being brought to the district, and generally speaking, the Mackay district is just about in the midst of a dairying boom. Lands that would not previously be looked at are now coming into demand for dairying, and agitation on behalf of the people is having the effect of new scrub lands being opened up in various parts of the district for dairying.

Litter Records that will Stand Competition.

Advice recently to hand from America indicates that while G. F. Volle, of Knox County, Indiana, backslid a bit by crossing other blood with his Hampshire pigs, he did make a remarkable production record—8,080 lb. of pork produced from four litters in six months. One litter of ten pulled down the beam at 2,310 lb., one of eleven weighed 2,174 lb., another of eleven 2,122 lb., and the other with only seven 1,484 lb. These pigs were raised in strict accordance with the McLean County System of Sanitation on a balanced ration. One of the most interesting features of the accomplishment is the fact that Mr. Volle only had four sows on his farm.

These records are spoken of as indicating the superior quality of the Hampshire breed, a white-belted American pig that has not yet been introduced into Australia. It is also stated that the Hampshire characteristics, as is customary in all crosses of this nature, are strikingly evident in all of his pigs. The records will be hard to beat.

A.I.F. Reunion Committees.

The secretary of the United Council of Queensland A.I.F. Units advises that the magnificent response of ex-members of the A.I.F. to the appeals of the reunion committee, asking them to join in the march on Anzac Day was most gratifying. A further appeal is, therefore, made to returned men to assist their committee in keeping them in touch one with another. This help may be afforded by every Digger belonging to a unit that has formed a committee, communicating with the hon. secretary of that association, giving his name and address. This will assist in compiling and keeping the nominal roll up to date. The names and addresses of the hon. secretaries of reunion committees are as follow:—Artillery, H. J. Watkins, Kellett street, Auchenflower; 2nd Light Horse, J. Holliday, Anzac Club, Elizabeth street; 5th Light Horse, R. S. James, care Masonic Club, Creek street; 9th Battalion, J. D. Allan, care Lands Department, Brisbane; 15th Battalion, J. Churchill, care Trittons Limited, George street; 25th Battalion, W. Prentice, care Repatriation Department, Brisbane; 26th Battalion, R. Daniels, care Overells Limited, Valley; 31st Battalion, A. Mirls, 146 Queen street; 41st Battalion, V. Smallwood, care Repatriation Department, Brisbane; 42nd Battalion, G. J. Angell, Box 1503V, G.P.O., Brisbane; 47th Battalion, B. J. Platt, care Overells Limited, Valley; 5th Motor Transport, I. Cooper, care Anzac Club, Elizabeth street; 7th Field Ambulance, care Bernie Harris, Harris and Sons, jewellers, Edward street, City. There are still many Diggers who served with units that have at present no organisation catering for their welfare. Every possible assistance towards establishing committees among the following Queensland A.I.F. units:—Flying Corps, Engineers, Pioneers, Army Medical Corps, Army Service Corps, 49th and 52nd Battalions, will be given by the United Council of Queensland A.I.F. Units. Communications should be sent to the hon. secretary, Mr. Viv. Brahms, Box 1503V, G.P.O., Brisbane.

Milking Persistency.

It will be generally agreed that the value of a dairy cow depends upon her ability, not merely to produce a heavy milk yield, but to maintain high productivity over a period of years, and to combine this with a generous output of butter fat A list has just been compiled by the English Guernsey Cattle Society, which gives wonderful proof of the milking persistency of the Guernsey cow. Forty-five cows appear in this new list of merit.

They have all of them gained five, six, or seven certificates under the Society's Advanced Register scheme, which has only been in full operation since 1919, and thus all of these cows have completed five or more lactations of exceptionally heavy yields, both of milk and butter. The overall average for the forty-five cows and their combined total of 243 lactations is approximately 1,000 gallons of milk of over 5 per cent. butter fat. This, of course, only includes pedigree cows which are actually being tested for butter fat by the society.

Among the cows so listed is Trengwainton Sweet Briar 2nd, the property of Colonel E. H. W. Bolitho, with a yield of 76,208 lb. of milk and 3,702.68 lb. butter fat in seven lactations; Chorleywood Programme 3rd, in Mr. E. Gerrish's herd, near Land's End, in Cornwall, with a total yield of 66,065 lb. milk and 2,976 lb. butter fat in six lactations; and Juno of Echelle, a cow in Lord Poltimore's herd, with a yield of 69,235¾ lb. of milk and 3,884 lb. butter fat in seven lactations; Downe Fleur of Vimiera, in Mr. Walter Dunkels' herd, has given 67,543 lb. of milk and 3,530 lb. butter fat in seven lactations.

The yield of Tregye Maze (the famous 2,000-gallon Guernsey cow) for five lactations is 61,137¾ lb. milk and 3,217.46 lb. butter fat, with an average butter fat percentage of 5.26.

The Value of Grass

At one time farmers simply looked on grass as a cheap food that was provided for their benefit by Nature, and not a crop that needed manuring or care of any sort. To-day, thanks to science, such men are better informed, and know that as with arable land so with pasture, they cannot expect the best returns unless they put something there. Grass is, after all, practically the basis of all life, and it is to be looked upon as one of the most valuable foods for all kinds of live stock, not excepting the pig. Therefore, no efforts should be spared to get a good crop, one that will provide an early bite, and also last long into the autumn. Carefully-planned systems of manuring and grazing will help this object to its desired end, but haphazard use of the pastures will only rob them of nourishing verdure. It is not every farm, especially those on the hills, that is well equipped with grass land, and thus it is up to the farmer to do the best he can to aid Nature in the provision of this natural food.—"Live Stock Journal" (England).

