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QUEENSLAND AGRICULTURAL JOURNAL

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PART 2.

Event and Comment.

Malting Barley.

WHEN on the Darling Downs on a tour of inspection through the wheat areas recently, Mr. J. D. Annand, M.L.A., interested the Minister of Agriculture and Stock, Mr. Harry F. Walker, in the practicability of extending the cultivation of malting barley. After due inquiry, Mr. Walker arranged a conference, at which growers, malsters, and brewers were represented, for the purpose of discussing the disposal of the present season's surplus and the possibility of arriving at a working arrangement in respect of future crops that would be satisfactory to all parties. As a result of this conference and subsequent negotiations, the Minister announced recently that he was in a position to state the nature of a possible arrangement which it was proposed to submit to the growers for their consideration.

The production of malting barley in Queensland over a period of five years averages 69,000 bushels, while the Queensland consumption of malt is from 200,000 to 250,000 bushels. The capacity of the existing operating maltings is approximately 70,000 bushels, but the idle plant at Toowoomba, at present owned by the Wheat Board, has a capacity of 130,000 bushels. The operating maltings have already arranged for their current grain requirements, and it is estimated by growers' representatives that approximately 60,000 bushels of this season's crop remain in growers' hands and for which there is no market. Queensland can, however, consume this barley if it is malted, and if the idle maltings are again brought into operation the State's malting capacity would be approximately equal to our malt needs and a trebling of the production of barley would be justified.

Proposed Barley Board.

SUBJECT to the concurrence of growers, the Government is prepared to constitute a Barley Board under the Marketing Act. An understanding has been reached with the Wheat Board whereby the maltings premises at Toowoomba will be made available to the proposed Barley Board for the malting of the current season's surplus barley free of charge, the new board to have the option of acquiring the premises from the Wheat Board at the end of the present season. The Government will also assist the Wheat Board with the finance required to put the idle maltings in order for treating the current season's crop. An apportionment of this expenditure will be made as between the Wheat Board and the proposed Barley Board in a manner which will be announced in due course. Mr. Devoy, of Castlemaine-Perkins Limited, has agreed to make the services of his head malster, Mr. Redwood, who has had a long experience of malting under Queensland conditions, available to the new board. An offer has been secured from Messrs. Redwood Brothers to malt the barley under contract at the rate of 2s. 4d. per bushel. The Queensland Brewery Company and the Castlemaine-Perkins Company have agreed to purchase the greater portion of the resultant malt, and negotiations are proceeding with the other Queensland breweries. Subject to all these arrangements being consummated by the proposed Barley Board, the Government will place its guarantee behind the contracts between the several parties, and a first advance of 3s. 6d. per bushel of graded barley net at country station can be paid to growers at time of delivery. The Government will also arrange with the Commonwealth Bank for the necessary funds for the board for malting costs, working and other expenses. If matters turn out as anticipated the final return to growers should be an additional 6d. or 9d. per bushel, making a total payment of 4s. or 4s. 3d.

Extension of Barley Growing.

NEGOTIATIONS are in train with the breweries as to the quantities they will take next year. Before the planting season (about March or April next) Mr. Walker expects to be able to announce the guaranteed first advance for a given maximum quantity of barley which will be available to growers in December next, from the crop of the 1930 planting. If the negotiations at present pending turn out satisfactorily it will probably be possible to make the same or a slightly larger advance as is proposed for this season. In establishing new industries and reviving old ones, the danger of over-production for the market available has to be avoided. The Minister proposes, therefore, that the board, if constituted, shall be vested with authority to allocate acreages among growers in the first years of operation; such authority to be exercised in the event of there being any indication of a tendency to over-produce for existing markets.

Proposed Grain Board.

IF approved by the interests concerned, Mr. Walker is prepared to arrange for the merging of the Wheat Board, the Barley Board, and the Canary Seed Board, and their being reconstituted as a Grain Board with a separate committee and separate funds and accounting for each product. Such an arrangement would probably make for economy in administration and co-ordination of effort in the handling, on behalf of the farmers, of the Darling Downs grain crops.

Grain Growers' Responsibility.

IT is emphasised, however, that the question of the desirability or otherwise of establishing organised marketing on these lines is one entirely for the growers to decide. The Government does not wish to thrust any particular scheme upon growers. The Minister was requested by Darling Downs interests to see what could be done to relieve the barley growers of their difficulty and to get the industry on its feet again. Having set out the fundamental facts and also the extent of the assistance which the Government is prepared to give, the matter is left entirely to the interests concerned; but on the basis of the arrangements which the Government has been able to make, it seems that an excellent opportunity now exists for further rural development.

Social Aspects of Agriculture.

SOME time ago in the course of a public address in Melbourne, Sir G. A. Julius, Chairman of the Council for Scientific and Industrial Research, expressed some very interesting thoughts on some of the problems of Australian industry. Discussing some of the social aspects of agriculture, he reminded us that the proportion of farmers to our total population is undoubtedly undergoing a rapid decline. There are many reasons for this, and most of them are quite obvious to working farmers. But, as Sir George points out, if this is a reflection of increasing productivity per worker and progressive elimination of the unfit, it is eminently desirable, but in so far as it represents a falling off in our ability to sell our farm products in foreign markets, the case is not so clear. Other and older countries are experiencing the same decline, in fact it is a recognised world-wide tendency of modern life. Sooner or later, however, a reaction must come; the social amenities and other advantages of country life must prove an irresistible attraction to, probably, even the next generation. Modern discoveries and inventions will all be factors in the improvement of our rural social conditions. Sir G. A. Julius, however, takes a serious view of the present tendency of our rural population to forsake the country and its simpler life for the high and bright lights of the city. He says:—

From the social point of view, there are potentialities in rural life which nothing else can supply. Farming is the one great industry, or group of industries, still remaining, in which the young man of small means can undertake an independent self-reliant type of life.

It is perhaps not too much to say that the more farms a country can keep busy and prosperous, the sounder will be its social structure.

The peculiar genius of our people traces back to pioneer life. The sturdy individualism which plagues the farmer in some directions is, nevertheless, a quality devoutly to be guarded.

The opportunity to live by one's own direction, to choose a somewhat ill rewarded independence, to remain at a task which calls for skill, care, and judgment, and is inexhaustible in its possibilities for experimental study, is not lightly to be lost. To many men work of this sort is essential to happiness, and the nation needs just such men. The process of attrition of agriculture, which is now going on, is a matter about which we may well feel deep concern, and which calls for the earnest application of constructive statesmanship.

The social aspects of the agricultural problem are by no means confined to the farming population. We must take thought of the place which agriculture is to occupy in the nation's future economy, of the relations between rural and urban populations, of the type of civilisation which we are developing, and how we might mould it nearer to fundamental human ideals.

Shall we permit agriculture to shrink to the status of a minor industry? Is there virtue in having a population rooted in the soil, and distributed fairly evenly over the face of the country, or can we look on with equanimity as that population becomes concentrated in our cities? Are cities and coastal regions to be developed at the expense of back country?

And what of the land, is our heritage to be handed on to future generations unimpaired? Shall we use the land conservatively, or waste it as foolish heirs of a fortune, to the use of which we have not been properly reared?

Will the countryside of the future be green and fertile, or ugly, sere, and barren? To what extent is the denudation of the land of trees responsible for destructive floods and loss of surface soil, and are we not likely to rue the lack of timber we now so recklessly destroy?

These, and similar questions, are not purely rhetorical; some of them open up questions of policy in which different opinions may be sincerely held, but some raise questions of fact to which there can be but one honest answer.

THE QUEENSLAND SUGAR INDUSTRY.

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

In this series of articles is incorporated the material for a revision of a Bulletin on the Sugar Industry which Mr. Easterby prepared some years ago. Since then the industry has developed to such a degree, and the conditions have so altered, that a revision has become necessary. At the same time, it is recognised that the sugar industry in Queensland, which supplies 96 per cent. of Australian-grown sugar, is so many-sided and is governed by so many factors that it forms in itself a complicated study of no mean magnitude, and one with which it is impossible to deal completely in much less than a large volume. The industry has also in recent years become bound up closely with both Federal and State policy.

Mr. Easterby has covered his subject thoroughly under several heads, each of which he discusses with all possible brevity while retaining every essential of a very interesting narrative.

Part 1 was published in our January number, in which Mr. Easterby reviewed the development of the industry in pre-Federation days. In this instalment he continues that review.—Ed.

PART II.

(a) Short History of the Industry prior to Federation.

(Continued.)

EVEN in the early days of the industry the consumption of sugar in Australia was greater than in any part of the world. About 1878 the consumption was 16 lb. a head greater than in England, which was the next highest. The high consumption in Australia was attributed to the average superior condition of the population, and to the custom at that time of giving rations in part payment of wages, which rations always included sugar.

In 1878 the consumption in Australia was 91,500 tons, and of this one-sixth was produced in Queensland, and one-twelfth by New South Wales. The remainder was imported, chiefly from Java and the Mauritius. Even at that period it was forecast that Queensland would eventually manufacture the whole of the requirements of Australia.

At this time there were no central mills as we understand the term to-day, but there were small mills who bought cane from settlers in addition to their own crops. Many of the larger plantations also bought cane from neighbouring farmers. The price paid in Mackay in 1879 was 11s. per ton of cane showing a density of 10 deg. Beaume, the mill-owner doing the cutting and carting. At Nerang, one millowner gave £12 10s. per acre for one-year-old cane and helped with the cutting and carting, while at Beenleigh up to £22 per acre was paid for two-year-old cane, the seller doing the harvesting and carting. Prices varied considerably, being regulated largely by the proportion of crushing power of the mills to the number of settlers in their immediate neighbourhood. In Bundaberg and Maryborough, many mills were simply crushing plants which sold the resulting juice to a central factory, to which it was pumped along pipe lines after being heavily limed. Some of the

small mills found it profitable to so sell their juice, but the larger manufacturers found they could make sugar more profitably themselves. In 1878, there were sixty-eight mills in operation.

The idea of central mills, however, was kept well in the foreground, and numbers of articles were published advocating the idea and dwelling on the advantages the small growers would reap if the work of cultivating the cane were left in their hands while central mills purchased the cane and did the manufacturing. Mr. Angus Mackay, who was sent as Queensland's Commissioner to the Philadelphia Exhibition, was instructed by the Government to visit the West Indies and make inquiries into this system. On his return, his report, which was published, spoke highly of the advantages that central factories offered, and the agitation, backed up by this report, continued, and eventually resulted in the establishment of a number of central mills in this State, where farmers would not only carry on the growing of the cane but become shareholders in the mills, although the ideas at first were not strictly on co-operative lines.

1880 to 1890.

During this decade the production of sugar in tons varied from 16,660 to 68,924, and further small mills were erected in various parts of the State. It was early in this period that the Colonial Sugar Refining Company (established in 1855) began to turn its attention to Queensland, and purchased freehold land in the Mackay and Herbert River districts, and arrangements were made for the transfer from land owners in the vicinity (all conditional selections). Parliamentary authority had to be procured for this, the company undertaking to erect buildings and appliances for the manufacture of sugar, costing £200,000, and that this sum should be expended within five years. Accordingly, the Colonial Sugar Refining Company's Act of 1881 became law. Some of these conditional selections had been acquired at 5s. and 10s. per acre, and in the debate on the Bill it was stated that such lands were worth three times as much, figures which can be compared with their value to-day. The area of land so to be transferred amounted to 9,305 acres more or less, and if the company did not spend the £200,000 the lands were to be forfeited and revert to the Crown. In less than eight years after the passage of the Bill the company had a total of about 38,000 acres in its three plantations at Homebush, Victoria, and Goondi, about 6,800 acres being under cane, while in the 1888 season over 5,000 acres were actually harvested, cane from a further 1,000 acres being purchased by the company for treatment at its mills. At the end of that season the total capital invested by the company in Queensland was £624,000, of which about £220,000 represented the actual cost of the machinery on the three estates, almost the whole of the latter having been obtained from the United Kingdom.

In the early eighties a high price ruled for sugar, as much as £37 being obtained for first white sugar in 1882. Not long after, though, greatly reduced prices were in evidence owing to the rapid development of beet sugar in Europe, which was being bounty fed, and in 1885 and 1886 the prices were down to £20 per ton, and it was stated that all the plantations were operating at a loss, and at this time a number of small mills went under.

The subject of the establishment of Central Sugar Mills was not allowed to rest, and in Mackay the first steps were taken that ultimately

led to the erection of a number of Central Mills. In November, 1885, a petition was presented to Parliament which subsequently led to the inauguration of the Central Mill system. The petition set forth the difficulties of cane farmers in being confined to mills of plantation owners, and made a powerful plea for assistance by stating that cane growing could be made a white man's industry. Mr. Thomas Pearce, then of Mackay, generally gets the credit for starting the movement which led to the erection of the Racecourse and North Eton Mills.

The Griffith Government in power at that time viewed black labour with little favour, and decided to make available a sum of £50,000 to groups of farmers at North Eton and Racecourse in the Mackay district to erect mills on conditions not greatly differing from those embodied in the subsequent Sugar Works Guarantee Act. These mills were expected to crush cane grown only by white labour, but it was soon found this could not at that time be put into practical effect.

The farmers agreed to take shares, but it was found that shareholders growing cane were receiving less than non-shareholders who supplied cane. The establishment of these two mills with the object of paying to the grower a higher price than he had been getting from the private planter, and having another aim, viz., the supplanting of coloured labour, was naturally not well received by the planters, who were exceedingly critical. The Colonial Sugar Refining Company, however, which had land at Homebush, near Mackay, and had erected a mill, now cut up their estate into moderate-sized farms, and the land was quickly taken up. The small farmer system thus began rapidly to come to the front, and a little later on the Sugar Works Guarantee Act gave further encouragement. It was soon recognised that this system had many advantages, and many of the larger planters began to cut up their holdings and sell farms to canegrowers.

The price of sugar still continued on the low side, and as Section II. of "*The Pacific Islanders Act of 1885*" provided that the importation of any more kanakas should cease at the end of 1890, this led to the cost of kanaka labour increasing, so that matters were not at all satisfactory. This was during the time of the Griffith Ministry, and when later a change of Government occurred it was determined to appoint a special Commission to make a full and searching inquiry into the general conditions of the industry.

This Commission, by its majority report found in 1889 that since 1883 sugars of all classes had fallen in price, and this was the principal reason for the depression; further, the cost of black labour had increased by more than 50 per cent. since 1883, and this, concurrent with the low price of sugar, had caused working expenses to exceed the value of the produce. The Central Mills of Racecourse and North Eton had not done well, and unless further subsidies were granted they must inevitably close. At the same time, the Commission recognised that it would be best that the business of growing sugar should be separated from manufacture. It was their opinion also that if all coloured labour was withdrawn the extinction of the industry must quickly follow, and they recommended that the introduction of this labour be permitted for some years longer than the period fixed for its ceasing. So in 1892 the section prohibiting the further entry of kanakas was repealed by a new Government, and kanaka labour thus re-established remained till the days of Federation.



PLATE 37.—RACECOURSE MILL, MACKAY.

The next year, 1893, was an important one to the industry, as "*The Sugar Works Guarantee Act of 1893*" became law. By means of this measure the following Central Mills were ultimately erected:—

Marian, Pleystowe, Plane Creek, Mackay; Proserpine, Proserpine; Mulgrave, Cairns; Mossman, Port Douglas district; Gin Gin, Bundaberg district; Isis, Childers; Mount Bauple, Maryborough district; Moreton, Nambour; Nerang, Southport district.

All these mills, except Nerang, are still working to-day.

No restriction was imposed by the Act with reference to the labour to be employed. It was asserted that this Act was the salvation of the Mackay district, and indirectly resulted in considerable revenue being derived by the State. It also caused the settlement of a large number of small growers in various parts of the colony.

Of course, the establishment of Central Mills was not unattended with difficulty, and it took much time before they were in actual operation. In some cases mills were erected before sufficient cane had been grown; other drawbacks were that landowners required too big a price for land, while some mills had to pay high rates for tramway easements.

In the case of the North Eton and Racecourse Mills which were erected before the passing of the Sugar Works Guarantee Act, provision was made for Government control, and the directors were divided into A directors (5) and B directors (4), the A directors being nominees of the Government. In the case of the mills under the Sugar Works Guarantee Act, the growers offered their land on mortgage as security for the advances made for building the mill and tramways. The Government held the deeds of the lands, but the growers had the sole management of the mills' affairs. The Act made no provision for Government control except in the case of a mill making default.

Reverting to the Racecourse Mill at Mackay, this was the first Central Mill erected to crush cane in Australia, and it was claimed that its foundation was the commencement of the White Australia movement in sugar. It was also the first mill owned and controlled by farmers to pay off its liability to the Government. In 1887, when the question of farmers' mills was first brought up, there were thirty-one mills in Mackay alone, and dissatisfaction was rife amongst the growers as to the treatment they received in the matter of price.

The price paid by Racecourse Mill at its first crushing was 12s. per ton for plant cane and 11s. for ratoons. The varieties principally grown at that time were Malabar, Striped Tanna, Black Tanna, Black Fiji, Meerah, and Rose Bamboo.

In 1891, the tonnage of cane required to make a ton of sugar at this mill had been reduced from 11½ tons to 9, and the sugar was sold to the Colonial Sugar Refining Company at an average price of £12 6s. 5½d. per ton, growers receiving 13s. 6d. per ton for cane. Finances, however, were at a pretty low ebb. The manager only received £250 per annum, and a proposal to increase his salary by £50 pretty nearly wrecked the directorate.

Under the 1893 Sugar Works Guarantee Act, about £500,000 was advanced by the Government for the erection of Central Mills. The original loans made by the Treasurer of Queensland were for a period of fifteen years, and valuations were made by a Government officer as provided by the Act. Provisions were embodied that if the mill made default the Treasurer could fix the price of cane and that the Treasurer could enter into the possession of the sugar works and all lands mortgaged.

Before the advent of the Central Sugar Mills, the old plantation methods with the kanakas resembled portions of the old world where the feudal system established communities whose schools, churches, and places of abode were practically under the control of one person. During the building of the numerous small mills artisans found employment for the time being, but after that the white staff of a plantation would consist only of overseers, clerks, and storekeepers. The capitalist alone was able to cope with pioneering difficulties in sugar-growing and manufacture. With the change in the conditions introduced by the Central Mills came a very decided alteration in the personnel of the people engaged in it. Instead of about fifty planters in a district, 800 small farmers took their place. The overseer of a gang of, say, sixty kanakas, was replaced by half a dozen farmers employing four kanakas each. The small men, in many cases labourers, who then entered on cane-growing were raised in the social scale to employers and finding themselves so, improved their opportunities. With the introduction of the Central Mill system, farmers became to some extent manufacturers and accustomed to supervising important businesses. These communities had their churches, schools, school of arts, sports and rifle clubs. The whole tendency was to eliminate the large landlord and create a type of reliant self-made men.

The kanaka days, however, were not without their humorous side. The boys would have feasts and sham fights, showing great proficiency in throwing grass spears. If they were late in turning out in the mornings they would often get a kick from an irate boss or overseer, but they mostly bore it smilingly. Their humpies or huts were in many cases built of grass and cane tops and trash, and it was not uncommon for a fire to happen at night time and then pandemonium would be let loose. There would be no hope of saving the structure, and the boys would be yelling like maniacs, and in many cases crying, with good reason as they often had money in the shape of notes hidden in the straw walls. When lined up for medical inspection it was amusing to hear the kanakas account of the various things that he considered were the matter with him or his "Mary" when he was married, and the dispenser at the mill hospital could tell many funny stories of life in the kanaka quarters. Occasionally, real battles would be fought between different island boys, and a death or two sometimes happened. The "boys" in many cases had horses, rode bicycles, held football and cricket matches, and generally, enjoyed life. On the whole they were well treated and had their protectors in the shape of Government officials who saw that they were properly looked after. There was scarcely any intermarriage with the whites. Of the half caste population in Queensland, in 1901 less than 2 per cent. were of Polynesian extraction, while the percentage of Chinese was almost 30. The total half caste population of the State at that time was 2,177, including aborigines. No kanakas were employed in the Central Sugar Mills.

The advent of the Central Mills led to a great decline in the number of private manufacturers, and to-day there are no sugar-mills operating owned by a single person.

Two of the small mills in the Beenleigh area are of the type of the old plantation small mills once so numerous in the colony of Queensland, and except that coloured labour is no longer employed and certain improvements in manufacture have been introduced, they would give a good idea of what the old mills were like.

Bureau of Sugar Experiment Stations.

CANE PEST COMBAT AND CONTROL.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report, for the period November to December, 1929, from the Entomologist at Meringa, Mr. E. Jarvis:—

Visit to Freshwater.

On 8th November the canefields in the vicinity of Jungara, Freshwater, Redlynch, &c., were searched for further evidence of the occurrence of *Ephysterus chersæa* Meyr. the small "tineid moth borer" of cane, which during September last was found to have attacked young ratoon shoots in this district. Apparently, however, Mr. McDougall was unable to find further signs of such damage.

Outwardly, the nature of the injury caused by *E. chersæa* corresponds in general appearance with that of our large noctuid moth borer (*Phragmatiphila truncata* Walk.), viz., destruction of the central or heart-leaves.

When first discovered and described by the present writer in the year 1919 it occurred at Pyramid, Meringa, Kamma, and Gordonvale, but has since spread to other widely separated localities. A full description of this moth and of its caterpillar, &c., will be found in Bulletin No. 11 of this office (Div. of Entomology, Bureau of Sug. Expt. Stations).

Attention has already been drawn to the fact that, not being an indigenous species, but having—in the opinion of Dr. Guy A. K. Marshall of the British Museum—been probably introduced into Australia from Natal, it is quite possible that, in the absence of its own natural enemies and other controlling factors, this insect might, in a new country like Australia, increase abnormally and become troublesome to our growers in the near future. In India this species is known to bore the stems of rice plants and various native grasses.

The Cane Beetle Situation at Meringa.

Up to date (17th December) no general emergence of cane beetles has taken place at Meringa, and we may reasonably assume that the prolonged dry conditions being still experienced here are likely to operate as a severe natural check on the numerical increase of this pest throughout drought-stricken areas.

It is interesting to record that the rainfall at Meringa during the last eight months of April to November has been only 7.88 inches; while the average for this period for the last forty years is 30.70 inches.

In addition to the beetle or imago condition of this cockchafer having been adversely affected by such climatic conditions, other controlling factors happen to have operated this year as a hindrance to normal development of its pupæ in the soil, so that around Meringa, at any rate, little damage should be experienced from grubs of this pest during the coming season.

Greyback cane beetles, however, made their appearance as usual at Gordonvale, Babinda, and other places early in November, when they were observed by the writer flying freely to electric lights in the immediate vicinity of the Mulgrave mill. At the residence of the electrician, Mr. F. P. Bell, where numerous specimens of these cockchafers were attracted to veranda lights of about 100 candle power, additional evidence was afforded in connection with the phototropic reaction of this species. Response to such light was at first of a very positive nature, the beetles being violently attracted, although often failing to reach their objective owing to ill-directed flight. In such cases they would fall to the ground, and, after crawling with rapid shambling motion for a few seconds, mount upwards and again endeavour to reach the centre of illumination. Such positive activity, however, generally lasted but a minute or so, the beetle then becoming quite motionless and unresponsive to phototropic influences.

This sudden reaction appeared very remarkable when occurring in insects which a moment before had been all aquiver with intense desire to plunge into the midst of such brightness.

It was noticed, too, that specimens while in this sleepy condition would remain without movement for hour after hour, although in some instances chancing to be settled only 3 or 4 inches away from an electric lamp.

Reaction of this nature would appear to be very similar to that induced by sunlight, seeing that these cockchafers rest in the daytime on the leaves of their feeding-trees, at which times they are usually in a torpid state and more or less motionless.

Distribution of Tachinid Flies.

Several liberations of this useful dipterous parasite (*Ceromasia sphenophori*) have been made during the last few weeks in the Goondi area. In each case, the living flies were taken to the borer-infested field in glass tubes by Mr. W. A. McDougall, of this Experiment Station, and liberated at spots where borers were most in evidence.

The various farms selected for further liberations are being planned by Mr. R. N. MacLean, the Field Chemist at Goondi mill; our intention being to collaborate with him in the work of systematically distributing these parasites throughout this canegrowing district.

Visit to the Herbert River.

On the 9th instant Mr. McDougall was instructed to proceed to Ingham, and, whilst there, to get into touch with the representatives of the various canegrowers' branches at Cordelia, Upper Stone River, Hawkins Creek, Macknade, Ingham, and Long Pocket. While visiting the district, inquiry will be made regarding the occurrence of primary cane pests at the different localities coming under observation.

During the fighting season of greyback cockchafers, and of other related scarabæid cane beetles, living and pinned specimens will be collected, the former for breeding at this Experiment Station, the latter for inclusion in our official collection of dried insects.

Certain data, also, in connection with grub and beetle borer damage, presence of moth borers, rat damage, &c., will be obtained for future reference and consideration.

ENTOMOLOGIST'S ADVICE TO CANEGROWERS.

Wireworm Damage in Evidence.

Cases of injury to young ratoon cane from attacks of wireworms have been brought under our notice during the last few weeks. Many of the stalks in such affected shoots are observed to wilt, turn brown, or dry up, and upon examination will often reveal the presence just below the surface of the ground of an irregular cavity which has been gnawed through the soft rind, and may in some cases extend to the centre of the shoot, thus bringing about death of the heart-leaves.

The larvæ of Click beetles, which are often termed wireworms, are long, more or less cylindrical in shape, and of narrow, even width, something like the shape of a small earthworm; the body being usually firm, glossy, and yellowish in colour.

When handled they slip easily from between the fingers. In most species the beetles are obscurely coloured, being uniformly dark-grey or blackish. When laid on their backs on a flat surface they are able to spring into the air and regain their footing, by means of violently jerking the body downwards on the hard surface.

Control measures are usually directed against the beetles. A bait made of chopped grass dipped in a solution of sodium arsenite and molasses (1 lb. arsenite, 8 lb. molasses, in 10 gallons water) has been found effective. The beetles should be collected from such baits soon after nightfall. Commonsense remedies are to increase the humus content of infested soils; while ploughing deeply collect the wireworms by hand before planting, and thoroughly drain and work the land when necessary, this control measure being of great importance on land which happens to be low-lying and badly drained naturally.

Cane Grub Control.

First-stage grubs of the "greyback" cockchafer will still be feeding at the beginning of this month, when they will change their skin and commence the second instar, during which, when numerous, they are able to cause serious damage to cane growing in light friable soils.

In order to distinguish between these moults of the grub stages of this cane beetle growers need only examine the head, which, unlike the body, does not alter in size after each succeeding moult. The width across the head in grubs of the first instar is $\frac{1}{8}$ inch, in the second stage $\frac{1}{4}$ inch, and in the third stage $\frac{3}{8}$ inch.

Keep the soil on areas liable to grub-infestation moving, at frequent intervals if possible, between the rows of young cane, during the month or five weeks occupied by the first larval instar, especially when the surface happens to be caked after heavy rain. Go as deep and as close to the plants as can be ventured without incurring risk of injury to main roots. Such treatment, in addition to promoting vigorous growth of the stools, tends also to destroy a certain percentage of the small first-stage grubs of this pest, and by opening the surface soil enables ants or other small enemies to reach them.

Growers are advised to maintain clean cultivation on land being reserved for early planting throughout the fighting season of the beetle, as a dense growth of weeds, &c., between cane rows often attracts egg-laden females of both the "grey-back" and French's cane beetle, the latter being very fond of ovipositing in such places.

CANE PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received from Mr. R. W. Mungomery, Assistant Entomologist at Bundaberg, the following notes (17th December, 1929) having reference to cane grub infestation in the Bundaberg and neighbouring districts:—

Notes on Grub Infestation.

It is rather significant that many of the farms in the Bundaberg district which have suffered from the ravages of grubs during the last spring have been those on which, or adjacent to which, it has been the custom to ratoon the cane over a long number of years. Old ratoon crops have in most cases suffered the severest damage. The losses incurred through the death of the stools from grub attack do not, in such cases, constitute the sole loss, since another factor enters into the question; that is, the fact that these old ratoons aid in perpetuating the grub pest, and are the means of spreading the infestation to younger blocks of cane nearby, which likewise suffer a considerable amount of damage.

Why Grubs Disappear.

In many instances it is true that some areas which formerly were notorious for grub damage are now almost free from this pest, or, at most, suffer no appreciable damage. This is most likely due to the combined action of insect parasites, predators, and diseases, both fungus and bacterial, all of which combine to keep the grub population down to very small limits. On the other hand, some areas previously free become infested, and once grubs become established in large numbers on a farm they usually remain troublesome over a period of years until the natural controlling agents increase sufficiently to reduce their numbers and restore the balance of nature. In areas such as these where growers know that their own or neighbouring farms have been infested within recent years, they should be forewarned and not allow their crops to ratoon too many times. After harvesting the second ratoon crop would, in most cases, be a good time to plough out and prepare the land for another crop. Although the writer is aware that in this district ratoon crops are, generally speaking, less costly to grow than plant crops, and also that growers often like to ratoon as long as they can profitably produce a crop, it is a case of false economy when by so doing they encourage grubs to increase unchecked.

The Rate at Which Grubs Increase.

In support of the above, the following example of the rate of increase of grubs will, no doubt, be of interest to those growers who have not yet become familiar with this side of the question. Take the case of a pair of large grubs which are below plough level, and therefore remain in the soil during the course of its preparation for spring planting. They change that year into the pupal and adult stages, and, assuming an equal sex ratio and reinfestation, thirty eggs are laid.

which, on hatching out, give rise to thirty grubs to infest the plant crop. Again, disregarding for the present deaths from natural enemies and infestation from outside, both of which factors, however, do operate, these grubs within a two-year life cycle remain over into the first ratoons, which they damage when young. In the following year they change into beetles, and the grubs resulting from these thirty beetles will then amount to 450, which will do a vast amount of damage to the young third ratoon crop, and would most likely completely destroy it. This demonstrates the fact that, by hand-picking and carefully cultivating the ground so as to rid it of grubs previous to planting, the infestation up to the second ratoon crop may be kept reasonably small; but by carrying on the practice of ratooning any further, this encourages a relatively heavier infestation of grubs in succeeding crops, which are in danger of being eaten out. This, therefore, gives every justification for recommending that, in grubby areas, the cane crop should, as far as is reasonably possible, be ploughed out after harvesting the second ratoon crop.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received from Mr. A. N. Burns, Assistant Entomologist at Mackay, the following report (17th December, 1929) for the month ended 12th December, 1929:—

Occurrence of Set Boring Grubs (*Pentodon Australis* Blkb.) in Racecourse Mill Area.

During the past month several fairly extensive outbreaks of grub damage to young plant cane were brought under the notice of the Experiment Station, and when inspections were subsequently made of the affected areas the injury was found to be caused by second and third-stage grubs of the *Pentodon* beetle. The chief damage was observed in farms quite near the mill, but also on several farms at Te Kowai, Walkerston, and Homebush, minor infestations were noted.

The injured cane presented a similar appearance to that damaged by grubs of the frenchi beetle, though the heart-leaves were more withered than they usually are when greyback or frenchi grubs are at the roots; this is no doubt due to the fact that grubs of this beetle invariably bore into the shoots below ground level or else into the sets themselves. Unlike the other two abovementioned species they are not very partial to the fibrous roots of the cane. In some instances as many as four and five third-stage grubs were found inside the sets, some had entered through the cut ends, whilst others had bored through the rind into the interiors of the sets. Holes made by these grubs were usually quite round, and their tunnels may be several inches in length.

On account of the prevalence of this insect at times in the Maroochy River district, near Brisbane, and its characteristic habit of boring into shoots and sets, it has received the appropriate name of the "Black Stem Gouger." The adult beetle is jet black, hence that descriptive part of the name.

The life cycle of this insect is comparatively short, and there are probably several generations of it produced in a year, though only one main one because most of the eggs are recorded as being laid during the spring months, thus producing the generation at present active in canefields. The three stages of the grub are passed through in the space of a few weeks, and the pupal stage occupies about three weeks only.

In nearly all the patches affected on the farms inspected, also on the Experiment Station where a few of these grubs were discovered, the infestation was confined to hollows in the fields, or else to areas where silt had been deposited by rain water, and therefore naturally low areas.

Outbreaks of this pest do not appear to be general every year; they seem to occur every few years with a comparative scarcity during the intervening years. The beetles themselves are not very frequently noticed on the wing, odd specimens are sometimes attracted to artificial lights. This beetle is recorded as being rare in the Cairns district, but occurs freely in the Mackay, Bundaberg, Maryborough, and Brisbane districts. Besides being recorded as a cane pest in Queensland, this species also attacks the roots of corn, both in New South Wales and some parts of Queensland. There are several other related species belonging to the same genus (*Pentodon*) which are recorded as being injurious to various root crops in other parts of the world.

A brief description of the fully-fed third-stage grub is as follows:—Length, in natural curved position, $\frac{3}{4}$ to 1 in. (about 22 mm.), width of head 0.2 in. (5 mm.), body whitish-cream with abdominal segments dirty bluish-black. Dorsally the tops of the curves of each body segment and the inter segmental ridges carry several (from 2 to 4) transverse rows of short dark-brown bristles. Spiracles brown, a pair on each of segments 1 and numbers 4 to 11. Legs pale yellowish brown, joints 2 and 3 carrying a number of long brown hairs. There is no distinct anal path; the anal segment carries on its ventral surface a patch of dark-brown bristles, about 110 in number. Those following the anal suture (numbering about 10 on either side) are much longer than the other bristles. Head dark-brown, mandibles very dark-brown at base becoming quite black towards and at the extremities. Labrum dark brown-black. Antennæ brown, devoid of hairs.

The pupa measures about $\frac{3}{4}$ in. in length; when newly changed it is creamy yellow in colour, darkening to brown as development progresses. Abdominal segments sharply defined, eight visible dorsally, and forming a slight ridge along the middle of the dorsal area. The junctions or sutures between these segments from numbers 1 to 5 have a small dark-brown inverted V-shaped marking (slightly flattened) at their medians. The tip of the anal segment carries a small cleft brownish marking.

The adult beetle measures about $\frac{3}{4}$ in. in length (16 mm.) and is of a uniform shiny black colour above. The ventral surface, particularly in the coxal sutures and near the outer edges and segmental junctures, is reddish-black. The portions of the legs extending beyond the body are black and thick set, also moderately hairy. The antennæ are dark reddish-black.

To date outbreaks of this insect have not really been extensive enough to warrant fumigation, but this method of control could be carried out if necessary and in precisely the same manner as for grubs of the greyback beetle. As the areas subjected to attack are usually small, replanting with sets (whilst wet) that have been dipped in a solution of sodium arsenite, molasses, and water has been recommended. Further injury is not likely to occur from the present time onwards, because now all the grubs are practically in the pupal stage; and the other generations produced at times other than the spring months do not appear to cause much injury. In the Bundaberg district it was noticed that where thin sets had been planted they suffered the most, doubtless owing to the lack of reserve nutriment for the shoots and roots. Where thicker sets had been planted the effect on the cane was not so bad, and new shoots developed from the bases of the original ones.

Occurrence of Sugar-cane Aleurodid or "Snow Fly" (*Aleurodes berghi?* Sign.) at Farleigh.

Some two weeks ago numbers of this small insect were observed in a field of plant cane E.K. 28 and Q. 813, and about 2 miles from the Farleigh mill. A considerable number of plants were attacked, and the injury inflicted by these aphid-like insects combined with the extremely dry weather conditions had caused a considerable amount of yellowing of the plants.

These insects secrete a saccharine-like substance which is greatly attractive to some species of ants, which in consequence swarm over the Aleurodids to obtain this sweet substance. These ants no doubt form a natural protection to the former from parasitic insects, &c. The ants attending the specimens observed were a small black, long-legged, active species, probably belonging to the genus *Cremastogaster*, which contains a number of ants that are found in company with aphids, hoppers, larvæ, &c.

Very little appears to be known regarding the life history of this insect which appears to be identical with a species that commonly attacks sugar-cane leaves in Java.

The eggs are laid in groups on the under surface of the cane leaves, invariably the older leaves. The young larvæ on emergence "form oval glass-like cases of different colours and feed inside these and finally pupate there." (Froggatt, Ent., N.S.W.)

The adult insects are very active, and when disturbed spring out and fly from the cane. Whilst feeding they congregate in little groups on the undersides of the cane leaves and amongst the larval cases, eggs, &c. In this position the wings are kept folded tent-like over the back which gives the insects a triangular appearance. The total length in this position is about 1.75 mm. With the wings expanded they measure approximately 2.5 mm. The forewings are greyish white with two distinct and one obscure black transverse bands across them, the obscure one being situated between the other two. These bands are intercepted by a longitudinal vein which runs the entire length of the wing, almost centrally. The two distinct bands are situated one near the base of the wings and the other in the sub-apical area. At the

end of the central wing vein on the outer edge is a small black spot; there is also another minute black spot almost at the base of the wing in the lower hind margin below the median vein and between the first two transverse black markings. The hindwings are much smaller than the forewings and are semi-transparent whitish. The head, thorax, and abdomen are dark-greyish with a bluish tinge, and the legs are brownish.

Attacks by this insect have so far never been recorded as having been severe enough to call for control measures. As it is, the outer and consequently older leaves of the cane shoots only are attacked, therefore a fairly easy and efficient control would be to simply cut these off, which would not injure the plants, and burn them. By this method no doubt many adults would escape, but all eggs, larvæ, and pupæ would be destroyed.

The following report (30th December, 1929) from Mr. W. A. McDougall, the Assistant to the Entomologist, Meringa, has been received by the Bureau of Sugar Experiment Stations:—

Attempts to establish tachinid flies in the Herbert River district have not been successful. Under 1 per cent. of sticks is infested by borer; much too small an infestation to support flies.

Of the minor pests, the "army worms" do very little damage, and "dead-hearts" are noticed occasionally. The false wireworm (*Gonocephalum carpentariæ* Blkb.) was reported as attacking cane during February and March of this year. The damage from this beetle, in these instances, would not necessitate control measures as given on page 34 of Bulletin 3, Revised Edition 1927 (Bureau of Sugar Experiment Stations).