Marketing of Strawberries.

Regulation 188 under the Primary Producers' Organisation and Marketing Acts has been approved. This regulation provides for the conducting of a poll to decide whether an Order in Council shall be made declaring that strawberries grown in Queensland shall be acquired by the Committee of Direction as the owners thereof. The proposed Order in Council will apply to all strawberries grown in Queensland for canning purposes or for sale on a wholesale basis during a period of one year from 15th May, 1930—that is, to 14th May, 1931. The ballot is to be conducted by the Committee of Direction. Growers entitled to vote at such poll will be growers of strawberries in the State of Queensland who declare they expect to have strawberries for sale on a wholesale basis during the above period of one year. The roll of persons eligible to vote shall be compiled by the Committee of Direction from their records, and other sources of information. To insure their names being on the roll, persons eligible to vote are invited to send their names and addresses at once to "The Committee of Direction of Fruit Marketing, Turbot street, Brisbane."

Queensland Pastoral Supplies, Limited—Buyers' Guide.

The most satisfactory feature of this catalogue, which has just come to hand, is the impression gained that the company's motto—"Service before Self"—has been the basic maxim in all its operations. Numerous letters from buyers, which are scattered throughout its pages, attest to this fact, and you can scarcely open a page without alighting upon some maxim, philosophic truth or similar interesting matter, which relieves its contents of any sense of monotony. In the grocery and housekeeping departments various recipes are given for using the particular line referred to. It is a condition of purchase with this firm that its prices are understood never to be higher than any other wholesale house—otherwise a buyer has the right to deduct the difference.

Flies Transmit Swine Fever.

Recent American advices inform us that hog cholera (here called swine fever) is not, as commonly supposed, carried so much by man or pigeons as it is by both barn and house flies.

This finding is the result of ten years of investigational work chiefly in Iowa (United States of America). By liberating flies that were coloured for later identification, it was learned that they had travelled as far as 13 miles, going 6 miles in twenty-four hours. House flies followed a team 2 miles. According to Dr. C. N. McBride, of the United States Bureau of Animal Industry, if more of the Western farmers in the United States would bale as much straw as was needed and burn the rest of it, they would be doing a wise thing as far as swine fever is concerned. Wet straw and manure piles make ideal breeding places for stable flies and should be spread on the fields with a manure spreader (or be ploughed in as soon as possible) rather than be allowed to accumulate around the barns or feed yards. This is good advice that should be carefully noted by every farmer.

The Goal.

Three things to govern: Temper, tongue, and conduct.
Three things to cultivate: Courage, affection, and gentleness.
Three things to commend: Thrift, industry, and promptness.
Three things to despise: Cruelty, arroganee, and ingratitude.
Three things to wish for: Health, friends, and contentment.
Three things to admire: Dignity, gracefulness, and intellectual power.
Three things to give: Alms to the needy, comfort to the sad, appreciation to the worthy.

Points in Dairy Practice.

Feed regularly and plentifully. In addition to pastures, grow fodder crops, if possible, all the year round. Grow lucerne, if possible, if only a quarter of an acre. During the autumn plant oats, vetches, wheat, barley, &c., and during the spring and summer grow maize, sorghum, saccaline, Sudan grass, &c. In addition, give the cows a little concentrated food, such as crushed oats, maize meal, bran (each two parts), mixed with lucerne chaff (eight parts).

Improve your pastures by top-dressing and the sowing of winter grasses and clovers. The pasture on land which has been used for dairying for a long period without any effort being made to return to the soil the mineral constituents which have been taken from it becomes deficient in such ingredients, and the animals that graze on it suffer. In some dairying districts there is need for a change of food from paspalum, which in districts where frosts are experienced produces little or no nourishing material in the winter. Better pastures mean healthier and more consistently productive cattle.

Divide your farm, if possible, into small sections—say, of 10 acres each—and graze them off in rotation. Thus the cows have fresh young pasture all the time, and their milk yields are increased.

A lick should be provided on most dairy farms. A suitable one for most conditions is forty parts Liverpool salt, ten to twenty parts bonemeal, and one part sulphate of iron.

Profit by the security afforded by a reserve of feed in the form of silage. The most convenient form of silo for the dairy farmer is the overhead type; but a stack is cheaply constructed, and where the soil is suitable a pit silo can be used. Silage is a good insurance against times of scarcity; it does not burn or deteriorate, and cows milk well on it.

If there is an experiment plot in your district, watch the trials and learn from its successes and failures.

Join, if possible, a herd-recording unit; it is the cheapest and most effective way of getting at the yields of your cows. Put a pure-bred bull of known and recorded production strain at the head of the held, keep his heifers out of the highest-yielding cows, and as soon as they come in cull out and sell to the butcher the low producers. It is wonderful how quickly the average yield of the herd goes up if it is managed on these lines.

Feeding well is the basis of everything in dairying. Testing the cows is only the means of finding out if they respond to the food given them; some respond, others do not—that is the difference between the profitable and unprofitable individuals. Under the present economic conditions only the best should find a place in the milking-yard.

The Art of Flying.