As in other northern mill areas the grub damage, during the early part of this year, was the heaviest for many years. Most of it was confined to the Hawkins Creek (Macknade mill) and Upper Stone (Victoria mill) districts. The weather conditions during the past six weeks have given beetle emergences (from the ground) a severe check. About 6th December at Hawkins Creek and 27th November at Upper Stone would see the beginning of much lighter flights than those of last year. Elsewhere in these mill areas "greybacks" are comparatively scarce. There were numerous Christmas beetles (*Anoplognathus boisduvali* Bois.), called the "Golden Beetle" by the farmers on the Herbert, and *Repsimus æneus* Fab. ("Blue Beetle") resting on Moreton Bay Ash or Poplar Gum. Near Halifax single specimens of *Anoplognathus smaragdinus* Ohaus (female) and of *Calloodes rayneri* Macleay were shaken off a tea-tree and off River Hibiscus (*Hibiscus tiliaceus*), called "fourpenny" tree by the farmers. Of these four species of beetles the first is known to damage cane, but only under exceptionally dry weather conditions. One farm suffered from grub damage during September of this year. It appears that grubs of *A. boisduvali* were responsible. There are still some third-stage grubs of this beetle to be picked up alive, while it is evident that many have been destroyed by Campsomeris wasps. Pest destruction funds are, as usual, paying for beetles collected. Unfortunately, the two districts which suffered the damage from grubs during the early part of this year cannot pay for beetles at present. Most of the funds were spent combating other pests. Early next year those in charge of this type of work in the Herbert River district hope to put in trial fumigation plots against the "greyback" grubs. From the nature of the flights it would seem that extensive digging will have to be done and careful selections of localities made for these trials to serve their purpose.

Thanks are due to field officers of Macknade and Victoria mills, the secretary of the H.R.D.C.G.A., and several farmers for help given and information supplied.

THE JOURNAL APPRECIATED.

Renewing his subscription to the "Q.A.J." for another five years, a Cooroy farmer writes (2nd January, 1930):—

"We appreciate its help; receive profit from its instructions; enjoy its pictures; and admire its literary quality. We look for its coming every time."

ARMILLARIA ROOT ROT.*

By J. H. SIMMONDS, M.Sc., Plant Pathologist.

Armillaria mellea, commonly known as the honey fungus on account of the characteristic colour of its mushroom-like fruiting stage, is one of the comparatively few fungi which are well able to adapt themselves to either a saprophytic or parasitic habit of growth. Normally this fungus lives as a saprophyte on old decaying roots, stumps, &c., but should it come in contact with the root of a suitable living host it can attack this, usually per medium of some injury, and cause extensive rot which very often ends in death.

As a parasite the fungus is capable of attacking many different hosts belonging to widely separated groups of plants. In Europe, considerable loss occurs in the pine forests as the result of the rotting of the roots and base of the trunk by this fungus. In America many native and introduced trees may be attacked. In Australia *Armillaria* root rot is found affecting, in many cases to a serious extent, citrus, deciduous trees, especially the apple, and the grape. The potato is also sometimes attacked, and is noteworthy as being one of the few herbaceous plants affected with the disease.

SYMPTOMS.

Unfortunately this rot is a somewhat insidious disease, and considerable damage may be done to the underground parts of the plant before the symptoms resulting from this are sufficiently marked to be noted. An affected tree usually exhibits a stunted condition of growth, a yellowing of the foliage, and possibly more or less dieback. Branches on one side having for their source of supply one or more attacked roots may exhibit these symptoms to a more marked extent. Frequently the tree when approaching a dying condition will throw an abnormally large crop of fruit as a last effort to perpetuate its species.

Should any such symptoms be observed, the soil should be removed well away from all the main roots and a careful examination made for signs of *Armillaria* invasion. This will be indicated by more or less extensive areas of soft rotting bark, which may be easily stripped off, and yields a characteristic mushroom odour. White felt-like wefts of closely interwoven fungal threads may sometimes be observed lying between the bark and the wood.

The most characteristic feature is the presence of shiny-black or dark-brown string-like fungal strands or rhizomorphs. These rhizomorphs are specially modified structures developed to enable the fungus to resist the adverse conditions of desiccation, &c., met with during its life in the soil. Each strand consists of an outer resistant layer or cortex formed of closely interwoven fungal threads or mycelium, which are intimately fused with one another to give a cellular structure resembling that found in the higher plants. The central portion consists of more loosely woven mycelium, and is known as the medulla.

In citrus the black rhizomorphs lie more or less embedded in the softened bark or else radiate out as free, branched strands. In the former case they may appear merely as short black irregular streaks protruding from a crack in the bark, or they may be entirely superficial though firmly attached (Plate 38).

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

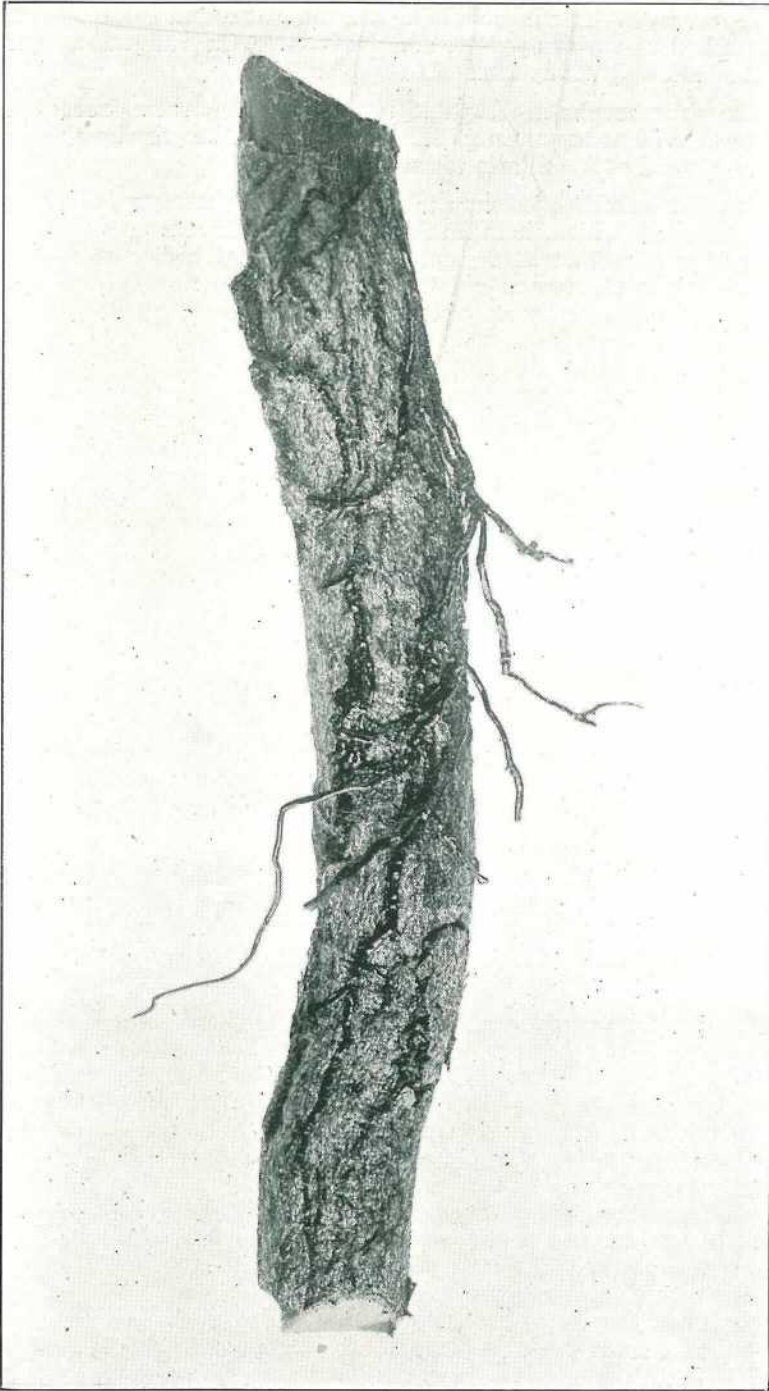


PLATE 38.—ORANGE ROOT ATTACKED BY *Armillaria mellea*.

In the apple and most other fruit trees the rhizomorphs are free and appear as black strings more or less tangled round the roots. These are attached at various points, and from these the fungus extends out into the bark and woody tissue of the plant.

The rhizomorphs are capable of growth from their free ends for considerable distances through the soil, and it is largely by this means that the spread of *Armillaria* takes place.

Armillaria mellea belongs to one of the highest groups of fungi, the Agariceae, which includes those of the mushroom type. During a period of wet weather in the autumn the fruiting bodies of this fungus may appear in clusters round the base of old rotting stumps, &c., or beneath fruit-trees badly affected with the disease. These structures are of the ordinary toadstool shape, and have a yellow-brown or honey-coloured stalk and disc, the latter being speckled over with small brown scales. The gills on the under surface of the disc are white and distinct. Covering the outside of each gill is the layer known as the hymenium. This consists of closely packed club-shaped cells, some of which project somewhat further than their neighbours and develop on their apex four short peg-like projections, on each of which is developed a minute rounded basidiospore. Many millions of these spores may be produced in a day by one toadstool.

The basidiospores germinate and are able to infect decaying wood with which they may be associated and thus serve to extend the saprophytic activities of the fungus. Apparently the living plant becomes infected only when attacked by one of the rhizomorphs. In a new orchard these have been previously developed upon rotting remains of scrub and forest trees left in the ground during clearing operations. Usually the fungus gains entrance through an injured or dying root or through one which is closely associated with the original rotting material.

CONTROL.

If possible, land which is to be used for orchard purposes should be well stumped and have all the main roots removed by thorough and deep ploughing. Annual crops, other than potatoes which are also affected, could be planted for a year or more in order to allow time for the fungus to die out of the soil.

If a preliminary inspection has shown a tree to be attacked, the soil must be removed well away from the crown and main roots so as to expose them to easy access. Any badly rotted roots are then removed entirely. Others less extensively attacked must have the affected areas thoroughly cut out until sound tissue is reached, after which Bordeaux paste should be painted on the wounds. Any diseased material will of course be carefully collected and burnt. The pieces may be conveniently gathered by laying a piece of paper under the scene of operations. The main roots should be left exposed to the beneficial action of the sun and air for as long as the absence of frosts will permit. This treatment is usually effective only if the disease is caught in its early stages before the fungus has penetrated too deeply into the wood.

If a tree is too badly diseased for remedial measures to be a success, it should be carefully removed together with all its roots, and should be burnt on the spot. If the original stump or root from which infection started can be located, this also should be dug out and burnt.

The affected area is then best isolated, to prevent the spreading of the fungal rhizomorphs through the soil to healthy trees, by digging a trench 2 feet deep round the outside of the furthest root extension of the diseased one. The soil within the trench should be repeatedly turned over and exposed to the sun. Replanting should be delayed for two or three years, otherwise there is a chance for the new tree to become infected from rhizomorphs unintentionally left in the ground.

RURAL LIFE IN OTHER LANDS—IX.

By the EDITOR.*

HIGHWAYS IN HOLLAND.

SO unique are its problems, so industrious are its people, and so interesting is the country generally that one was tempted to stay a little longer in Holland after leaving Germany and before going back across the border into Belgium and down once more along the pleasant roads of France where the sun is sometimes seen for at least two successive days.

Nature only gave the Dutchman a sporting chance to settle and develop his country, and how slender that chance was can be imagined when it is known that, but for the long lines of dykes that dam back the sea, any high tide would swamp nearly 40 per cent. of the total land surface of the country. Miles and miles of embankments are also necessary to hold in channel the river waters which, uncontrolled, would flood vast tracts of what is now, more or less, dry land.

The eternal battle of the Dutch farmer is to keep his head literally above the water—we would welcome some of his complaint in parts of Queensland—and the story of his age-long fight against that element is one of the most inspiring in human history. That he has succeeded against such heavy odds is a tribute to characteristics of invincible pluck, dour determination, and an unbeatable spirit that arouses at once one's admiration.

A Nation Built Out of a Bog.

“He who cannot keep out the water doesn't deserve the land” is the principle on which the man of Holland built his nation up out of the bog. The immensity of the problem is evident when it is realised that most of the country is below sea level, so ordinary drainage was out of the question. To meet this difficulty (a very serious one in a wet climate) a system of uphill drainage was devised. This is how it was done: When it was decided to reclaim a water-covered area a dyke was built round it. Windmills of sufficient power and dependability were erected and a series of canals constructed. By wind power the water in the drains on the lowest levels was lifted into higher ditches, until finally it was delivered into a high-level canal with an outlet to the sea.

I saw a device on something like the same principle, but of different mechanism, at a place called La Louviere, near Mons in Belgium, where it is necessary to lift fully-laden barges from a low-level canal to a high-level channel. The lift was something like 30 feet. Though it seemed an impossibility to a layman at first glance, yet it was quite simple in practice. It was done in this way: The barge was floated into a lock or tank with doors or gates that could be sealed and made water-tight at both ends. As soon as the gate entrance to the lock was closed the mechanism was brought into action. This was governed by hydraulic power and the lock or tank, with its loaded barge afloat on the impounded water, commenced to rise slowly on great steel shafts on a principle similar to that employed in the operation of old-fashioned hydraulic lifts in lofty buildings. On reaching the limit of elevation the other gate of the lock was released and the laden barge floated out into the canal on the higher level to sail majestically on its way. All through the Low Countries, in Holland particularly where most of the country's transport is by water, one often experienced the illusion of barges sailing placidly through green-grassed fields without being water-borne. This illusion was heightened when the canals were high above the bordering land levels.

* In a Radio Talk from 4QG.

What the water question means to the Dutch people, particularly the Dutch farmer, is expressed in the fact that one of the most important of public offices is the Waterstaat which supervises generally the means of countering the constant problem of how to get rid of unwanted water.

A Land of Ordered Beauty.

Every highway in Holland—they were cobbled with stone cubes like the old familiar road to Armentieres—seemed to be bordered on either side with a canal and a row of trees. Through towns and villages the canals flowed and into them was dumped all household refuse—in fact, the canal seemed to take the place of the compost heap in every French and Belgian back yard, and neither Kingfisher Creek nor Upper Breakfast Creek could compare with them in strength and power of smell. But in spite of it all, on figures, Holland is one of the healthiest countries in the world, though at least one cynic has remarked that the slow-moving, almost stagnant water in the canals of Holland is so bad that even microbes haven't a chance to win a living in it. That is, however, by the way.

Perhaps, because it seemed so different from any other environment that one had known, that one learnt to appreciate the ordered beauty of rural Holland. Well cared-for trees lined every roadway and bordered every canal. Through the trees one saw fields as flat and fresh as bowling greens. No fences or hedges broke the vista, trenches formed the dividing lines between the farms. Canals and ditches criss-crossed the landscape.

Where Everybody Works.

Everyone seems to work in Holland—I am speaking now of the country—not of its cities, where poverty, the bitter struggle for existence and heart-breaking unemployment are much what they are like in the centres of population of other European countries—and everything seems to have a definite utilitarian value. The farmhouses seem to have been built on a uniform plan—square, solid brick structures with high pitched roofs—the space under the roof being generally used as a hay loft. Cattle are housed in winter in an extension of the dwelling and practically under the same roof. The winter quarters of the stock are kept scrupulously clean. The cattle are housed from November until April, and for the rest of the year are milked in the open. It is a common sight to see the cows milked alongside the road without bails; leg-ropes are used, but in a different way from our practice. The animal's legs are tied together below the knee and thus the risk of Daisy kicking the bucket, or putting her foot in it, is obviated. The Friesian—great framed, big-boned, well-fed animals—is the favoured breed. In Holland one never sees a poor cow. Most of the milk is used for cheese, which is processed in co-operative factories. The cheese is moulded, as a rule, into balls about as big as a boy's soccer football, then salted for a couple of days and then stored for curing. After a fortnight in storage they are marketed.

Living on the Cow.

Dutch farmers sell on outside markets something over 80,000 tons of cheese a year, valued at over £6,000,000 sterling. Butter exports are about the same. Condensed and powdered milk are also exported, their annual value approaching £5,000,000 sterling. Altogether in Holland, with its population of about 8,000,000 and its area of 12,500 square miles—about equal in size to a North Australian cattle station—nearly 600,000 people depend on the cow directly for a living. The dairy business is carried out co-operatively, almost entirely so, and the highest efficiency is aimed at in every stage of production, processing, and marketing. Every cheese, for instance, must bear the brand of the Netherland Cheese Control as a guarantee of quality. Every package of butter carries a similar guarantee.

Where Flower Gardens are an Economic Asset.

A short run by car from the dairying country brought us to a district where rural industry was entirely different. The land there was originally a lake bottom which had been entirely drained and reclaimed. Flower cultivation was evidently the main industry, and the whole way ran through beautiful flower gardens in which the tulip predominated. When these gardens are in bloom the delightful artistry of Nature reveals itself in a riot of gorgeous hues. The effect of this massed colouring is marvellous. In comparison one thought of emerald slopes in Picardy, poppy splashed—seemingly careless spills of intensest red on fields of green enamel; of apple lands in Normandy in early autumn; of an English woodland in summer with its beautiful bluebell carpet; of the Vale of Glendalough in Ireland, where the

greenest of green is seen; of Scottish highlands clad in royal purple when the bloom is on the heather; of streets in Perth when the flowering gums are blossoming; of cannas grouped in Sydney gardens; of Brisbane in jacaranda time, or later, when the poinciana offers for our admiration its glory of scarlet beauty. A large export trade in bulbs and seeds has been built up with Britain, America, and other countries. The flower lands have been cut up into very small holdings, and that is one of the reasons why farmed area averages are so low in Holland. About three-fourths of all the farms in the country are of areas less than 25 acres. About 15 per cent. are from 25 to 50 acres, and only 2 per cent. more than 125 acres in extent. Only twenty-four people in Holland own more than 500 acres, and only 216 holdings are more than 250 acres.

Every district seems to have its own distinctive rural industry. For instance, round about a place called Boskoop something like 10,000 people make a living out of cultivating nursery stock, mainly for export. From Boskoop it is only a coo-ee over to Gouda, where cheese is the standby; and not far across to North Brabant and the southern province of Limberg where cheese, though of a different order (and smell), is also made.

From the flat country Limberg is a break with its picturesque, low, road-ribbed hills and quadrangles of growing grain and blossoming orchard lands.

Reclamation of the sea bottom and other water-covered lands is still proceeding in Holland. The Zuyder Zee is the scene of the biggest operation, and it is planned to add, when this project is completed, 500,000 more acres of fertile soil to the Netherlands land area, which will make more room (not much) for Holland's ever-increasing population.

One of the World's Best Object Lessons.

There was always, in one's brief wanderings through parts of rural Europe, something to learn, estimate, or compare—the characteristics of the people, their customs, methods, traditions, outlook, and so forth. And there was always much to wonder at, to appreciate, and to highly appraise. There was to be experienced, too, the charm of scenic variety and historical associations in many lands where the records of our human story are etched on every contour, and in which many architectural monuments mark as milestones the march of human progress down the centuries.

One of the most interesting countries of Europe is Holland, or, as the Dutch like to call it, the Kingdom of the Netherlands, and it furnishes one of the best object-lessons in the world in the way of conversion of waste lands into fertile and prolific farming country. Holland, as we in Australia measure areas and distances, is a very small country with its total land surface of 12,500 square miles. The country is divided naturally into low-lying delta lands, which have been reclaimed from the sea—a region of natural channels and canals—and a definite section of that great North European plain which takes in Belgium and Northern Germany. The climate is rather colder than England, and, as cultivation of the soil is so intense, there is very little natural vegetation. Holland's main home production includes bulbs, sugar-beet, flax, other ordinary farm and garden crops, and dairy produce. It is net-worked with an excellent road system, and water carriage by canals adds to the ease of transportation. It does a large transit trade with the Rhine Valley, and also a big export business with Britain and its nearer neighbours.

Something Like an Agricultural Problem.

Nearly 35 per cent. of Holland's total area is alluvial, and that accounts for its great fertility. Originally much of the land along the North Sea coast, which is below sea-level, was peat moor constantly flooded. Lakes were formed, and these were drained or pumped dry by windmill power. The lake bottoms and other water-logged lands were converted by infinite labour against river and sea encroachment into very rich pasture lands. That was something like an agricultural problem.

This great national work, of course, could not be done by individuals, and a system of co-operation was instituted throughout large districts. This co-operative system of water fighting was not backed by any State organisation. Its beginning was the effort of private initiative a thousand years ago.

This spirit of co-operation, which is one of the outstanding characteristics of the Dutch farmer, in rural enterprise was, through continual battling against the elements, with the possibility of overwhelming disaster always round the corner, grafted into the very soul of the nation.

Modern engineering skill has, of course, removed what was an ever-present dread; it has been a great factor in the success of other and more extensive reclamation schemes in Holland, but the cost of maintenance of dykes and waterways still goes on. From 10s. to £1 an acre is the annual charge imposed for the upkeep of the service. The reclaimed lands are of great natural fertility, and not only is a high acreage production the rule, but crops are regular and reliable. As Britain may be regarded as the stud stock farm of Europe (and the world generally for that matter), so Holland may be called the vegetable garden of Western Europe.

The low level of the country and natural fertility of the soil, so much of which was won from the sea, is very favourable to dairying as practised in Holland. About 27 per cent. of the country is cultivated, and about 38 per cent. is under permanent pasture, but these figures do not give quite a clear idea of the importance of grass lands in Holland. Most of the best soil is carrying grass, and grazing of dairy cattle there may be described almost as an exact science. Not a square yard of pasture is allowed to remain idle, and pasture restoration and renovation are carefully and continually practised. In some districts not a single acre of ploughed land is to be seen, only 5 to 10-acre fields, as flat as a tennis lawn, in which a furrow is never turned, and on which one seldom sees a horse, but instead herds of sleek dairy cows cud-chewing or grazing contentedly, and occasionally some sheep and pigs.

Dutch Dairying.

In Holland, according to the information available, in the course of the last fifty years or so, cattle breeding, cultivation, and dairying have been so improved technically that, notwithstanding an ever increasing population and consumption, the export surplus of dairy products has kept going up. Although the population has increased since 1900 from 5,000,000 to somewhere about 8,000,000, the export of butter has gone up from 22,000 to 45,000 tons; of cheese from 47,000 tons to 84,000 tons, and of condensed milk from nothing to 148,000 tons. The fact that Holland, with all its disadvantages and physical difficulties, is probably the greatest exporter of cheese, proves how much the production of food can be increased by sound farming assisted by trained scientists and technical experts.

Another remarkable thing is that this high production is possible in a country where most of the farms are comparatively small. Large landed estates are unknown in Holland. In the pastoral districts the size of the farms varies between 40 and 100 acres, cattle are kept in the open from mid-spring until late autumn, and housing of stock is thus necessary for about five months of the year.

That agricultural production in Holland has been lifted to such a high level is due not only to the practical skill of the Dutch farmer, but also, as in Denmark, to the excellent organisation of agricultural instruction by the State. The way is made easy there for every farmer's son to receive sound technical farm training, and for the farmers to obtain sound advice at very little cost. In this regard our own system in Queensland bears favourable comparison, with this difference—that the services of trained agriculturists and scientists are made available to the Queensland farmer without any charge whatever.

Rural Education.

Of course, in Holland with its long winters, when farmers naturally spend much of their time indoors, rural education is sought, perhaps, with greater earnestness, but so strong is public opinion there on this subject that a young farmer who has not attended an agricultural winter school, or, at least, taken a winter course in agriculture or animal husbandry, is not taken seriously. The consequence is that the younger generation of farmers no longer holds on to old-fashioned ideas and working methods, but eagerly applies in practice every available modern improvement. In Queensland we are doing something in this way through an excellent system, which is developing well, of winter schools of instruction for farmers at the Queensland Agricultural High School and College at Gatton.

No Fancy Farms in Holland.

Another fact worthy of consideration is that, in a country of small farmers, not overburdened with capital, breeds of dairy cattle should be worked up to such a high standard. In other countries this work is left to a few expert breeders. There are no fancy farms in Holland. Dutch breeders have always been influenced by economic conditions, and a Dutch farmer, we are told, cannot indulge in the luxury of breeding fancy cattle. Experience has taught him that raising milk

production abnormally would, in the long run, give a smaller financial result if, at the same time, attention were not given to the cow's constitution. Nor does the Dutch farmer set any great value on artificially boosted high milk production of individual animals, especially when the fat percentage is not taken into account.

The Importance of Herd Testing.

He attaches great importance to milk-testing; more than 65 per cent. of the milch cows in Friesland, for instance, are regularly tested. Not only the milk production, but the fat percentage is regularly determined, and in selecting breeding cattle, greater importance is attached to the latter than to the former. By applying this method the average production of milch cows inscribed in the Friesian Herd Book has been raised from 4,357 kilos (kilog equals 2½ lb.) in 1912 to 4,586 kilos in 1924, and the fat percentage from 3.20 to 3.52 per cent., and the production of butter from 150 to 175 kilos within the same period.

In Queensland, of course, we have our own herd-testing scheme, the advantages of which are appreciated by an ever-growing number of dairy farmers. In other directions, too, we are well in the van of agricultural progress, but there are still left some avenues of rural enterprise in which, if I may so suggest, the Dutch farmer may be regarded by us all as a sound and industrious exemplar.

NOTES ON PROCEEDINGS OF THE AGRICULTURAL SECTION OF THE CONFERENCE OF EMPIRE METEOROLOGISTS, 1929.

Subjoined is a report of the proceedings of the recent Conference of Empire Meteorologists prepared by Mr. A. S. Fitzpatrick, M.Sc., who is attached to the staff of the representative in Great Britain of the Council and of the Development and Migration Commission, and which we have received from the Council of Scientific and Industrial Research:—

I attended the meetings of the above section of the conference held from 29th August to 4th September, 1929. During this time most of the overseas delegates attended, and there was a fair representation of agricultural research workers from Great Britain.

As will be seen from the attached papers, the subjects dealt with mainly concerned the relationship between meteorology and various phases of agricultural research—viz., plant physiology and disease; fruit production; animal numbers; entomology; and crop forecasting.

Although papers dealing with one or more of these subjects were presented from most parts of the Empire, there was no printed contribution from Australia. Colonel Gold, however, read a paper which had been submitted by Mr. Hunt, the Commonwealth Meteorologist, dealing with the subject of seasonal forecasting. Despite the existence of valuable work—such as Richardson's studies on plant respiration—delegates to the conference might reasonably have deduced that there is little valuable co-operation in Australia between agricultural research workers and meteorologists.

The sectional discussions opened with a paper by Sir Napier Shaw on the value of weekly records of meteorological factors. Following discussion on this point, it was agreed by the conference that the monthly summary attended to obscure phenomena to a greater extent than would weekly averages, and that the week should, therefore, be adopted as a unit for observations in agricultural meteorology.

On the broader question of education in meteorology and its agricultural relationships, the conference felt that greater attention should be devoted by Universities, Agricultural Colleges, and Farm Schools throughout the Empire to provision of instruction in the physics of the atmosphere and the geography of weather.

It was obvious throughout the meetings of the section that the meteorologists were not fully aware of the exact data required by the research worker, and that the research worker, when he knew the exact data he required, was not aware of the apparatus or methods suitable for arriving at this data. This gave rise to one motion that meteorology could render valuable service to agriculture by assisting agriculturalists to devise standard methods for adoption in the systematic recording of these local climates and by studying the results as meteorological data.

The section also considered that there was scope to extend standard records in order to measure factors such as the intensity and quality of radiation and the moisture content of soil. When, however, the results of agricultural research are published, the section considers that those results should be accompanied by adequate meteorological observations since the results may be susceptible to closer analysis in the light of the meteorological conditions experienced during the course of the research work.

The question of establishing a clearing station for information on methods and results of agricultural meteorological work was considered. The Ministry of Agriculture and Fisheries is at present doing work in this direction, and certain aspects of agricultural meteorology are covered by the existing Imperial Bureaux of soil, science, animal nutrition, animal health, animal genetics, entomology, and mycology. It was, therefore, felt desirable to ask the Ministry of Agriculture and Fisheries to develop its work in this direction with a view to obtaining information likely to be useful as a guide to the Imperial Agricultural Research Conference which is to be held in Australia in 1932. The papers definitely setting out to establish a relationship between meteorological factors and specific problems in agricultural research in most cases showed that though their authors felt that meteorological factors were important and in some cases predominant in their influences, the exact degree of influence exerted by those factors had not been determined. For this reason motions were proposed and carried recommending surveys in different parts of the Empire to determine, for example, for fruit crops the effect of varying weather conditions on the growth, cropping, and resistance to diseases and pests of fruit grown on soils of various types, and the degree of susceptibility to frost damage of the chief commercial varieties of fruit, and to discover the characters which confer resistance to frost.

In regard to the numbers of wild animals, it was felt that the fluctuations in these numbers was closely related to meteorological conditions, and that co-operative research should, therefore, be prosecuted.

Again, in relation to insect pests and plant diseases and their mass outbreaks, it was considered that more attention should be paid to the effects of atmospheric phenomena.

The question of forecasting crop yields provoked considerable discussion, and it was obvious that there was a wide divergence as to the best methods of estimating yields.

The section finally agreed that complete investigation was necessary to determine reliable methods for the improvement of forecasts. The statistical methods of Dr. R. A. Fisher, of Rothamsted, in ascertaining the effect of rainfall on wheat yield were mentioned in this connection, and it seems likely that Dr. Fisher's methods will be thoroughly examined during the next two years.

One's general impression was that the sectional discussions had provided a useful opportunity for the agricultural research workers to place before meteorologists of the Empire some of their difficulties, and the need for a closer connection between the study of weather and climate and the examination of biological problems. In particular, useful discussions took place on the best methods of recording soil temperatures, and of determining the photo-electric and photo-chemical intensity of daylight.

THE MOTOR A MODERN BLESSING.

“To state quite bluntly that the whole face of the civilised globe has altered and is being altered by motor-cars, to an extent which changes the attitude of the public towards morals, comfort, health, and even facial characteristics, savours of exaggeration at first sight,” writes Professor A. M. Low, in the “Sunday Dispatch.” “For a fortunate few the motor-car still possesses its sporting attraction, but to the majority it has become a necessity; far more important than the doctor's brougham and capable of bringing a new atmosphere into every phase of domestic or commercial life. The motor-car spells freedom. It is the most revolutionary agent that civilisation has known. It is helping to produce international peace and international language. It is changing the face of the world before our very eyes. An invention which brings with it a desire for education cannot but benefit mankind. Make no mistake. The changes that are taking place in civilisation are not all for the bad. For many of them the motor-car is entirely responsible.”

CHICKEN-POX IN POULTRY.

From February to May is the period over which trouble from chicken-pox may be expected by poultry farmers in this State, but by the adoption of the proper measures much can be done to minimise loss.

Chicken-pox, or "warts," is generally ascribed to bites of mosquitoes, which are believed by some to be the sole cause of the malady, but this is incorrect, observes the Poultry Expert of the Department of Agriculture. The so-called "warts" are proved, by both practical experience and scientific investigation, to be "chicken-pox," a specific disease, just as are small-pox and chicken-pox in human beings. Experience has shown that it is preventable in poultry—mosquitoes notwithstanding—at any rate so far as any ill effects are concerned.

It is admitted that mosquitoes play their part in its dissemination once it prevails among an unprotected flock, but the only question that is still in some doubt is whether the mosquitoes actually carry the infection, or whether the punctures made by the mosquitoes allow an opening for the infection to reach the blood, and more readily induce the infection. Observations suggests that the mosquito is not necessary to an outbreak of the disease, inasmuch as outbreaks occur where mosquitoes are not present. In these cases the first signs of the disease are yellowish-looking blebs, varying in size from a pin's head to a split pea about the combs and wattles of the birds. It is certain also that a place can be swarming with mosquitoes without any appearance of the disease, even in the season for it. Therefore, the mosquito, as a cause, must be acquitted. That it is a blood disease is definitely known.

Treatment.

Upon the first signs of the outbreak of this disease, the administration of Epsom salts and sulphur, as recommended below, should be at once begun, but in rather larger doses, or more frequently for about three weeks. The disease will run its course once it has broken out; but its severity may be modified in the case of the birds that take it later.

As soon as the sores appear, the main thing is to dry them up. For this purpose there is nothing better than painting the sores with tincture of iodine. Common laundry blue is also useful for drying them up. The iodine should, however, not be used on sores on the eye; this is where the blue is most useful. The painting will allay the itching irritation which causes the fowl to scratch the sores, and thus spread them all over the face, head, and comb. The sores spreading around the eyes and beak are responsible for most of the losses, owing to their preventing the birds from feeding; starvation, not the disease itself, causes most of the deaths.

The loss occasioned by an outbreak of chicken-pox is not only the actual loss by death, however, but the ruin of all prospects of winter eggs from the pullets attacked, because, after having had this disease, they usually break up and go into a half moult.

Measures for Prevention.

The measures that may be adopted to this end are very simple, but they must be commenced at the right time, and they must be faithfully carried out. To be effective, a commencement should be made about the first week in January, and 1 oz. of flowers of sulphur for the equivalent of every fifty adult birds should be given in the morning mash every third day for a period of three weeks. This should then be stopped, and for the next three weeks Epsom salts should be added every third day to the drinking water at the rate of 1 oz. to the gallon. At the end of the three weeks stop the Epsom salts and return to the flowers of sulphur in the mash, and continue alternating these treatments until the period over which chicken-pox is seasonable is past.

It is emphasised that the full protective benefit of the flowers of sulphur will not be obtained unless the advice given is carried out in its entirety and to the letter, but in order that no misunderstanding may arise it may be stated in terms of weight for weight. To every 7 or 8 lb. of the mash, whether wet or dry, 1 oz. of sulphur should be mixed, commencing well ahead of the time when the disease is liable to appear, and continuing till the season is over, which means that it is advisable to commence the sulphur treatment now, and to continue it through the summer till about April, or even May.—A. and P. Notes, N.S.W. Dept. Agric.

THE DAIRY HEIFER.

The dairy heifer is a unit of the potential milking herd. The breeder who knows how to grow and handle dairy heifers will add substantially to his achievement with his dairy herd.

The demand for reproduction and milk production are so heavy on high-producing dairy females that every opportunity must be given for growth and development before the animal begins her lactation period.

Improper feeding and breeding at too early an age are two factors to avoid.

The time to take advantage of the growth impulse is when it is most potent and when demands for milk production do not interfere with its influence.

Do not allow the dairy heifer to get a setback by turning on to scant pasturage or by improper feeding.—C. F. McGRATH, Supervisor of Dairying.

CHOOSING A DAIRY BREED.

The question of what breed of dairy cattle is the best had been asked by a number of persons either about to enter or engaged in the dairy business.

It is not so much the question of breed that requires consideration as the question of profitable producers.

There are good dairy animals that are profitable at the pail in all dairy breeds, and it is true also that poor producers are found in each breed. The selection of animals within the breed chosen is the matter of most importance. The breed chosen should be the one that appeals to personal taste and that is suitable to the conditions under which they are to be dairied. Any one of the dairy breeds is worthy of a place on our dairy farms.

The sure way to determine the dairy animal's value is to test it for production. The progeny of animals whose production has been recorded should be secured when possible. The milk-producing trait is hereditary, and selected females should be bred to sires with production on paternal and maternal sides.—C. F. McGRATH, Supervisor of Dairying.

DAIRY HERD IMPROVEMENT.

By C. F. McGRATH, Supervisor of Dairying.

An important factor of success in dairy farming is the use of improved dairy sires. Good dairy cows are far too scarce, and it would be impossible for dairy farmers to purchase a sufficient number of them to replace all unprofitable cows at present in our dairy herds. The way to fill the places of the unprofitable cows is by selection of females and the use of improved dairy sires. To continue dairying unprofitable cows and rearing females from them increases the number of "scrub" dairy cows, and is inimical to the progress of the industry.

The dairy farmer who continues to breed heifers from unprofitable cows will not secure a return commensurate with the capital invested and labour employed. Every breed of improved live stock has been developed by well-defined laws of breeding and selection. Under the influence of skilful selection, breeding, and feeding, the dairy cow has made marked and rapid changes, both in type and functions, and differs greatly in general characteristics from the foundation stock from which the modern type of dairy cow has been evolved. The evolution of a special purpose dairy cow as we know her to-day is a tribute to the work of the breeders of dairy cattle.

The use of a pure bred dairy sire is essential, as purity of blood denotes that the animal possesses the characteristics of his breed for generations back. Pedigree alone, however, does not guarantee that a sire will beget heavy producing females.

Selection of a Dairy Sire.

The chief consideration in selecting a sire to head a dairy herd is the production records of the dams on both the maternal and sire sides.

The dairy sire either increases or decreases the production of his progeny. A prepotent dairy bull bred on production lines will beget offspring that are an improvement over their dams from the standpoint of production.

The solution of the problem of providing the necessary number of profitable dairy females to replace the unprofitable cows on our dairy farms depends upon systematic testing, culling, and the use of improved dairy sires.

The production recording of the cows comprising our stud herds is receiving increasing attention, and the records of thirty-three pure bred cows that in September and October, 1929, completed a 273 days' test and qualified for entry into the respective herd books, which are listed as follows, are well worth perusal:—

COWS THAT COMPLETED 273 DAYS TEST AND QUALIFIED FOR ENTRY INTO THE HERD BOOK FOR THE MONTHS OF SEPTEMBER
OCTOBER, 1929.