"Many people have an erroneous idea about flying. Some think it is a romantic undertaking or a suitable outlet for recklessness," said Mr. L. J. Brain, A.F.C. (Brisbane manager of Qantas Ltd.), when delivering an instructive address on the "Art of Flying" to members of the Queensland section of the Australian Aero. Club, at Empire Chambers, last night. The art of flying was essentially an exact science, continued Mr. Brain. As a modern means of transport it was already playing an important part in the community, and would play an even greater part in the future. Aviation could in no way be regarded as a "show" business. The two essential qualifications for the beginner were that he should be young and mentally alert. The best type was a quick thinker, but cautious, without discarding the normal ideas of what constituted safety or foresight. Mr. Brain then detailed the progressive steps of a beginner to the last stages where he was capable and competent for his pilot's ticket. He strongly advised members against flying in adverse conditions. Statistics showed that even with the most experienced pilots the greatest percentage of accidents was due to flying "blind."

District Canegrowers' Executives.

Regulations under "*The Primary Producers' Organisation and Marketing Acts, 1926 to 1928*," relating to the election of Chairmen and the powers of Chairmen of District Executives, have been approved. The Regulations are numbered from 239 to 245, and deal mainly with the mode of election of a Chairman. Briefly, they provide as follows:—

(*a*) That every District Executive shall, within a reasonable time after the declaration of the poll, meet to elect one member to be Chairman.

(*b*) That at the election the Secretary or Acting Secretary shall preside, but shall not exercise either a primary or casting vote.

(*c*) The person declared to be elected must have received a majority of the votes cast by all elected members.

(*d*) If no member obtains a majority of votes, the Secretary shall convene a special meeting to elect the Chairman.

(*e*) Such meeting shall consist of three representatives from each Mill Suppliers' Committee in the district represented by the District Executive and the elected members of the Executive, provided that an elected member of the Executive shall not act or vote as a representative of a Mill Suppliers' Committee as well as an elected member of the Executive.

(*f*) At such special meeting the Secretary or Acting Secretary of the Executive shall preside, but shall not exercise a vote.

(*g*) The Chairman of a District Executive shall have both a primary and a casting vote.

Winter Work in the Vineyard.

Viticulturists may be reminded of the importance of making an early start with the winter ploughing.

All the operations pertaining to the working of a vineyard throughout the summer have a tendency towards the consolidation of the soil immediately below the surface. This is accentuated by early autumn rains, and by the growth of weeds incidental to such rains. In such a condition, accumulated water is quickly shed from the surface, and more particularly so if the land has any appreciable fall. Winter cultivation aims at enabling the land to absorb moisture and preventing "run-off," and a broken, loose condition is therefore produced. Naturally, the rougher and more open the surface, the more easily does the water find lodgment, and the more certainly reach the subsoil. In the early winter cultivation, destruction of weeds is purely secondary, although it is very largely effected.

Under normal circumstances, the earlier the winter ploughing can be started the better. Where small areas are concerned it is a simple matter, but with large vineyards the work has to be started early in order that it may be completed in good time. The nature of the soil has to be considered, and the ploughing so arranged that the most difficult portions are completed first. Heavy soils should, in most cases, be completed before they become too wet, while lighter ones may safely be left until later, as they may be ploughed at almost any time.

The system of ploughing varies in different districts and according to local custom, but it should be accepted as an axiom that the lower the average rainfall the greater the care that should be put into cultivation. Efficient work aims at complete turning of every portion of the surface at least twice a year.

The system generally recommended is as follows:—So soon as the land is in a fit condition for ploughing, plough to a depth of 6 inches away from the vines, throwing the sod towards the centre of the row, keeping the crown as low as possible, and turning subsequent furrows over, until vines are reached upon either side. The strip of soil left unploughed underneath the crown will be worked during the second ploughing. It is not always advisable to plough deeply right up to the vines, owing to the possibility of severing important roots, or even pulling the vine out of position. It is preferable to turn the last furrows with a lighter finishing plough. Implements are obtainable that are so constructed that the body is set over from the beam, which is at the same time movable, and can be set right out to allow the horse to walk wide of the row. In this way there is very little left unploughed—simply a small strip against the vines, which is easily treated by means of a hoe.

For the ploughing of large areas ploughs can be procured up to size of four furrows, and which can be adjusted for finishing off close to the vines, and again readjusted for the second or throwing-on ploughing, thereby doing away with single-furrow work. The hoeing operation may be accomplished by hand, or by a specially-constructed implement known as the "vine hoe," which carries a hoe or blade out upon an arm so that when guided by the steering disc on the near side, it can be worked around the stems of the vines with ease, turning one-half of the unploughed strip on either side. When the whole work has been completed the soil is high in the middle of the rows, while the vines stand in the depression, and are therefore more likely to get the benefit of any rain that falls. The uneven and rough surface meets, in an ideal manner, the requirements mentioned above.

The soil is permitted to remain in this condition throughout the winter, and harrowed prior to the second ploughing to facilitate the operation, and left until such a time as it may be desirable to push on with the further cultivation. Pruning and other work will be completed in the meantime.—A. and P. Notes, New South Wales Department of Agriculture.

Points in Bacon Curing.

1. Use judgment in selecting the pig, which should be about 150 lb. live weight. Select perfectly healthy pigs, free from bruises, cuts, sunscald, &c. Sows passing through the oestral period should be held for at least ten days, otherwise good-keeping meat will not result.

2. Before slaughtering let the animal fast for eighteen to twenty-four hours, keep it quiet, and allow plenty of clean drinking water.