Owner.	Address.	Name of Cow.	Age at Commencement of Test.	Milk Yield.	Butter Fat Yield. Lb.
ILLAWARRA MILKING SHORTHORN.					
S. R. Alcock	Wooroolin	Favourite of Pine Park	Aged	9,345-25	388-037
J. Bradley	Goomeri	Wunulla Queenie 4th	Senior (2-year old)	6,701-148	286-724
J. Bradley	Goomeri	Wunulla Graceful 2nd	Junior (3-year old)	8,994-746	376-308
H. Dickfos	Coleyville	Molly 2nd of the Cedars	Senior (4-year old)	10,288-0	386-54
G. Heading	Murgon	Red Rose of Headlands	*Junior (2-year old)	11,407-298	430-72
G. Heading	Murgon	Miss Amy of Headlands	Senior (3-year old)	8,545-973	346-617
S. J. Lester	Laidley	Tottie 9th of Brooklyn Terrace	Junior (2-year old)	6,834-59	269-823
G. Lindenmayer	Binjour	Florrie of Wandegong	Senior (2-year old)	7,554-25	305-728
S. Mitchell	Warwick	Fuschia 3rd of Rosenthal	Aged	10,571-5	415-291
S. Mitchell	Warwick	Lilac of Goomburra	Aged	10,581-5	437-598
J. Phillips	Wondai	Midge 6th of Greyleigh	Aged	11,057-0	452-906
Queensland A.H.S. and College	Gatton	Rascal 12th of Thornleigh	Junior (2-year old)	6,048-125	247-839
Queensland A.H.S. and College	Gatton	Pet 6th of Thornleigh	Junior (2-year old)	6,786-825	272-567
Queensland A.H.S. and College	Gatton	College Violet	Junior (2-year old)	5,617-525	231-285
Queensland A.H.S. and College	Gatton	Queenie 5th of Fairholme	Senior (2-year old)	8,231-875	331-012
F. W. Woolley	Moregatta	Lovely 2nd of Beechwood	Senior (2-year old)	6,471-3	275-734
F. W. Woolley	Moregatta	Marigold 2nd of Beechwood	Senior (2-year old)	7,003-8	265-454
JERSEY.					
R. A. Anderson	Yandina	Yimmin Shooting Star	Junior (2-year old)	4,295-9	241-966
R. A. Anderson	Yandina	Yimmin Society Girl	Junior (2-year old)	3,958-15	214-151
A. F. Birt	Gundiah	Buttercup of Glenore	Junior (3-year old)	5,537-25	307-653
J. Collins	Tingoora	Lady of Calton	Aged	10,389-25	597-151
J. Collins	Tingoora	Maisie of Calton	Senior (3-year old)	7,412-125	378-49
J. Collins	Tingoora	Lady Dorothy of Calton	Aged	9,176-0	559-333
J. Collins	Tingoora	Cynthia of Calton	Junior (2-year old)	6,947-0	371-78
J. Collins	Tingoora	Maud of Calton	Senior (4-year old)	8,264-25	450-417
B. J. Jensen	Rosevale	Hazel of Woodstock	Senior (2-year old)	4,912-125	281-797
B. J. Jensen	Rosevale	Ena of Woodstock	Senior (2-year old)	5,674-625	304-663
B. J. Jensen	Rosevale	Managers Zebuda of Woodstock	Senior (2-year old)	4,856-5	216-278
Chas. Klaus	Mundubbera	Lily of Golden Hill	Junior (2-year old)	4,279-5	247-774
McGeehan Bros.	Kairi	Werrabee Sweet Larkspur	Junior (3-year old)	7,414-55	352-413
McGeehan Bros.	Kairi	Inasfayl Bonney	Aged	9,222-35	478-269
T. A. Petherick	Locyker	Trearne Carnation	Aged	6,444-825	381-356
T. Richters	Tingoora	Beauty 4th of Oaklands	Junior (2-year old)	7,171-625	278-595

* 365 Days.

CLIMATOLOGICAL TABLE—DECEMBER, 1929.

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.		
<i>Coastal.</i>	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29.83	91	78	102	16	74	2. 19, 20	157	5
Herberton .. ..	.. ..	85	63	92	17, 22	58	8, 16	196	7
Rockhampton ..	29.85	93	71	102	23	63	4, 6	240	5
Brisbane	29.87	87	68	97	15	60	6	190	7
<i>Darling Downs.</i>									
Dalby	29.84	91	62	101	21	51	6, 17	428	7
Stanthorpe .. ..	.. ..	84	54	97	10	39	7, 17	336	9
Toowoomba .. ..	.. ..	86	59	98	10	47	5	332	8
<i>Mid-interior.</i>									
Georgetown	29.80	97	71	104	22	62	18	263	6
Longreach	29.78	100	72	110	22	58	4, 5	57	6
Mitchell	29.83	92	62	102	9, 24	49	6	253	7
<i>Western.</i>									
Burketown	29.80	95	76	102	17, 18, 19	72	30	316	5
Boulia	29.78	99	70	113	23	60	4, 5	30	4
Thargomindah ..	29.80	93	70	112	24	58	4, 5	9	1

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Dec.	No. of Years' Records.	Dec., 1929.	Dec., 1928.		Dec.	No. of Years' Records.	Dec., 1929.	Dec., 1928.
<i>North Coast.</i>	In.		In.	In.	<i>South Coast—continued:</i>	In.		In.	In.
Atherton	7.72	28	3.43	6.50	Nambour	6.86	33	8.05	5.04
Cairns	8.69	47	5.99	3.75	Nanango	3.87	47	4.03	4.90
Cardwell	8.27	57	1.66	3.83	Rockhampton ..	4.81	42	2.40	4.36
Cooktown	6.87	53	1.64	3.07	Woodford	5.69	42	6.69	2.79
Herberton	5.72	42	1.96	6.58					
Ingham	6.99	37	1.13	8.78	<i>Darling Downs.</i>				
Innisfail	11.84	48	0.76	10.34	Dalby	3.22	59	4.50	3.09
Mossman	11.49	16	5.42	4.29	Emu Vale	3.60	33	1.64	5.24
Townsville	5.58	58	2.19	3.76	Jimbour	3.23	41	4.66	4.28
					Miles	2.96	44	5.89	2.28
<i>Central Coast.</i>					Stanthorpe	3.54	56	3.36	4.94
Ayr	3.97	42	1.53	4.13	Toowoomba	4.37	57	3.32	5.91
Bowen	4.46	58	2.99	2.10	Warwick	3.44	64	2.74	2.74
Charters Towers	3.55	47	2.12	3.82					
Mackay	7.40	58	3.30	10.10	<i>Maranoa.</i>				
Proserpine	8.38	26	1.05	10.10	Roma	2.49	55	2.89	1.53
St. Lawrence ..	4.78	58	1.04	7.80					
<i>South Coast.</i>									
Biggenden	4.73	30	1.92	2.81	<i>State Farms, &c.</i>				
Bundaberg	4.96	46	6.24	1.19	Bungeworgorai ..	3.08	15	1.74	..
Brisbane	4.90	78	1.90	2.56	Gatton College ..	3.64	30	2.39	3.52
Caboolture	5.24	42	4.23	3.88	Gindie	3.03	30	2.36	2.58
Childers	5.78	34	1.84	4.29	Hemmitage	3.05	23	2.22	..
Crohamhurst ..	7.12	36	8.91	4.24	Kairi	6.69	15	1.39	3.29
Esk	4.70	42	4.18	9.64	Mackay Sugar Experiment Station	8.92	32	2.73	8.65
Gayndah	4.17	58	2.04	3.28	Warren	3.84	14	..	1.18
Gympie	6.10	59	3.13	4.01					
Kilkivan	4.59	50	3.27	2.71					
Maryborough ..	4.77	57	2.45	5.10					

TWO STRAWBERRY LEAF DISEASES.

By J. H. SIMMONDS, M.Sc., Plant Pathologist.

Leaf scorch and eye spot are the two most common diseases of the strawberry occurring in Queensland. Both are foliage diseases which are capable of causing severe damage to susceptible varieties during a wet season. As in this State the varieties susceptible to the one malady are usually resistant to the other, it is difficult to form an estimate of their relative importance, this being determined by the extent to which any one variety is grown in a district. Scorch is probably most severe in its effect on the plant. Both these diseases are found widely distributed throughout the New and the Old Worlds where they have been known for many years.

Leaf Scorch.

The disease known as leaf scorch shows up first as small purple spots on the outer older leaves of the plant. These gradually enlarge until they are $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, remaining either a uniform dark purple or drying out in the central region to a dark brown. The centre never exhibits the light colour characteristic of eye spot. As the spots become older the leaf tissue immediately surrounding them becomes discoloured and dies, and, if they are at all numerous, as is the case when the disease has reached serious proportions, these areas will coalesce so that eventually a large area of the leaf turns brown and dries out. It is to the appearance of the brown and somewhat shrivelled areas commonly found working in from the margin that the disease owes its name of scorch. The leaves are affected in order of their age so that it is common to find plants badly attacked by the disease with their outer leaves brown and shrivelled, and those within showing a more distinct spotting which gradually becomes less until the younger leaves may be quite free.

Purple brown blotches may also be found on the stalks of the leaves and fruit. When these are attacked girdling may result in the loss of flowers and young fruit. In some cases clusters of minute black pustules may be made out on the upper and lower surfaces of an old spot. These represent the fruiting bodies of the fungus causing the disease.

It is sometimes difficult to distinguish scorch in its late stages from red spider injury. The latter commences as a light reddish-brown discolouration of certain relatively broad areas of leaf. These areas are usually indefinite and diffuse, and not in the nature of clearly defined spots. When these areas dry out they closely resemble the older stages of leaf scorch, but even then may be distinguished by the fact that on the under surface may be seen the remains of the delicate webbing formed by the red spiders—this usually being made more apparent by the collection of cast skins, soil debris, &c., held in its threads.

Cause.

The disease is caused by a fungus parasite known scientifically as *Diplocarpon earliana*. This fungus is distributed about a field by means of spores, which are minute bodies corresponding in function to the seeds of flowering plants. Should one of these spores be splashed or carried by air-currents so as to alight on a strawberry leaf, it is able,

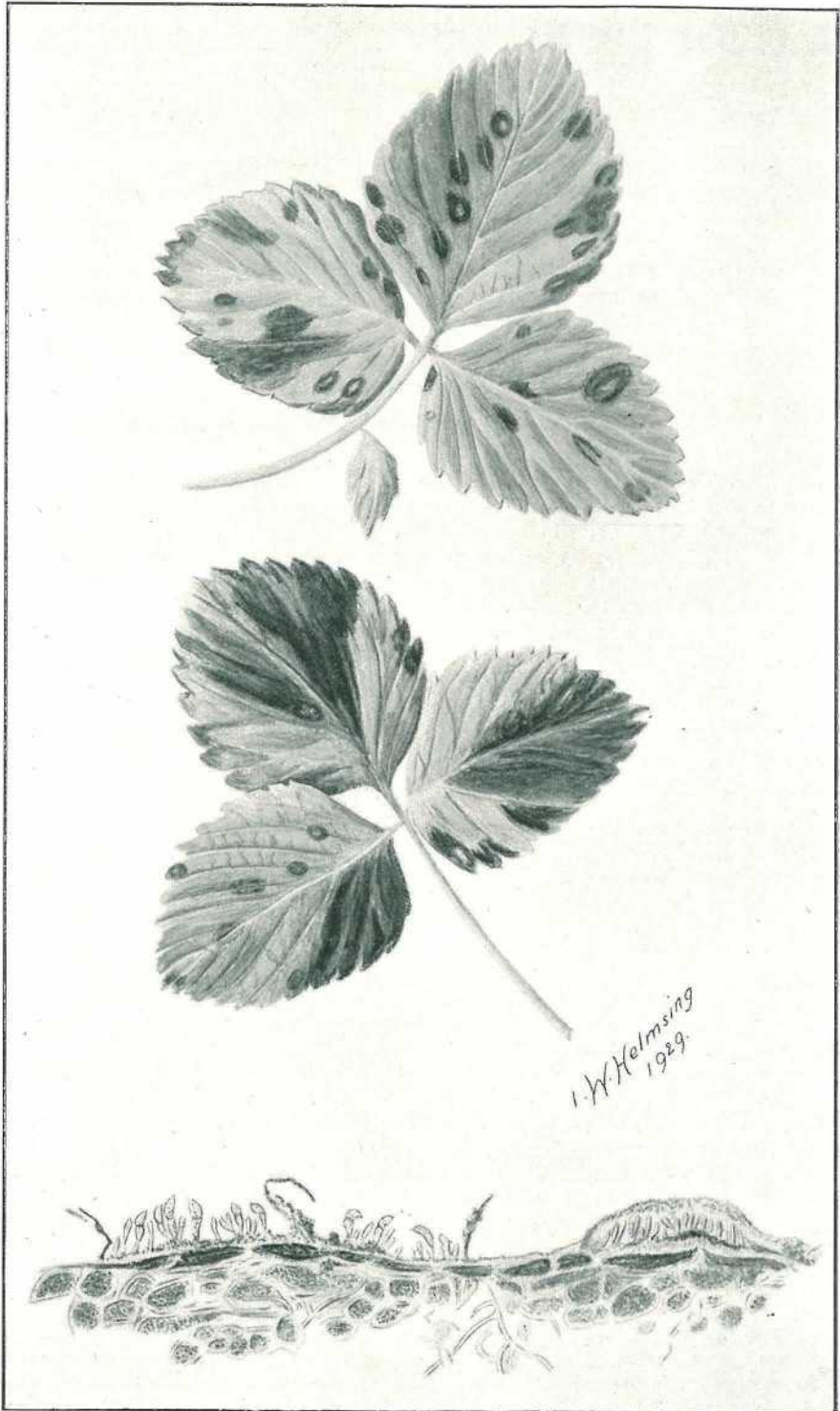


PLATE 39.—Above: Strawberry leaves exhibiting symptoms of leaf scorch. Below: Section through a leaf lesion showing conidial fruiting pustules of *Diplocarpon earliana*. (Highly magnified.)

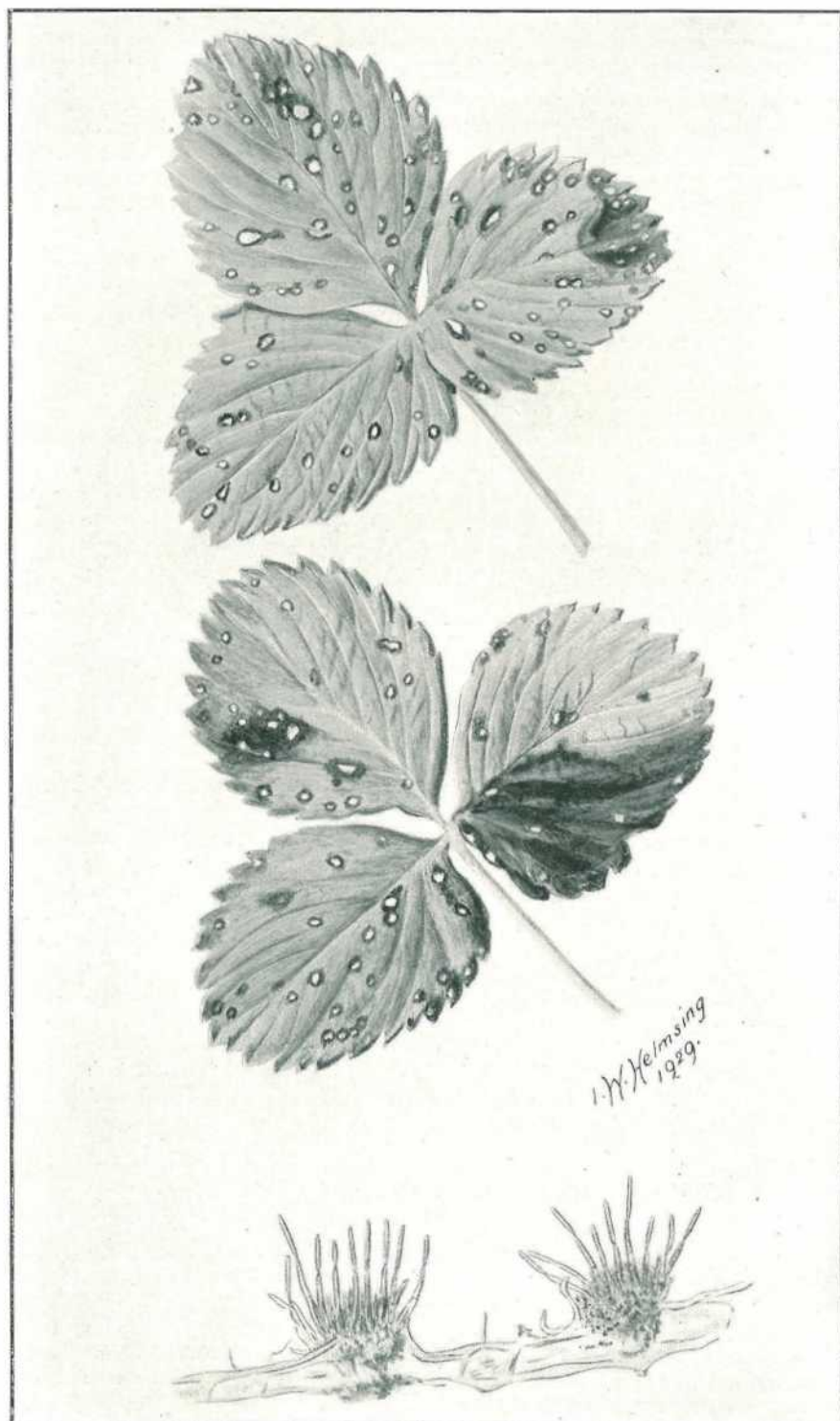


PLATE 40.—Above: Strawberry leaves affected with eye spot. Below: Section through a leaf spot showing conidial fruiting bodies of *Mycosphaerella fragariae*. (Highly magnified.)

when moisture conditions are suitable, to germinate and penetrate the leaf-tissue by means of a delicate thread. This then forms numerous branches which gradually kill the leaf-tissue in their vicinity until finally a clearly visible and characteristic spot is formed.

In order to reproduce itself and further spread the disease the fungus after a time commences to form a batch of spores. In the present case two kinds of spore may be produced, of which the more common is that illustrated in Plate 39. In the process of spore formation the fungus threads accumulate at certain points beneath the surface, and from this bed short upright branches are given off which develop from their apex small, broadly sickle-shaped spores. This process ruptures the upper layers of the leaf and exposes the spores to the air, ready to be carried away to infect further plants.

Contributing Conditions and Susceptible Varieties.

Like most fungus diseases moist conditions, whether brought about by low, damp situations or excessive rainfall, are conducive to the development of this disease. In the 1928 season, when there was an exceptional amount of rain during the autumn and early winter months, scorch assumed epidemic proportions in some localities.

Of the two varieties most commonly grown in Queensland the "Aurie" is highly susceptible to scorch, while "Phenomenal" is resistant. "Usher's Special" resembles "Phenomenal" in being resistant. When considering the susceptibility of these varieties to eye spot the position will be found to be completely reversed.

Eye Spot.

The early stages of eye spot closely resemble those of scorch in that there appears one or more small purple dots on the surface of the leaf. These enlarge somewhat and soon commence to dry out in the centre to a light brown. This region after further drying turns a light grey to almost white colour. The mature spot then appears as a distinct rounded or somewhat angular white spot one-sixteenth to one-eighth inch in diameter surrounded by a narrow and rather diffuse purple border. As with scorch it is the older outside leaves on which spotting is most abundant. When the spots are fairly numerous the adjacent tissue turns yellow and eventually dries out. There is thus produced finally a dry, shrivelled condition of the leaves resembling that formed in the case of leaf scorch but clearly distinguished from the latter by the presence of the definite white spotting which is discernible even after the leaf has completely dried out.

Cause.

Eye spot is another fungus disease caused in this case by the organism known as *Mycosphaarella fragariae*. This fungus is spread about the field by means of spores in much the same manner as in the case of leaf scorch. To the naked eye the fruiting bodies appear as minute specks scattered over the older spots. Under the microscope each of these is seen to consist of a number of short threads projecting in a cluster from the surface of the leaf, from the ends of each of which may be formed a narrow elongate spore (Plate 40).

Towards the end of the season another type of spore may be produced. These are contained in small rounded receptacles, and may serve as one means by which the fungus lives over until the next season. The fungus can also exist for several months in the purely vegetative state in connection with the spots in old leaves and then, later, form spores which will infect a new season's growth.

Contributory Conditions and Varietal Susceptibility.

The same climatic conditions favouring scorch are also suitable for the development of eye spot. That is to say, excessive rain during the growing season will probably result in a serious outbreak with much defoliation and consequent reduction in crop.

Of the common Queensland varieties those susceptible to leaf scorch are resistant to eye spot, and vice versa. Thus, "Phenomenal" and "Usher's Special" are susceptible to eye spot, while "Aurie" is resistant.

Control of Scorch and Eye Spot.

(1) The fungi causing both scorch and eye spot live over from one season to the next associated with old leaf debris left in the soil or on the plants. Hence the method often adopted of renewing the plants each year, especially if fresh land and clean plants are selected, should greatly aid in keeping the disease under control. Old plants should be removed and burnt as soon as finished with in order to free the land from infectious material.

(2) If it is not intended to renew the plants all diseased foliage should be removed and burnt at the end of the season. Another plan is to mow the plants after the crop has been taken off, and after covering the dead leaves and plants lightly with dry grass run a quick fire over them.

(3) When planting, runners should be obtained from a locality from which leaf disease is absent, or at least from a plot in which this is not present to any extent.

If some of the runners are found to be affected the diseased leaves should be removed. Any plants badly attacked should be discarded entirely.

If it is not possible to obtain runners from a disease-free field, the mowing and burning mentioned above, followed by a Bordeaux spray as soon as the plants are commencing to shoot, will greatly aid in the production of clean runners.

(4) Avoid damp situations for strawberry planting.

(5) Other considerations being equal, use only varieties resistant to the disease most troublesome in the district concerned.

(6) Both leaf diseases can be controlled by spraying with a fungicide. Bordeaux mixture of 4.4.40 strength should be applied as soon as the new season's growth is well started. This should be followed by two or three further applications in order to ensure the leaves being kept well covered. These may be given up to the time that the first berries commence to form.

Spraying should not be expected to give satisfactory control unless attention is also given to the cultural practices mentioned above.

THE RECORD OF PERFORMANCE PLAN FOR SELECTING BREEDING STOCK.

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

In several of the principal pig-breeding States of America, in Canada, in Denmark, in Great Britain, Germany, and other countries, "Record of Performance Tests" to determine the production ability of breeding sows are now being carried out on systematic lines and largely under departmental control. The centres where these tests are carried out are usually referred to as "Testing Stations," and to their activities much publicity has been given in recent years. In this article Mr. Shelton discusses these tests and recommends that a similar system be introduced into Australia in the endeavour to still further build up and stabilise our pig industry.—ED.

Record of Performance Tests.

ARISING out of correspondence with several prominent American authorities on swine production, and per medium of the Agricultural Press specialising in this line of industry, a good deal of information is now to hand having special reference to the Record of Performance Tests, a system of testing breeding stock (pigs) with the same objective in view as that arrived at in the testing of dairy cows—i.e., to ascertain their productive capacity and determine whether they are worth retaining in the herd or not. The system of brood sow testing is necessarily different from that obtaining in the case of dairy cows, for, in the former, the records of performance have reference to the capacity for production, the rate of increase in weight and the suitability of the type of stock produced for market requirements, whereas, in the case of dairy cattle, the principal objective is to ascertain the butter-fat content of milk and cream per the Babcock test, now universally in use in every dairying community.

Early Attempts.

Discussing the historical aspect of these tests, Professor E. F. Ferrin, and his associates P. A. Anderson and Don Johnson, of the Division of Animal Husbandry at the University of Minnesota, state that for several centuries pigs have been selected and bred with the aim of producing stock which is economical in the use of feeds, and which yields carcasses of pork well suited to the demands of the consumer. Pig production in the United States on an extensive scale has been carried on for just about 100 years. During this time there have been many changes in type. These changes have come in the most part as a response to economic conditions, but there have always been other factors, some of them of little practical value, which have had considerable weight in the development of new types. It is just as true now as it was a century ago that the only reason for raising pigs is the production of pork in the most efficient way. But in reviewing the changes in type during the past century it is apparent that many times pig producers have been chasing rainbows rather than following strictly the most economical method of growing their stock.

The Position as it is in America.

Concerning the present-day type of pig, it is probable that producers are somewhere near the mark of greatest efficiency. However, it is not possible to say exactly in what points to-day's type of pig is most lacking in efficiency. There are many factors to be taken into account. The producer wants a pig which will make weight at a low cost. Brood sows must be prolific and good mothers, caring for their pigs carefully and nursing them well. No subsequent favourable influences can overcome the handicap of small litters at weaning time. The pigs must be hardy, resistant to parasites and disease, good feeders, consequently rapid in gains, and mature at an early age if they are to be money-makers. Above all, the pigs when fattened must yield carcasses which will comply closely with market demands. The demands of the pork consuming public must be satisfied if farmers are to make a profit from pigs.

It is a very difficult matter to gauge accurately the exact importance which each one of these many factors should have in forming the ideal type of pork or bacon pig. If pig producers are not now on the right road to the best type, the reason is the lack of accurate standards by which to measure the most profitable

type. We have been selecting and breeding pigs very largely according to the appearances of the animal. Within fairly broad limits the kind of pig which can be produced at a low cost and which satisfies market demands, approximately, is known. But the difficulty is that we have had no measures which have told us accurately whether the type in popular favour was the most efficient or not.

Standards Set Up.

There is a standard which can guide pig production to the right type. Dairy cattle breeders have made wonderful progress in breeding for type and efficiency in production. The same success is possible in pig raising if accurate standards of measurement are adopted. Denmark for a period of approximately eighteen years has followed a plan of breeding pigs on the basis of low cost of growing pigs and high carcass value. A great improvement has been made in the profit derived from raising these pigs. The essential points of the system apply to pig raising in the United States just as the testing of dairy cattle here was based largely on the methods followed in Scandinavian countries.

The National Swine Growers' Association of America has endorsed the Record of Performance Plan which is being worked out by a committee of that organisation. This plan provides a standard for selecting pigs that are the most profitable pork makers. It comprises the feeding out of four pigs selected from a litter which is large enough to make profit on the pigs a possibility. The amount of feeds necessary to make a pound of pork during the growth and fattening of the pigs from weaning age to an average weight of 225 lb. each is determined. Two of the four pigs are slaughtered and the carcass value carefully determined. If the pigs of a litter make gains at a low cost, and produce carcasses of high value, the breeder of the litter should develop his herd by the maximum use of this strain of blood. At the Minnesota Experiment Station pigs are bought at weaning age from all breeders who desire to co-operate with the Experiment Station in the Record of Performance Work. In time a Register of Merit will be established in which are listed those boars and sows whose offspring have been tested and found to be profitable pork makers. Breeders who wish to improve their herds on the basis of this plan can select Register of Merit stock when buying boars or sows. Accordingly, the Record of Performance Plan provides the most economically sound basis for breeding pigs which has ever been proposed.

Recent Experiments in America.

Last year (1929) ten Minnesota breeders co-operated with the University by sending in to the Station pigs from eleven litters. The pigs were started on feed at the age of sixty-five days. Four of the first litters to arrive reached the final average weight of 225 lb. per pig, and two pigs from each litter were, up to time of writing in October, slaughtered. The pigs of each litter were fed as a group of four in a way similar to every other litter. Shelled corn was self-fed. A protein mixture of 50 parts of tankage (meat meal), 25 parts of linseed meal, and 25 parts of choice alfalfa meal (luerne meal) was self-fed also. The mineral mixture which was self-fed was composed of 50 per cent. high calcium ground limestone, 27.97 per cent. bonemeal, 20 per cent. common salt, 2 per cent. iron oxide, .01 per cent. copper sulphate, and .02 per cent. potassium iodide.

There was found to be considerable variation in the average daily gain of the pigs from the different litters, in quantities and kinds of feed consumed, and, of course, in the feed cost per 100 lb. of gain. There was also a difference in dressing percentages and in the desirability of the cuts, apparent after slaughter.

Feeding.—The differences between lots were in the methods of feeding. Shelled corn was fed dry in all cases and the mineral mixture was self fed to each lot. Middlings (i.e., pollard), tankage, and buttermilk were mixed and fed as slop twice daily to Lot I. The same amounts of these feeds were fed twice a day to Lot II., but the tankage and middlings were in dry form. Lot III. was fed the same as Lot I. except that all feeds were given three times daily. All dry feeds were self fed to Lot IV., and the buttermilk was supplied in a trough. Lots I., II., and III., which were hand fed, were given as much feed as they would clean up quickly at each time of feeding.

Housing.—Movable houses furnished shelter for the pigs and water was supplied each lot by automatic fountains. There was no difference in the type of the pigs, comparing one group with another when the feeding began. The pigs in this experiment were pure-breds of good type. Lot IV. showed a tendency to fatten more rapidly than the hand-fed pigs of the first three lots. The hand-fed pigs at the close of the feeding period appeared more growthy, and most of the gilts (young sows) were in good shape to be carried on for breeding purposes. The self-feeding method can be used for developing breeding stock if corn is not fed in this way.

American Conclusions.

1. In this experiment the pigs fed slop made a little more rapid gains than those which were hand fed the same feeds in dry form. This resulted in a smaller total quantity of feeds for 100 lb. of gain.

2. Feeding twice daily was just as satisfactory a method as feeding three times daily.

3. The self-fed pigs made a little more economical use of their feeds than the hand-fed pigs.

4. When feeding pure-bred pigs, slop feeding is a desirable method. For market stock self-feeding is the best method if the pigs are on full feed.

Because a few records do not give an accurate picture of average conditions, the breed of the litters are not listed. Each breeder who co-operates with the Experiment Stations receives a report of the pigs which he sent in. This is a reliable basis upon which to judge the value of the particular strain of breeding.

The Record of Performance testing will be continued in 1930. Pigs from sixteen litters can be fed out at University farm. While some changes in details are probable as experience shows the right way to establish the work on a permanent basis, the essential features of the plan will be as they are at present. Record of Performance work has the possibility of working greater improvement in the pig business than any other plan which has been tried in the United States.

The Experiment Stations want breeders to co-operate by selling it four pigs from one litter at weaning time to be tested. The litter should be from a desirable line of breeding. The sire and dam of the litter should be kept so that if the pigs make good records the strain can be increased in numbers rapidly. Nominations of herds will be accepted at any time and as many pigs fed out as the equipment of the piggeries will accommodate.

These American Records of Performance tests are still in progress at the Minnesota and Wisconsin and Iowa Experiment Stations (U.S.A.), and are being extended as opportunity offers to other countries. It will be noted that to set the recording of pigs along these lines into motion, it is necessary for interested bodies to get together and make the necessary arrangements for the tests to be carried out at some recognised experiment station, agricultural college, and/or on selected farms. Breeders desirous of co-operating arrange to send four pigs from a litter, two sows and two barrows, to the Testing Station as soon after the weaning as is possible. These pigs are then fed out under identical conditions with all the others on test. If so arranged the pigs are donated to the Testing Station or they are paid for at market price at the time they are sent in, and the breeder if he so desires may buy back one of the sows for breeding purposes at the same price. At the end of the test the other three are killed, records compiled on the rapidity and economy of gains, and the carcass and dressing efficiency are then rated and duly entered up.

The tests are referred to as intensely practical and as providing a reliable medium through which breeders of pigs may secure infinitely more reliable data as to the value of the breed sows and of the blood lines (other than of their ability to produce show-ring winners) than is obtainable through any other system. It is predicted by Dr. John M. Evvard that these tests will become the "Babcock tests of the pork-producing industry." For the first five years of the tests in America comparative figures on the different breeds will not be made public—after that they will be. As the breed sows in these tests are rated so will the breeds they represent be, hence it is highly desirable that all stock used in the tests should be of the very best it is possible to obtain in the breeds, otherwise the results would be misleading and a distinct detriment to the breed.

Queensland Tests.

Breeding tests in Queensland are at present in full swing at the Queensland Agricultural High School and College piggery, but these tests are not altogether on the lines of records of performance, though they aim at securing valuable and reliable data on early maturity, economy of production, suitability for market requirements, and prolificacy, all very special and necessary features in the production of stock for any market. The pigs resultant from these experiments are bacon pigs, the scheme aiming at a general improvement in this particular class of stock. The matter is one well worthy of the attention of Stud Pig Breeders' Societies, of Pig Industry Committees and other bodies, and it is hoped these notes will pave the way for the initiation of tests in this part of the world, where pig raising is looming large in public favour and where the farmers as a whole are intensely interested.

Further particulars regarding the Record of Performance Tests, Testing Stations, &c., may be obtained by writing to the Department of Agriculture and Stock, Brisbane.

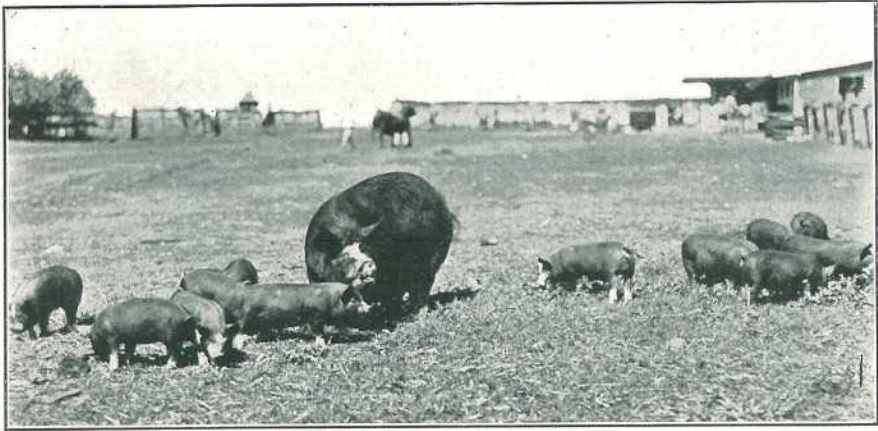


PLATE 41 (Fig. 1).

Westbrook Ruby 3rd (8898) and her litter of twelve. A noted brood sow of the Berkshire breed, bred and owned by The Farm Home for Boys, Westbrook, Queensland, where a stud of high-class Berkshire pigs is maintained in full profit, and whence many productive and prominent prize-winning animals have been distributed. Sows of this description are profit-makers of the very best type.

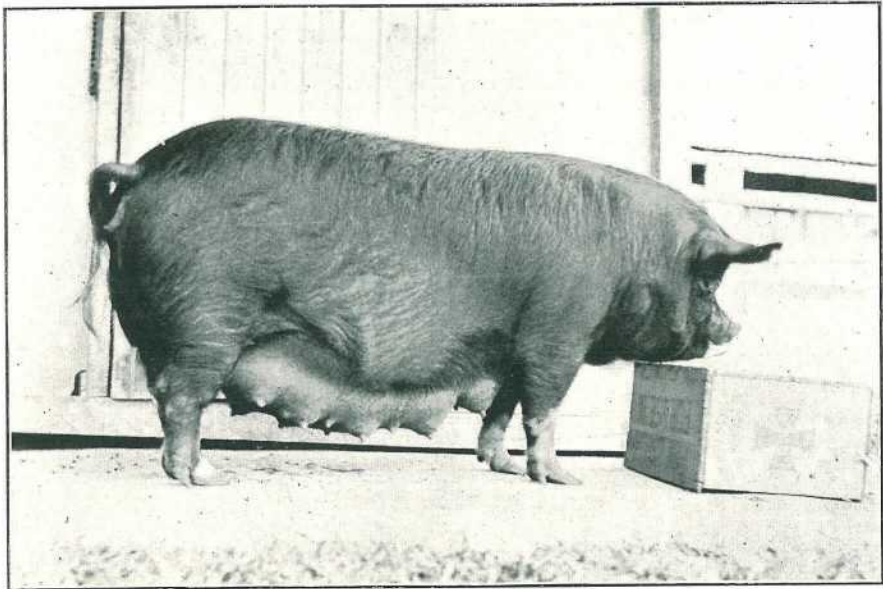


PLATE 42 (Fig. 2).

Berkshire Sow, Gatton Pamela (8748), bred at the Gatton College and now owned by Mr. A. Drescher, of Pimpama, South Coast, Queensland. Note length and depth of body, development of teats and udder, and generally superior quality of this typical brood sow.

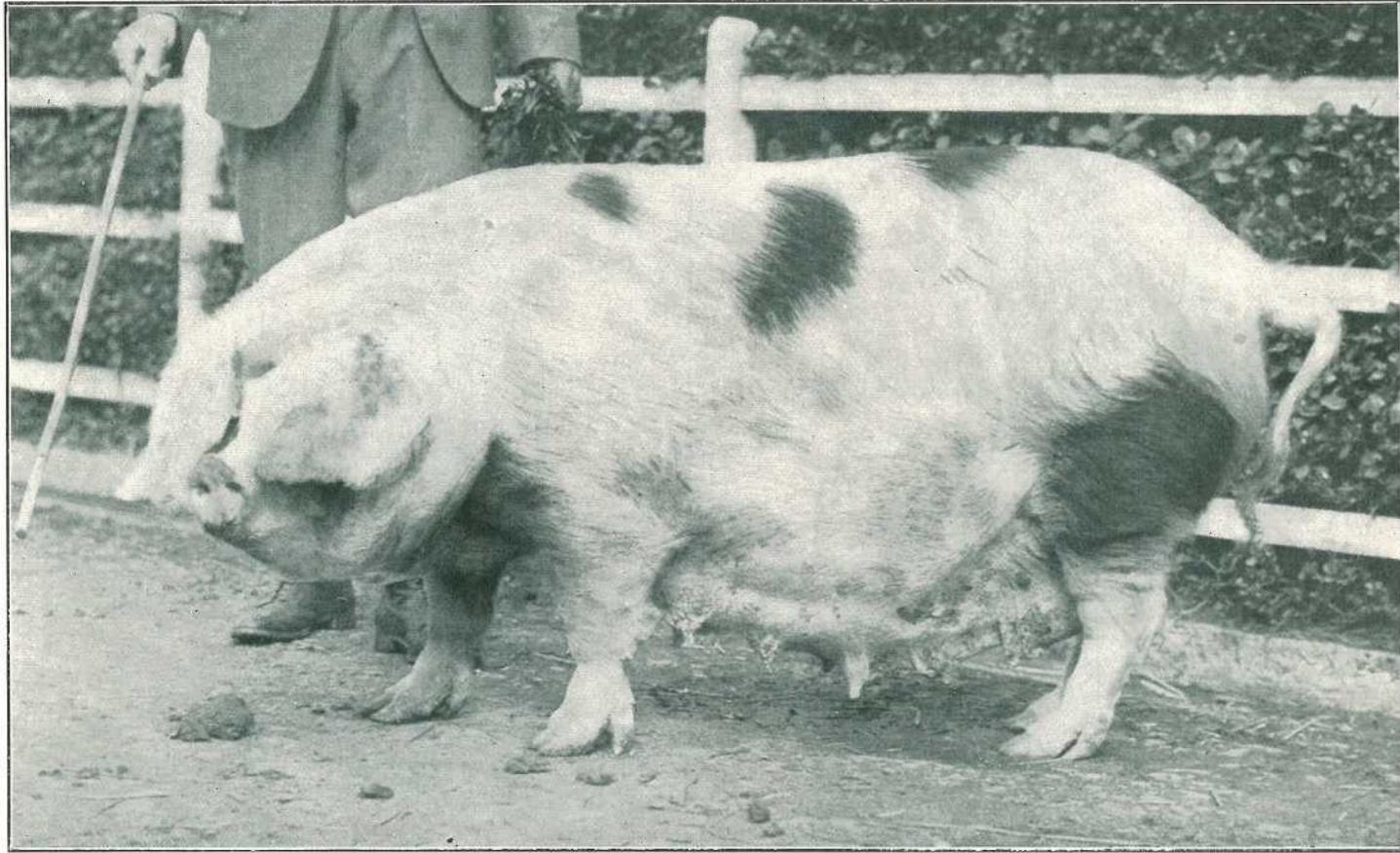


PLATE 43 (Fig. 3).—CHARTERHOUSE LADY (91), CHAMPION GLOUCESTER OLD SPOT SOW, MELBOURNE ROYAL AGRICULTURAL SHOW, SEPTEMBER, 1929.