3. Never kill an animal which is losing weight, or which has become overheated just before killing time.

4. Kill animals by sticking to ensure thorough bleeding.

5. Exercise care in scalding, and see that the carcass is cleaned thoroughly and that no hair is left thereon.

6. Adopt convenient cutting to give efficient drying. (A good method is to divide the side into shoulder, middle, and ham.)

7. Release joint oil from cavities of joints in both shoulders and hams.

8. Have the tables and the room in which the curing is to be conducted scrupulously clean.

Dalby Show.

It can be said with safety that the dairy cattle section at the recent Dalby Show was one of the factors which did a good deal to making the event the success that it was. The dairy cattle section was an excellent one. The quality of the Jerseys and I.M.S. was all that could be desired, while the Jerseys had some outstanding animals amongst them. The display of pigs was the best ever seen at Dalby, Duroc-Jerseys, Berkshires, and Tamworths being the three breeds shown.

Mr. W. Middleton, Wyreema, Queensland, judged the cattle section, and made the following awards:—

Champion Jersey bull, Mr. D. R. Hutton's Bellefaire Blondes Bellringer. Champion Jersey cow, the same owner's Trecarne Rose II. Champion I.M.S. bull, F. G. Lamkin's Fuschia's Monarch. Reserve Champion, I.M.S. bull, P. J. Skernan's College Molly's Prince. Champion I.M.S. cow, W. F. Kajewski's Cherry VI. of Burradale, with the same owner's Rainbow VI. of Upton reserve champion cow. The Ayrshire class for cow 3 years old and over was won by Mr. R. C. Drew's Shudley Model.

The Home and the Garden.

OUR BABIES.

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

MILK.

OF all foods milk is the most necessary, the most easily contaminated, and the most perishable. Without good milk children cannot be healthy, and babies cannot live. Cow's milk should seldom be necessary for the young infant, but after weaning it is indispensable. No other food is so important for the public health.

Neutralising Contamination.

Milk as it comes from the cow is almost free from germs, but it soon becomes contaminated by all sorts of bacteria. Some of this contamination is unavoidable. Much of it comes from dirt on the cow's udder and flanks, the milker's hands, and the air of the cowshed. Stray hairs, flies, and fragments of cow food or cow manure drop into the milkpail or are blown into it, and all of these contain bacteria. Worse than all these are the myriads of bacteria contained in unsterilised milkcans. Washing with boiling water is an imperfect method of sterilisation, for the water is not boiling when it gets into the cans, and its contact with their interior is too short. Efficient steam sterilisers are not available except in factories. For these reasons much milk is dirty at the start, and most milk is doubtfully clean.

If milk is fairly clean to begin with it does not keep clean for more than a few hours at ordinary temperatures, for the bacteria that have been introduced grow with extreme rapidity. Fortunately there is an interval during which the bacteria do not increase in number in fresh clean milk. At 50 deg. Fahr. such milk will remain fresh and clean for twenty-four hours, at 60 deg. for twelve hours, at 70 deg. for six hours. At the end of this period it deteriorates rapidly. Unfortunately, milk which is dirty from the first deteriorates much earlier.

If, therefore, at temperatures of over 70 deg. we wish to keep milk for twelve hours or more, there are only two alternatives. Either the milk must be kept constantly chilled to below 50 deg. or the milk must be heated. The most simple method is to bring the milk to boiling point (212 deg.) and then cool it. Boiling destroys all but a few of the contained bacteria, but these will grow, and boiled milk is not safe for more than twelve hours at summer temperatures. Another method is pasteurisation, which is the heating of the milk to a lower temperature (145 deg.) and keeping it at that temperature for thirty minutes. After pasteurisation it should be put into sealed sterilised bottles and kept chilled until delivery.

How Epidemics may be Caused.

Occasionally milk becomes contamined by disease germs, either derived from the cow (for instance, those of tuberculosis) or from the milkers or those who handle the milk (for instance, those of typhoid, scarlet fever, and diphtheria). Such contaminations not only cause disease; they have frequently caused epidemics. Against this danger the only perfect safeguard is boiling or pasteurisation. By our domestic habit of boiling milk we in Queensland are saved from much disease which in States with shorter summers results from the unclean habit of drinking raw milk.

Dried Milk.

Of late years dried milk has come into use and is much advertised. It has unquestionably been of much value where clean fresh milk has been unprocurable. Many babies have thrived on it, but, unfortunately, many others have failed to thrive. Like other tinned foods, we have found it sometimes a useful substitute, but inferior to good fresh milk. It is also, of course, more expensive.

Science Serves the Consumer.

When Brisbane was a small town there was no great difficulty in the milk supply. As it grew into a large city, and the milk suppliers were driven further and further out, much of our milk became very inferior and unsafe for babies. Fortunately, sound and scientific methods have of late provided us with a trustworthy supply of chilled pasteurised milk in sealed bottles. It is thus ensured against contamination by dust and road sweepings while being distributed. Kept on ice it is safe for twenty-four hours. If not iced it is safe for twelve hours; if kept longer it should be scalded at the end of that time. For nearly three years this milk supplied by the Metropolitan Milk Supply Company has been used by the Baby Clinics and Creches in this city, and we have found it safe and wholesome.

It is much to be regretted that there are other towns in Queensland which need, but have not, an equally good milk supply.

WINTER DANGERS.

A baby may suffer from diarrhœa—that is to say from loose and frequent motions—caused by improper feeding at any time of year, but cases of severe diarrhœa are much less common during the winter months. In particular the epidemics of infectious diarrhœa or dysentery do not occur during the cool weather. On the other hand, a number of infections causing coughs and colds, which may occur at any time of the year, are more common and more serious during the winter. Although winter in Queensland should be a healthy season, many unnecessary deaths of infants and young children from bronchitis and pneumonia may be expected at this time. We should have fewer deaths if mothers only knew that these diseases follow infection. There are a large number of disease organisms which attack the nose and throat, sometimes spreading into the ears and lungs. Among them, to mention only a few, are those which cause influenza, measles, and whooping cough.

The Common Cold.

By far the most common infection of the air passages is that known as a "common cold." Baby has a running nose, a cough, and is feverish for a day or two. His mother says he has caught a chill, and does not know she is talking nonsense. These "colds" are infectious diseases spread from person to person. Though usually mild diseases, they are the most common causes of abscesses of the ear, bronchitis, and pneumonia. If mothers would try to protect their infants from infection we should have fewer deaths. "Colds" are more common in winter, because then people stay more indoors with closed doors and windows, so that living germs spread more easily from one to another, and at this season many people are carrying these germs about. If you allow anyone who comes into your house to fondle or kiss your baby, his chances of catching a "cold" are very many. Or one of the older children gets the infection at school, which you cannot help, comes home, and straightway gives it to the baby, which you can and should prevent. Do not get a "cold" yourself, for then it is difficult to avoid infecting your babe, though you should try. We have seen a woman forcing infection into a baby by putting a dummy into her own mouth and then into the baby's mouth. This is horrible.

The Baby at the Picture Show.

But infection spreads in other ways. Whenever anyone coughs or sneezes he sprays his germs into the surrounding air to be breathed in by other people. Of course, he should smother his cough with a handkerchief, but he often does not. Even loud talking will spray germs about. This is how crowds of people in closed halls, such as picture shows, become infected easily and rapidly. If you take your babies to these places you are either very careless of their health or know little how to preserve it.

Plenty of Fresh Air for the Young Australian.

You can do very much to protect your young children from these infections, but you cannot always be successful. Therefore keep them strong and healthy so that they may throw off infection as easily as possible. Do not keep them shut up indoors; this lowers their strength and increases the risk of infection. See that they always have plenty of fresh air to breathe, especially at night. Clothe them sensibly according to the weather, but do not overclothe, for this weakens their resistance. Keep them strong and healthy by proper feeding. Bottle-fed babies and poorly-nourished children stand the worse chance.

The Safest Thing to Do.

The chilliness that comes before a "cold" is not the cause of the "cold"; it is the beginning of the "cold." The safest thing to do with a child who has a "cold" is to put it to bed till it is better. Certainly it should be kept in bed as long as it is feverish and a day longer. It will be thirsty, so let it have plenty of water or fruit juice, and water. It will not be hungry, so never force food on it. This rule applies also to young babies who should have more water and less milk until the trouble is over.

If the mothers of Queensland will take the advice here given, we shall pass through this winter with fewer deaths.

HOW TO COOK A HAM.

"Too many cooks spoil the broth," but one cook is often quite enough to spoil the meat! Like the bad workman, who blames his tools, the bad cook is ever ready to declare that the shortcomings of the joint when it comes to table are to be looked for in the meat itself rather than in the method of preparing it. And if there is one joint more than another that requires careful preparation and careful cooking, it is a ham. There are good hams and bad hams, but how many of the former have been entirely ruined by an unskilful or careless cook! An all-important matter in regard to a ham is the length of time given to soaking it beforehand. A mild ham may not require more than twelve hours, but one that is strongly salted may want twenty-four or even thirty-six hours. By looking at it one can often tell how it has been cured, or by putting a skewer into it and applying the tip of the latter to the tongue, one can judge whether the ham be over-salt or not. In any case, it is well to err on the liberal side when soaking. After the ham has been sufficiently soaked, it should be scraped quite clean and dried with a clean cloth. Then it is put into cold water in a cauldron large enough to allow for swelling, and brought very gently to the boil. After that it should be allowed to simmer slowly until it is cooked. The time to be allowed for simmering is thirty minutes for every pound it weighs in the case of a large ham of, say 12 lb. or over. For a smaller one rather less may suffice. It may be tested with a skewer, which will go in and come out clean and readily if the cooking is complete. The ham should then be set aside to cool in its liquor, after the skin has been removed.

KITCHEN GARDEN.

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

Rhubarb.

The continued production of rhubarb may be greatly assisted by giving a heavy mulching of manure and hoeing it well into the soil. Keep the beds well watered, and give regularly a dressing of liquid manure, say, once a week.

It is not necessary to use forcing manures on the young stock, as plants are ruined if forced in the early stages of growth.

The rhubarb makes rapid growth during the autumn and spring, and when stalk cutting has been started liquid manuring and manuring may be given.

Lettuce Culture.

A thin sowing of lettuce seed where the plants are to mature insures not only an earlier crop, but it will be found that the plants grown in this manner are far less likely to run to seed than others transplanted from over-crowded seed-beds.

Lettuce resents checks in all stages of growth, and through inattention in the early stages many losses occur through early seeding. An undisturbed plant may be relied upon to give a good head at least a fortnight or more in advance of others, and for this reason alone it is worth while taking a little extra care in preparing the bed and sowing the seed.