Exhibited by Mr. A. E. Ball, a noted breeder of G.O.S. Pigs in the Southern State. Note pure quality, roomy body, shape of ears and colour markings.

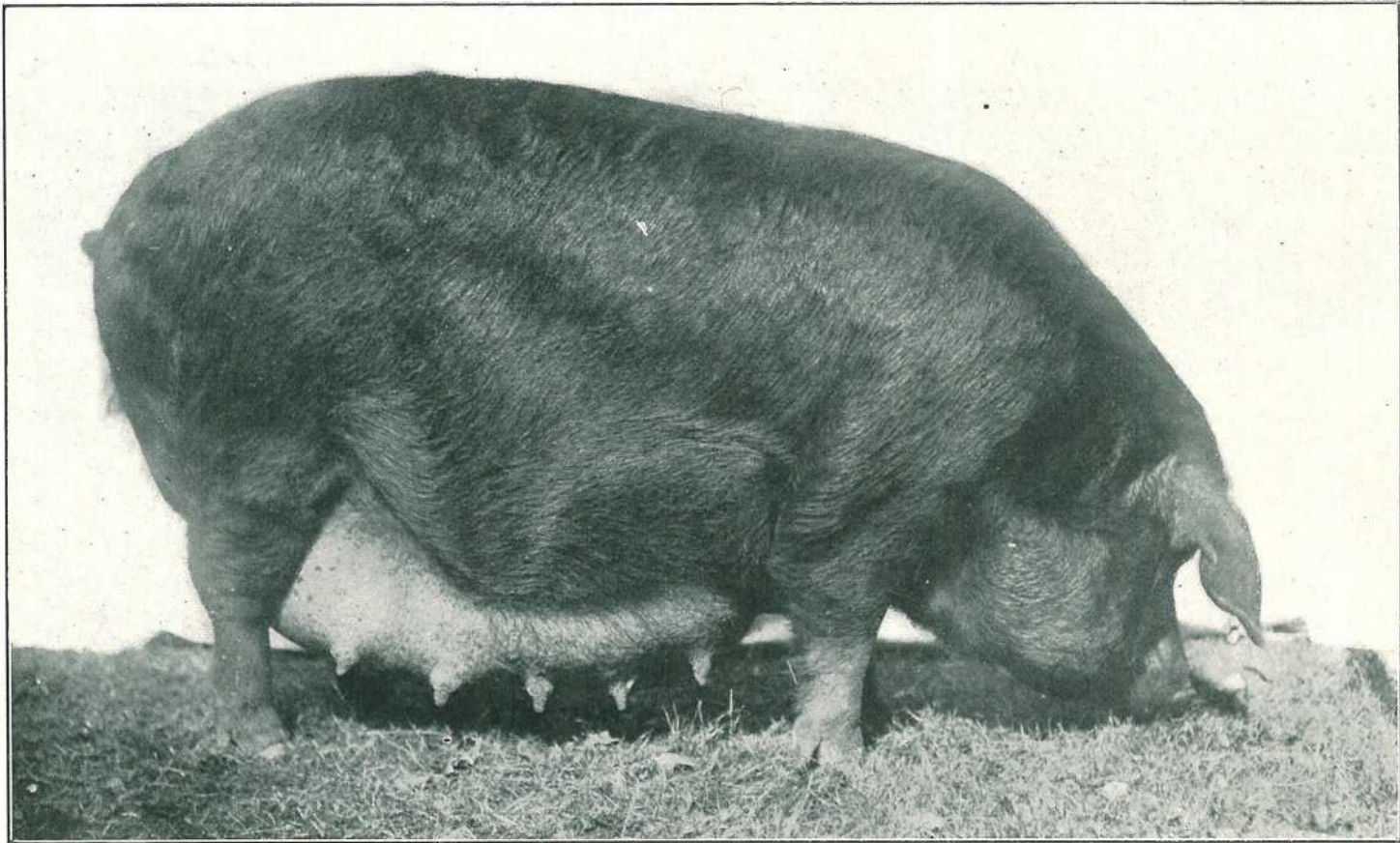


PLATE 44 (Fig. 4).—CHAMPION DUROC-JERSEY SOW AT THE ROYAL NATIONAL SHOW, BRISBANE, 1929.

This wonderful sow, Yamsion Flower (now unfortunately deceased) was bred by Mr. W. Koehler, of Yamsion, *via* Dalby, and was owned and exhibited by Mr. Alan F. Conochie, of Tingoora. Yamsion Flower set a very high standard among Duroc-Jersey Pigs in Queensland, and her type, quality and general excellence appealed to all. Her capacity as a breeder was clearly demonstrated by the production of a very fine sturdy litter of eleven Durocs a few days before her death. Her dam, Lawn Hill Flower, bred by Mr. Percy V. Campbell, and owned by Mr. Koehler is also a very fine animal.

THE QUEENSLAND PIG INDUSTRY IN 1929. REVIEW OF A YEAR'S PROGRESS.

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

Statistics.

The Stock Returns for the year just ended are not yet available, but during the year we were advised by the Registrar-General's Department that at the 1st January, 1929, there were 215,764 pigs in Queensland, an increase of 23,817 head over the number recorded during the previous year. This number, 215,764 head, is above the general average of around 200,000, but it is not abnormal, nor could it be said it represents an unusual increase over the records of the past twenty or more years. It really represents a normal pig population, a safe number considering the uncertain nature of the seasons and the state of the pig markets generally.

In Queensland we have about one-fifth of the total number of pigs recorded in the Commonwealth, and on recent figures we have approximately 22 pigs per cent. of human population, which compares more than favorably with that of any other country in the world with the exception of Denmark, the United States of America, Canada, the Irish Free State, New Zealand, Germany, and South America, all of which have a much larger pig population per cent. of human population than is common in this country. In comparison with the Statistics of Human Population there are more pigs in the Northern State than in either New South Wales, Victoria, or the other States, though actually both New South Wales and Victoria carry more pigs than we do in normal years.

Present and Future Prospects.

It is apparent there is little or no prospect of any appreciable increase in the total number of pigs kept on farms while market conditions are unsettled and while the seasons are so variable, though it is safe to say there is no indication that the numbers are likely to suffer any serious decrease as a result either of unsettled markets or normally uncertain years. A long continued severe drought would certainly have a very serious effect, just as uncertain and unfavorable seasons check our progress and limit our production, nor are these conditions likely to alter so long as we are dependent entirely on local and interstate markets for our pork products. The normal increase in production can readily keep pace with increased demands, for, after all, we are not actually a pork-eating people; and, generally speaking, pork products, i.e. fresh pork, bacon, and hams and smallgoods are really looked upon more as luxuries than as actual necessities in Queensland homes, and until the producers and manufacturers of these products enter upon an extensive scheme to largely increase home consumption of these very appetising and nutritious articles of diet, we cannot expect any marked increase in the trade.

Knowledge of the Job—An Economic Phase.

In the pamphlet entitled "Pig Raising in Queensland," issued earlier in the year 1929, and still available for distribution gratis to those interested, various economic phases of the industry are dealt with, and stress is laid on the necessity of increasing our knowledge of the job before entering upon any extensive scheme for increased production. Therein it is stated that pig raising is one of the industries associated with dairying and mixed farming in which every farmer in Queensland is interested. As with other branches of agriculture the production of pigs is a business requiring specialised knowledge, though it may appear to the uninitiated there is nothing to be learned about feeding and handling pigs. Fortunately, the business is not one requiring a large capital or an expensive plant, particularly where it is associated (as it invariably is) with dairying and general farming. The provision of abundant supplies of suitable foods, a liberal, and we may add, permanent water supply, clean comfortable accommodation, and necessary utensils are among the principal requirements, once the farmer is actually situated on a farm where it is possible to grow the necessary food and where conditions are favourable for the keeping of pigs and other stock. The specialist who intends devoting the whole of his time and a large capital to pig raising on commercial lines will, of course, work on different lines to the dairy farmer or to the suburban farmer who keeps a few pigs, or to the farmer engaged principally in the production of stud pigs.

* In a Radio Talk, broadcast from 4QG.



PLATE 45.—YOUNG PIG FARMERS IN THE MAKING.

The Senior Instructor in Pig Raising (Mr. E. J. Shelton) conducting a practical demonstration before a small group of Pig Club members at Mapleton, on the Blackall Range. The Head Teacher of the Mapleton State School (Mr. Radcliffe) is on the left of the group.

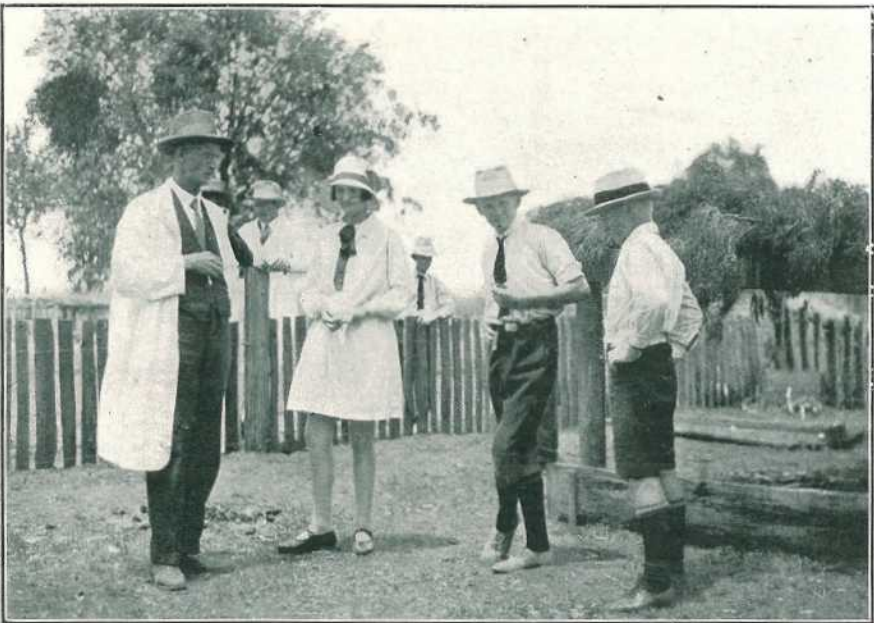


PLATE 46.

Mr. Shelton discusses matters of mutual interest with the Sullivan children, members of the Jinghi Gully Pig Club in the Jandowae district. Mrs. Sullivan, the mother of these sturdy Queenslanders, is President of the local branch of the Country Women's Association and, with Mr. Sullivan, is a prominent worker in all progressive schemes.

However, no matter what line the farmer may work on in carrying pigs among his farm stock, it is essential that careful consideration be given to the financial side of the proposition and especially at the outset, while all along continuous attention is necessary to factors that determine the profit and loss in the carrying out of the activities.

One certainly needs a sound knowledge of the job in order to make a success of it, while in addition one must really be keenly interested and have a love for the job if he is to stick at it and make it a commercial success.

Are Queensland Pig Raisers Efficient.

In reviewing the work of the year one may well ask the question: "Have we proved as efficient at our job as we should be, or are we lacking in any special direction?" Generally speaking I think it will be admitted that Queensland farmers are just as efficient at their jobs as are the farmers resident across the borders of the several States with whom we are bound up in this great Commonwealth, for our sheep and wool, beef cattle and dairying industries are quite up to the standards of the other States, while in sugar, fruit, and corn, cotton, wheat and other industries we have some of the best farmers in the Southern Hemisphere.

Nevertheless it must be admitted that, generally speaking, our pig raisers have yet a great deal to learn before they can be classed as efficient as they ought to be. The conditions under which pigs are kept on many farms and the general neglect in housing and accommodation bespeak a lack of knowledge or appreciation which is a hindrance to progress, and it is along these lines and in the use of better quality and more efficiently balanced rations that we need to specialise. I believe it will generally be admitted that the class of pigs kept on Queensland farms has improved to such an extent during recent years that we now compare more than favourably with our neighbours, though even in this direction there is room for improvement. We also need to pay more attention to marketing our pigs in a condition more suited to the requirements of the factories, for the industry still suffers a heavy burden of loss through the marketing of pigs in an overfat and overweight condition and from various other hindrances to the securing of the maximum price for every animal sold. We do not as yet make the fullest use of green stuff, of mineral matters, and even of drinking water, and in all these lines it is hoped we will record improvement during the coming year. We certainly need to be efficient for there are many pitfalls and stumbling-blocks to progress.

Teaching the Juniors.

It will be of interest to readers of this talk to know that there has been a marked increase in the number of boys and girls actively interested in the Pig Club movement, and to know that the year 1929 has been the best year we have yet experienced in this class of work. We have had close on 1,000 members specially interested in Pig Club work, plus a big army of children working in poultry and calf clubs and in other activities associated with the Home Project Scheme. These club members are taught to be efficient, and in almost every instance they have shown a remarkable aptitude and have indicated by their work that they thoroughly appreciate the necessity for giving strict attention to careful selection, breeding, feeding, accommodation, exhibition, and marketing of their stock. They are keenly interested, and we wish them all a very Happy and Prosperous New Year.

Schools of Instruction.

The Annual School of Instruction to Pig Farmers held at Gatton College (June, 1929) was a great success, and will be repeated again at the College in June, 1930, and we take this opportunity of making special mention of these Schools of Instruction, for they are of the utmost value and provide an excellent opportunity for those interested to get together for the mutual benefit of all concerned.

Visits to Factories.

We hope that in 1930 many other parties of farmers will make it convenient to visit the several bacon factories to see for themselves the conditions under which their pigs are handled and the various methods of manufacture and disposal. It is the right of every producer to study the methods of manufacture and to follow his products through the factories to their ultimate destination.

A BRITISH PIG RECORDING SCHEME.

Discussing the subject of Pig Recording as carried out by the Animal Nutrition Research Institute of the University of Cambridge, Department of Agriculture, England, in the first report (issued June, 1929) of the East Anglian Pig Recording Scheme, H. R. Davidson, M.A., Dip. Agric., and A. N. Duckham, M.A., Dip. Agric., have this to say as outlining the initial steps of these experiments:—

The Pig Recording Scheme.

Pig Recording is a subject which has recently come to the fore as a method of assisting and improving the pig industry in the same way that the measurement and recording of yields have proved invaluable to the dairying and poultry industries of this country. Our Scandinavian and other competitors for the English pork and bacon markets have for some years adopted the accurate recording of prolificacy, rate of maturity, feed consumption, and quality as an instrument of progress, which not only measures the efficiency of the sows, but also yields valuable data and figures on the status and efficiency of the whole pig industry in any one area. In Great Britain there exists a plethora of opinion on the various problems of pig keeping and on the relative value of the many breeds of pigs, and this initial report may be welcomed as one of the first attempts to substitute quantitative facts and measurements for such qualitative opinion. It is, therefore, opportune that it should appear at a time when so much attention is being focussed on pork and bacon production by the British Pig Industry Council, the Imperial Economic Committee, and other bodies.

Recording Methods.

After an interesting foreword by Professor T. B. Wood, the report deals with various methods of pig recording employed abroad, and points out that, although none of these methods can be considered suitable by itself for English conditions, the East Anglian scheme is partially based on foreign experience, but it is designed to obtain the essential data for the pig keeper with the minimum of trouble and expense. It is also shown that the value of any pig recording scheme lies not only in the information and facts it gives the farmer, but also in the way in which accumulated records can be used statistically to solve many of the pig keeper's problems, such as the most suitable herds or methods of management or the best age for castration. In addition, it helps to provide the much-needed liaison between the farmer and the research worker.

Results Obtained.

The second section of the report summarises the results obtained from the various herds. From these records it is estimated that the difference per bacon pig in the cost of production between the best and the worst herd was over £2 per pig in the eighteen months under review. The best herd marketed eight pigs from each litter and took seven months to make a bacon pig of 150 lb. dead weight, whilst the worst herd marketed only four pigs per litter, and required ten months on the average to reach the same weight. The average of all litters recorded was six pigs marketed per litter at 150 lb. dead weight in nine months. This illustrates the way in which pig recording can show the farmer his efficiency as a pig keeper, and it is interesting to note that in some of the less successful herds certain defects in feeding and management have been located, such as the feeding of unbalanced rations deficient in minerals and protein.

The scheme has not been in operation long enough yet to permit of the collection of information relating to the elimination of unprofitable sows and boars, but unsolicited opinions from farmer members, who must be the ultimate judges of the value of pig recording, indicate that they thoroughly appreciate its value, even in the relatively short time it has been running.

Other Information.

Subsequent sections present data on such questions as length of gestation, the intervals between farrowings, the relative weights at weaning of gilts and sows' litters, &c. Figures are put forward to show the paramount importance of weaning a large number of sound, healthy pigs per litter, and it is interesting to note the differences in the mortality before weaning and in the bacon quality of the two sexes.

With regard to quality, when ready for market many of the pigs were recorded at two East Anglian bacon factories, and it is shown that only two-fifths of the bacon pigs received were suitable for the better class trade. The chief faults were too thick back fat, heavy shoulders, and deficient length (in relation to weight), and the authors point out that these difficulties could partially be avoided if farmers were encouraged by the Wiltshire bacon curers to market their baconers at lower weights.

The report concludes with a section outlining the possibilities of the general adoption of pig recording in this country as a method of helping us, as pig producers, to fight and excel our continental and other competitors.