A liberal dressing of manure is always beneficial to this crop, for, in addition to the food value, it retains moisture and keeps the roots cool during the hottest weather. Cow manure is the best, but whatever manure is used should be buried 9 in. below the surface. If it is put in deeper than this the roots will not reach it until the plant is well developed, and therefore unable to take full advantage of the food provided. Unlike many more delicate plants, the roots of lettuce will penetrate rank manure even when quite small, and grow very rapidly. Sow lettuce seeds in drills running from north to south. Draw them out with a blunt stick deep enough to allow a scattering of finely-sifted soil being placed in the bottom, and the seed being covered 1 in. deep. This will ensure an early and very even germination. When the seedlings are about 1 in. high, thin out to one plant to every 6 in. of the row. Frequent stirrings of the soil and an occasional dusting of soot will induce rapid growth, and if, when the plants are half-grown, the surface of the bed is given a dressing of either nitrate of soda or sulphate of ammonia, at the rate of ½ oz. to each yard of row, and lightly forked into the ground, and afterwards well watered in through a fine-rosed can, the plants will readily respond. Good results will follow an application of liquid manure or even soot water.

ROSES.

From the Pacific Nurseries, Wondall road, Manly, Queensland (Messrs. C. W. and A. C. Heers) comes to us their 1930 Rose Catalogue, an excellent little booklet that should be in the hands of every rose grower. The nurseries are easily accessible from the city and are open to all for inspection.

The following useful working notes are culled from this valuable catalogue:—

Time for Planting.—From June until the end of September. For the coastal, excepting perhaps the far North, we specially recommend the later period, and, in support, advance the following reasons:—

(1) Every horticulturist must admit that all roses invariably exhibit luxurious and succulent growth and wealth of bloom during the months of March, April, May, and early June. This being so, we contend that as the plants are full of flowing sap they not in a fit condition for transplanting during that period.

(2) Roses planted during the earlier months readily respond to the warm periods which assuredly occur in the middle of our winter, only to be as surely struck by our colder and more frosty days during the latter part of the winter. This shock not only checks the growth, but actually kills the tender white jelly-like roots then in the forming. There can be only one result—a plant with stunted growth upon which the foundation of your future tree has to be built. Remember, if these plants are left undisturbed in the nursery they remain dormant.

(3) On the other hand a thoroughly rested and ripened plant, transplanted during late July, August, or September, according to the trend of the season, is ready to break away into full and vigorous growth as the warmth of Spring appears, never to look back.

We readily admit that the rose, being a hardy plant, may even do well when planted early, but after much experience we prefer to pin our faith to late planting in most parts of Queensland where our winter is so variable. Holding these views, we hope clients will not ask us to send roses out earlier than June, although we much prefer, whenever convenient, that you follow our advice and plant later in the season, say, from the middle of July to the middle of September.

It is gratifying to us to know that quite a number of clients after acting upon our advice, write to say how pleased they are with their experience of late planting; so we reiterate—do not plant or prune roses too early in Queensland, especially along eastern slopes.

Roses should never be planted when the ground is sodden as the soil glues together and excludes the air so necessary for the future welfare of the plant. Rather delay planting, and in the meantime bury the whole plant lengthwise, cover completely with soil and await more favourable conditions.

Although Roses do well under almost any condition, it will always repay you to trench and drain the ground. However, should the ground be flat and unsuitable for drainage, it is better to dig it a foot deep and raise the bed. Such beds require hardwood or concrete borders, otherwise the outside plants dry out too easily. Work in a liberal supply of well-rotted cow or stable manure. This work should be done at least four weeks prior to planting. Plant so that the union will be just under the surface of the ground. In the case of light, sandy soils it is an advantage to have the union as much as two inches below the surface. Never on any account place fresh manures or any form of fertiliser near the roots at the time of planting.

The roots should be evenly spread and so arranged as to give them a downward tendency; cover with about three inches of fine soil and press down firmly; fill in and give a liberal supply of clean water. Keep the earth away from the graft until the plant strikes; in the meantime mulch with straw in order to protect union and keep the soil from caking.

The mulch also creates an ideal condition for further waterings. Should the weather continue dry, it will be necessary to water at intervals according to the conditions. Do not use fresh manure or artificial fertiliser near the roots when planting. Should the sun's rays become hot after planting, it is advisable to provide the plant with artificial shade.

Suckers.—Always keep a sharp lookout for brier suckers, which may from time to time sprout from below the graft. These are readily detected by their foliage, and if not removed they will in time kill the rose tree.

Manuring.—Roses should be heavily manured at least once a year, well-rotted animal manure being the best. It should be spread over the bed and lightly forked in. Bone dust and other suitable fertilisers are also beneficial. Established rose trees are greedy feeders, and periodical light dressings of fertiliser, applied during damp weather, give good results. Heavy soils need occasional dressings of lime, which, however, should not be used within a month or so of fertilisers.

Pruning.—There is no phase of rose culture more difficult to impart than that of pruning. After accepting the broad principles generally laid down, make a close study of the habits and peculiarities of the various types of roses. Apply common sense methods and observe and profit by the results obtained. We are opposed to early pruning in this State for similar reasons to those advanced against early planting. However, varieties with H.P. strain may, if the canes are sufficiently ripened, be shortened during March or April to from 3 to 5 ft. from the ground—the weaker the shorter. This will ensure a wealth of bloom in the late Autumn. For the annual overhaul the end of July and August is the best time. Hard pruning as practised in cold countries must not be generally applied here. The reason is not far to seek as the periods of inactivity are short and uncertain. Make the prevailing conditions your guide as to how and when to prune. Assist the pruning problem by observing the following golden rules during the entire season:—(1) Cut away dead, spindled wood; (2) Always cut blooms and stems that have bloomed well back to a strong eye; (3) Never allow seed pods to form on the bush. By these means you will encourage correct growth and freedom of bloom. There are odd varieties which resent the knife.

It is most important that plants be kept free from scale and other diseases, otherwise valuable portions have to be prematurely removed to the detriment of the plant. Exhibitors should prune harder than those growing for general purposes. Tea roses require lighter treatment than H.T.'s and H.P.'s.

To prune, cut away all dead, diseased, and spindling wood; thin out anything that is liable to crowd; cut back shoots to a strong eye, pointing outward in the case of uprights and inward on those of spreading habits; preserve any new, strong shoots coming from the base (often misnamed water shoots) that may serve to replace any worn out stems that should be renewed every three years or so.

As soon as the new growth appears, carefully rub off any shoot that is likely to overcrowd or grow in a wrong direction.

Climbers should be allowed their fling during the time they are establishing themselves. Train the strongest canes horizontally, about 18 in. apart, shorten the ends, and cut away all other wood. Provide for the renewal of these trailers every couple of years or so.

Aphis.—Nicotine sprays, such as Black Leaf Forty, are most effective. They may be kept in check by applying the hose freely.

Scale.—Spray with either red oil, kerosene, emulsion, or any lime-sulphur mixture. Many roses are lost annually through scale.

Grubs, &c.—For all leaf, plant, and flower-eating insects, spray with arsenate of lead as directed.

Mildew.—This is a stubborn fungus disease that has for many years past baffled our scientists. The rose, like all other life, no doubt requires a properly balanced food, and as analyses show that our soils are often deficient in potash and lime, it is not altogether surprising to find that, where good dressings of wood ashes have been applied, appreciable improvement in reducing the mildew scourge is apparent. Experiments are being conducted all over the world in search of a cure for mildew, and reports to hand show that potash used in its various forms gives results which are at least reassuring. For our part we can say that we have found the use of wood ashes, also spent carbide, beneficial. If these are not available, try giving each established tree say 4 to 6 oz. of sulphate of potash, in addition to lime, and observe the result.

Regular sprayings with liver of sulphur (1 oz. to 2 gallons of water), or 1 oz. bicarbonate of soda to 1 gallon of water, or Bordeaux, will ward off attacks. Remedies: Flowers of sulphur 9 parts, arsenate of lead 1 part, well mixed, applied with a bellows when the dew is on the foliage. Sprays: Sulphuric acid 1 part to 800 parts of rain water,. One ounce bicarbonate of soda to 1 gallon of rain water is a helpful spray. A drastic remedy is 2 tablespoonfuls Lysol to 1 gallon of water. Sprayings should be done before noon. Always treat the underneath as well as the top of the foliage.

Failures are generally attributable to one or more of the following causes:—

Having used fresh manures or fertiliser at time of planting; allowing roots to be exposed after unwrapping; lack of drainage or planting in soggy ground through excessive wet weather; planting too near the edge of raised beds, too near shrubs, trees, and/or hedges, also in shady positions; allowing plants to dry out after westerlies; giving too much water during first fourteen days; heavy frosts just after planting or even when the plant is established; planting too deep, planting too shallow, or planting too loose; acidity in damp or poorly prepared soils; chemical reactions from fertilisers previously applied to the soil; plants being knocked by children or the thoughtless gardener; dogs and cats are often the cause of plants dying or being damaged; the use of strong soap suds, &c.; planting too early or too late; planting in same spot where a rose has been growing unless soil has been replaced.

FLOWER GARDEN.

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

THE CARE OF THE LAWN.

For a lawn to be a success it must be carefully made in the first place. Good drainage is essential, for stagnant water-logged soil encourages weeds and kills the grass. The soil should be rich in plant food. Give the ground a heavy dressing of good manure, and thoroughly dig it over. Enough time should then be allowed for the soil to settle, as it must be firm when the grass is planted or there will be a series of hills and hollows shortly after. In addition to the manure apply the following mixture at the rate of 3 oz. to the square yard, forking or raking it well into the top spit of the soil:—2 lb. superphosphate of lime, 1 lb. bonemeal, and 1 lb. sulphate of ammonia.

Early in the spring, as the grass begins to grow, a heavy roller should be passed several times over the ground.

Lawns showing bare patches will require a dressing during the autumn, and the mixture previously mentioned will be found very suitable, and will keep the grass well nourished. Wood ashes and soot, combined or not, will also be found beneficial. All dressings should be applied during showery weather. If soil poverty is the cause of a patchy lawn, it is best to rake over in the autumn with a sharp-toothed rake, and dress with a good layer of fine soil and wood ashes.

Orchard Notes for July.

THE COASTAL DISTRICTS.

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

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

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

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

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

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

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

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

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

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

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

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

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

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

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

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

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

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

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

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

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

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

Farm Notes for July.

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

SUBSCRIPTIONS TO THE JOURNAL.

Subscribers are reminded that when a cross is placed in the square on the first page of the Journal it is an indication that the term of their subscription ends with the number so marked, and that it is advisable to renew immediately if they desire the retention of their names on our mailing list.

To farmers, graziers, horticulturists, and Schools of Art the annual subscription—one shilling—is merely nominal, and the charge is only imposed to cover the cost of postage. To them, otherwise, it is an absolutely free issue. Members of agricultural and similar societies who are not actively engaged in land pursuits are asked to pay five shillings a year, while the annual subscription charged to the general public is ten shillings.

Farmers particularly are urged to keep their names on our mailing list, for through the Journal they may keep themselves well informed in respect to the activities of the Department, and other matters with which they are directly concerned. Instead of sending just the annual subscription along it is suggested that, when renewing it, they do so for a longer term. For instance, five shillings would keep their names on our subscribers' register for five years. By doing this they would obviously help to reduce clerical labour as well as avoid the inconvenience to themselves of posting annually the very small sum necessary to keep their names on our mailing list.

On another page an order form may be found, and for those whose annual subscription is about due what is wrong with filling it up now and posting it direct to the Under Secretary, Department of Agriculture and Stock?

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	June, 1930.		July, 1930.		MOONRISE. June. 1930.	July, 1930.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	6.39	5.2	6.46	5.5	10.29	10.36
2	6.39	5.2	6.46	5.5	11.19	11.9
3	6.40	5.2	6.46	5.5	11.59	11.43
					p.m.	p.m.
4	6.40	5.1	6.46	5.6	12.36	12 15
5	6.41	5.1	6.46	5.6	1.8	12 49
6	6.41	5.1	6.46	5.7	1.40	1.22
7	6.42	5.1	6.46	5.7	2.12	2.1
8	6.42	5.0	6.46	5.8	2.46	2.47
9	6.42	5.0	6.45	5 8	3.21	3 36
10	6.43	5.0	6.45	5.8	4.3	4.28
11	6.43	5.0	6.45	5.9	4.51	5.24
12	6.43	5.0	6.45	5.9	5.52	6.18
13	6.43	5.0	6.45	5.9	6.35	7.11
14	6.44	5.0	6.45	5.10	7.30	8.7
15	6.44	5.0	6.45	5.10	8.25	9.0
16	6.44	5.0	6.45	5.11	9.20	9.53
17	6.44	5.1	6.44	5.11	10.15	10.46
18	6.45	5.1	6 44	5.12	11.9	11.39
19	6.45	5.1	6.44	5.12	...	...
					a.m.	a.m.
20	6.45	5.1	6.43	5.13	12.1	12.38
21	6.45	5.2	6.43	5.13	12.55	1.37
22	6.46	5.2	6.43	5.14	1.47	2.43
23	6.46	5.2	6.42	5.14	2.51	3.47
24	6.46	5.2	6.42	5.14	3.56	4.54
25	6.46	5.3	6.41	5.15	5.1	5.58
26	6.46	5.3	6.41	5.15	6.9	6.58
27	6.47	5.3	6.40	5.16	7.16	7.48
28	6.47	5.3	6.40	5.16	8.17	8.30
29	6.47	5.3	6.39	5.17	9.13	9.7
30	6.47	5.3	6.39	5.17	9.55	9.40
31	...	...	6.38	5.18	...	10.15

Phases of the Moon, Occultations, &c.

4 June	☾	First Quarter	7 56 a.m.
11 „	○	Full Moon	4 12 p.m.
19 „	☽	Last Quarter	7 0 p.m.
26 „	●	New Moon	11 47 p.m.

Apogee, 16th June, at 10.54 a.m.
Perigee, 28th June, at 1.18 p.m.

The planet Uranus will be occulted by the Moon in the early morning of 21st June, when both are high up in the north-north-east. The disappearance will take place between 4 and 5 a.m., the exact time varying according to the position of the observer.

Particular notice should be taken of the places on the horizon where the Sun rises and sets on the 20th, 21st, 22nd, and 23rd; it will be 23 degrees 26 minutes north of the east and west points, and mark our winter Solstice.

The Southern Cross will reach the meridian and be erect about 8 p.m. at the beginning of the month and about 6 p.m. at the end. It will then be 61 degrees 20 minutes, at Warwick, from the true horizon to the top star of the Cross. When at this position the part of the Great Bear known as the plough will be on our northern horizon and clearly seen, especially from places in the northern part of Queensland.

Mercury will rise at 5.18 a.m. on the 1st and at 4.55 a.m. on the 15th.

Venus will set at 7 p.m. on the 1st and at 7.19 p.m. on the 15th.

Mars will rise at 3.26 a.m. on the 1st and at 3.19 a.m. on the 15th.

Jupiter will set at 6 p.m. on the 1st and at 5.17 p.m. on the 15th.

Saturn will rise at 7.10 p.m. on the 1st and at 6.11 p.m. on the 15th.

3 July	☾	First Quarter	2 3 p.m.
11 „	○	Full Moon	6 1 a.m.
19 „	☽	Last Quarter	9 29 a.m.
26 „	●	New Moon	6 41 a.m.

Apogee, 13th July, at 11.36 p.m.
Perigee, 26th July, at 8.6 p.m.

On the 3rd the Earth will be in that part of its orbit which widens out from the Sun to a distance of 94,450,000 miles, or 1,560,000 miles more than its mean distance.

On the 5th Mercury will pass from the west to the east of Jupiter, and on the 15th it will pass the Sun.

The Moon will pass from west to east of Saturn on the 10th at 10 a.m. At 10 p.m. it will be interesting to notice that a distance of 7 degrees, or rather more than the length of the Southern Cross, will separate the two objects, which will be remarkably near the zenith at Brisbane, Toowoomba, and Warwick. On such occasions it is difficult to find any shadow to a telegraph pole.

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.