Copies of this report and of the second report (issued October, 1929) may be obtained on application to the Organiser, East Anglian Pig Recording Scheme, Department of Agriculture, University of Cambridge, England, at a price of 1s. 2d. each posted, or through the Senior Instructor in Pig Raising, Mr. E. J. Shelton, Department of Agriculture and Stock, Brisbane, to whom also inquiries may be addressed.

SCRUB TICKS IN SHEEP.

J. L. HODGE, Instructor in Sheep and Wool.

The Department had occasion during November to look for a cure for sheep attacked by scrub ticks. Messrs. Cobb Bros., of Winderera Creek, near Murgon, reported the loss of about 250 sheep. Major A. H. Cory, M.R.C.V.S. (L.), Chief Inspector of Stock, has always advocated the use of trypan blue in the case of dogs, foals, or calves attacked by the pest, and authorised the writer to recommend its use in the case of sheep.

Trypan Blue as a Remedy.

This remedy was given to Messrs. Cobb. Bros., with excellent results:—

A 2 per cent. solution (about 9 grains to a fluid oz. of water) is made by dissolving the trypan blue in boiling water. A sediment falls as the solution cools, and this should be removed by filtering through a funnel in which a properly folded filter paper is placed, or a fine piece of clean linen which has been previously boiled. The solution is used. The hypodermic syringe and needle before being used should be placed in a dish containing water, then placed over the fire and boiled for ten minutes. This is now ready for use when the solution has cooled.

The injection can be made anywhere under the skin, and in the case of sheep I recommend under the arm where the skin is free from wool. A fold of skin is caught up with the fingers of the left hand and the needle manipulated with the right hand.

The dose for sheep is 1 to 5 tablespoonsful. A second dose may be given twelve hours after the first should it be deemed necessary.

Messrs. Cobb Bros. report the effectiveness of the remedy in three cases.

No. 1 was a sheep down for two days. This sheep had the first injection on a Thursday morning, and on the Friday following another dose was given. On the Sunday the ewe was noticed eating and drinking and going about on her hind legs and knees. Next day she was up and recovered.

No. 2 sheep could not walk a chain without falling. An injection was given, and two hours later the ewe walked away with the rest of the flock from the shed.

No. 3 was a ewe heavy in lamb lying alongside a dam. The injection was given in the afternoon, and next morning the ewe was up and feeding with the flock.

If you like this issue of the Journal, kindly bring it under the notice of a neighbour who is not already a subscriber. To the man on the land it is free. All that he is asked to do is to complete the Order Form on another page and send it to the Under Secretary, Department of Agriculture and Stock, together with a shilling postal note, or its value in postage stamps, to cover postage for twelve months.

MERINO WOOLS IN QUEENSLAND.

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

MUCH has been written within the past few years in the daily papers and the periodicals with regard to the loss in quality in Queensland wools during the last twenty years. In this connection it is interesting to note, and also important to every branch of the trade, that the main point in this discussion has been consistently missed by most of the writers expressing their opinions. This is probably accounted for by the fact that the writers referred to are, in nearly every case, associated with the wool in some shape or other after the product leaves the sheep's back. They are not the expressions of the breeders of sheep.

The point to which I have referred as having been missed is the constitution of the animal producing the wool.

The breeders of merino sheep in Queensland are, as a body, highly intelligent men, and experience has proved to them that to a certain minor extent only quality had to be sacrificed in the attempt, which has been highly successful, to evolve a profitable type of merino which was better fitted by nature to withstand the adverse seasons which have been in the past and which I am afraid will be more or less always with us.

Some thirty years ago it was common in the west of Queensland to find runs stocked with the "Saxony" type of merino. From this type 5 lb. was considered a good clip, and it was mainly from these sheep in Queensland and other parts of Australia also that this continent gained her pre-eminence as the fine wool merino country of the world.

Experience soon proved what a grave error the breeders of merino sheep in Australia were making, and with the further introduction into the field of breeding of the "Vermont" disaster would have been caused in a great many flocks if the mistake had not been recognised at a comparatively early date. To return to the "Saxony" type: This sheep, as has been stated, was considered as satisfactory when cutting, say, 4½ lb. to 5 lb. of wool. The fleece was of superfineness, spinning somewhere in the vicinity of 90 counts. The constitution, however, left everything to be desired, and the people of Australia generally owe thanks to those breeders of our merino flocks who recognised the menace to the national industry in time to rectify a mistaken policy which would have, if persisted in, ruined the industry for years.

To those constantly advocating "fineness" in our flocks there is something more to be said than the fact that we now have in Queensland a type of sheep able, to a great degree, to withstand hardship and generally scratch for his living, and that is on the question of finance.

A comparison of gross figures received from the two types of sheep under review would be surprising to most people. Manufacturers continue to preach quality, but are their buyers paying the price in proportion? Even at present low values it is safe to say that the well-bred Western merino would beat the Saxony type on actual figures by three to four shillings per head.

So much then for the result of figures, but of greater importance still is the fact that the grower of the type of sheep advocated has a great chance of pulling his flock through during periods of drought, whereas in the case of the superfine type the chances are all against him.

The advice we frequently get from manufacturing centres with regard to our loss in quality is mainly in the nature of a scare.

Australia, generally, is still the world's fine wool country, and by virtue of her geographical position and other considerations is likely to remain so.

This continent of ours, looked at from a pastoral point of view, is a very large place, and there is plenty of room for the breeding of all sorts of qualities to suit the different trade requirements. Above all, let the breeder of merino sheep breed according to his country and rainfall, and as regards Western Queensland in particular, let the breeder be advised, when in doubt, to lean towards constitution rather than the sacrifice of it.

One live sheep is better than a great many dead ones, and all sorts and conditions require the same feeding.

Personally, I hold no brief, as these notes may indicate, for the strong-woolled type of merino as against the fine-woolled sheep, except where it is clearly shown by the nature of the country that the selection of the type chosen mainly for constitution spells the difference between success and failure. A safe maxim for breeders to follow is:—Select the type of sheep most suited to your country, the rainfall, or lack of it, and stick to that type.

Finally, leave it to the manufacturer to "get the wind up" with regard to quality in our flocks. His interests are, of course, best served when he can purchase a 90 quality wool proportionately cheaper than a 66 count. It matters not in the least to the manufacturer or his buyer from what type of sheep his wool comes, whereas to the grower, who has to keep his flock alive at great expense, it matters a great deal.

Our breeders, taken generally, are not on the wrong track, and always provided they do not go to the other extreme with regard to constitution as against quality, and provided the industry gets some protection with regard to the export of our stud sheep, there is no need to fear the competition, except in a healthy way, of any country.

Australia has justly earned, and should be able to maintain, her fame as the chief merino country of the world.

Every true merino wool man loves to see and handle a fleece of super-quality wool, but the greatest of care should be taken, in the West of Queensland at any rate, to see that the constitution of our flocks is not sacrificed to quality.

At the time of speaking, the wool and sheep industry is in a depressed state owing to the drop in the price of wool. The country, too, has not had sufficient time to recover from the effects of the late drought, especially in the central districts.

When we remember that South Africa can produce wool at a cost of £5 per bale, whereas it costs us in Queensland in the vicinity of £19 per bale, it should give even the most uninitiated seriously to consider as to our economic conditions. South Africa, too, is nearer the world's markets. Is it right, then, to permit the export of our stud sheep, both ewes and rams? I would suggest that the export should be, at least, rigidly controlled even if not altogether prohibited.

The Department of Agriculture and Stock has, on figures supplied it by the Registrar-General, estimated that, provided no drought losses occur before the end of June next, there will be an increase of approximately 2,000,000 sheep, and 44,000 bales of wool over the period mentioned, in Queensland. Judging, however, on prices realised at the last June sales, it is estimated that even with this increase in sheep and wool the cheque to be divided amongst the growers will be approximately £1,000,000 less. What then is to be done?

Some advocate the reintroduction of the appraisal scheme which functioned so well during war years and afterwards; others assert that the cost of production must come down. These two methods both breathe of politics, with which this branch of the Department has nothing to do, but I unhesitatingly assert that there is one outlet in the growers' own hands. This is in the production of better sheep and of management generally. It costs just as much, and possibly more, to feed a bad sheep as a good one. Rigidly cull the breeding ewes, and spend a few guineas more on rams, being sure on expert advice, that the right type of ram is selected for the ewes.

It should be no very difficult thing for an interested breeder to put 1 lb. of wool per head on the flock over a period of, say, two years, without in any way sacrificing the constitution.

Beware of overstocking. To some extent the insurance of stock is in the owner's own hands. Dry periods have always been in the West and Central parts of Queensland, and one is far safer and surer of a profitable return when carrying numbers well within the capacity of the holding.

Maintain the health of the flock by the supply, when necessary, of a scientific lick making up for the deficiencies in the pastures ascertained after analysis.

Watch carefully for the appearance of worms, and drench before the damage is done. A neglected infestation of worms may quite easily reduce the value of the clip by one-half, besides the losses which would occur.

Change the flocks from pasture to pasture. A change to an apparently worse paddock will often benefit a flock.

Use discretion with regard to grass seed. Choose the most suitable season of the year for shearing.

Mate the rams so as to lamb at a time proved best in the district, and in general give the flocks that care and attention to which they so readily respond.

A great sum of money is lost to the growers of wool annually by faulty wool-classing. Evidence of this is seen in the various wool stores year after year. Employ only those classers thoroughly recommended. Both good classers and others are paid at the same rate. Why not employ a good man in this very necessary and important work?

At the present time this fair State of ours requires the individual help of every owner in the sheep and wool industry. Personal gains brought about by better sheep and better management are gains to the State also, and this should be the object of every owner.

DAIRY FODDER PLOTS.

By A. E. GIBSON, Instructor in Agriculture, and C. S. CLYDESDALE, Assistant Instructor in Agriculture.

The subjoined notes have already appeared in the Journal, and are reprinted in response to numerous requests from our readers in several districts in the State. They are of particular interest and value at the present time.—Ed.

THE majority of farmers engaged in dairying do not appear to realise the advantages to be gained by the growing of crops to supplement pastures to tide their stock over the leaner months of the year.

With the object of introducing the system throughout the Northern, Central, and Southern coastal districts, where reliance is usually placed on Paspalum, Rhodes, and other grasses, certain crop trials were instituted by the Department of Agriculture and Stock to determine the best single crops or crop mixtures for the purpose, and to demonstrate also that the methods, as practised, are not out of reach or too elaborate for the dairy farmer to undertake.

In Southern Queensland the undermentioned farmers co-operated in carrying out trials with Dairy Fodder Plots during the past season:—A. Hulse, Yandina, North Coast line; F. C. Burton, Bridges, North Coast line; and J. B. Stephens, Nindooimbah Estate, Beaudesert.

The soil on Mr. Hulse's farm is a deep, alluvial type of dark-grey loam, fairly rich in humus, which has been under crop, principally maize, for several years. That on Mr. Burton's farm is a deep, light-red coloured, sandy loam, which has been under sugar-cane for a number of years, and, consequently, somewhat deficient in available plant food. Mr. Stephens's property is composed of rich, black, alluvial soil, situated on the banks of the Albert River, and is practically new ground, having produced only two crops, subsequent to which it was fallowed during the summer months.

No fertilisers were used on this occasion on any of the plots.

The rainfall recorded at Yandina Railway Station, which is $\frac{3}{4}$ mile from Mr. Hulse's, and 3 miles from Mr. Burton's property, was—

Month.	Points.	No. of Wet Days.
March	1,059	9
April	1,110	10
May	357	5
June	716	11
July	643	6
August	183	1
September	172	5

The rainfall for Beaudesert was—

Month.	Points.	No. of Wet Days.
March	487	13
April	453	13
May	213	11
June	792	9
July	652	6
August	31	2
September	205	12

Cultivation.—At Yandina the land occupied by plots was ploughed late in February, to a depth of 8 in., immediately after the removal of a crop of maize (grain), but turned up in a very rough condition; and later on, in March, was cross-ploughed and, prior to planting, was reduced to a fine tilth by means of the disc-cultivator, followed by the harrows.

At Bridges the land was ploughed and harrowed in March, and cross-ploughed and harrowed in May; these operations resulted in an excellent seed-bed.



PLATE 47.—PRINCE WHEAT AND VETCHES AT MR. A. HULSE'S FARM, YANDINA.

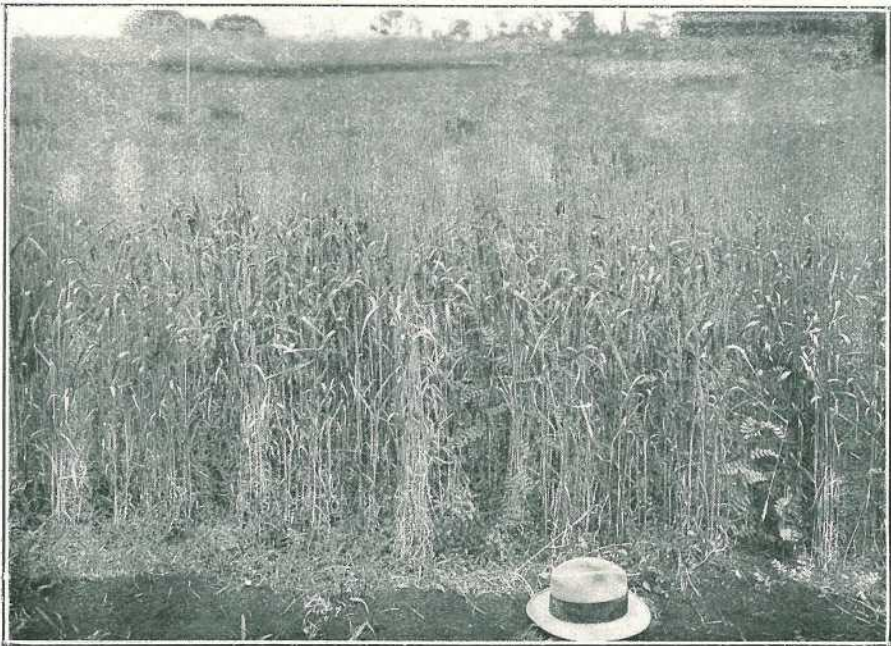


PLATE 48.—PRINCE WHEAT AND VETCHES AT MR. F. E. BURTON'S FARM, BRIDGES, N.C. LINE.

The plot at Nindooimbah was fallowed during the summer, and before planting was again ploughed, thus making a perfect seed-bed.

Sowing.—The heavy rain experienced in March and April delayed planting operations. The soil was not dry enough to plant until 16th May, which, under the circumstances, was rather too late to expect early supplies of Winter fodder.

At all plots the usual local practice of broadcast sowing was followed, seed drills being unavailable. When used in mixtures, peas and vetches were sown first and "disced" in, the cereals being sown on the disced surface—once harrowed, and then rolled.

The majority of the plots made rapid progress, particularly the early-maturing varieties.

Description and Varieties on North Coast.—The two varieties of wheat experimented with—"Prince" and "Patriot"—appear to be suitable for the coastal districts, being practically free from rust, and made excellent growth. When harvested, they averaged 5 ft. in height.

Ruakura and Algerian oats suffered considerable damage owing to excessively wet weather, causing them to lodge, and to be badly affected by rust. They reached a height of 3 ft. at time of harvesting.

Skinless barley suffered badly from the effects of rust, which appeared when the crops were 2 ft. high, in the "shot blade" stage.

Cape barley did fairly well, and when harvested averaged 4 ft. in height, producing a large amount of foliage, and showing only slight indications of rust.

Rye made quick growth, looked remarkably well throughout the growing season, and, when harvested, averaged 5 ft. in height.

In all plots the field peas did remarkably well, making vigorous growth throughout, and, when harvested, averaged 4 ft. 6 in. in height.

Vetches, which are usually rather slow in growth, produced a fair amount of foliage, and, when harvested, averaged 4 ft. in height.

Plots at Nindooimbah.—Throughout the plots, peas and vetches were considerably overgrown by the other cereals used, thus affecting the subsequent yields of fodder. The varieties of wheat—"Prince" and "Patriot"—made excellent growth, stooling well, and having but slight indications of rust. Although they were knocked about considerably by wind and rain prior to harvesting, they did not suffer any serious damage.

Skinless and Cape Barley.—During the early stages of growth, these varieties suffered damage from excessive rains, which caused them to lodge; opportunity was taken to make a first cutting, this being effected ten weeks from the date when the young plants first appeared above the ground. A subsequent cutting was made at a later date, details of which appear in tabulated form. Cape barley made most remarkable growth, but that of "skinless," subsequent to the first cutting, was somewhat thin.

Ruakura and Algerian Oats.—The former, being much the earlier of the two varieties, stooled well, and resulted in a much heavier growth. Later on, however, it showed an inclination to lodge, and to rust. The Algerian oats were somewhat later in maturing, but stooled well; this crop also showed an inclination to lodge, and a susceptibility to rust.

Rye.—Owing to its early-maturing habits and favourable conditions, the rye made rapid growth, and was harvested on 13th August, averaging 5 ft. in height at the time.

By using a little judgment in selecting the right varieties to grow, and getting the first sowing in, say, towards the end of March or April, a plentiful supply of green fodder should be available from early August until practically the end of October, by which time the spring growth in pastures should be well advanced.

In all plots, each of which contained one-tenth of an acre—

Wheat was sown at the rate of 60 lb. per acre.

Barley was sown at the rate of 50 lb. per acre.

Oats was sown at the rate of 40 lb. per acre.

Rye was sown at the rate of 60 lb. per acre.

Field peas was sown at the rate of 30 lb. per acre.

Vetches was sown at the rate of 20 lb. per acre.



PLATE 49.—PATRIOT WHEAT AND FIELD PEAS AT MR. F. E. BURTON'S FARM,
BRIDGES, N.C. LINE.

RESULTS.

Varieties.	YIELDS PER ACRE OF GREEN FODDER.											
	A. Hulse, Yandina.				F. G. Burton, Bridges.				J. B. Stevens, Nindooimbah.			
	T.	C.	Q.	LB.	T.	C.	Q.	LB.	T.	C.	Q.	LB.
Prince wheat and peas	16	16	2	12	2	14	0	2	13	10	0	10
Prince wheat and vetches.. .. .	10	16	0	8	6	1	2	4	11	17	2	20
Patriot wheat and peas	16	4	0	12	9	2	0	0	14	0	3	16
Patriot wheat and vetches	11	6	3	4	2	0	2	1	12	18	1	26
Rye and peas	10	16	0	8	5	5	1	9	14	11	2	22
Rye and vetches	7	11	1	6	Destroyed by wallabies				16	4	0	22
Cape barley and peas	12	3	0	9	10	16	0	8	13	10	0	10
Cape barley and vetches	7	11	1	0	2	19	1	19	(two cuttings)			
Skinless barley and peas	11	6	3	14	Destroyed by wallabies				5	18	3	10
Skinless barley and vetches	5	13	1	21	Destroyed by wallabies				5	2	2	15
Ruakura oats and peas	9	9	0	7	4	3	2	25	18	18	0	14
Ruakura oats and vetches	7	11	1	0	Destroyed by wallabies				17	16	2	2
Algerian oats and peas	8	18	1	1	3	6	0	19	9	3	2	18
Algerian oats and vetches.. .. .	6	15	0	5	Destroyed by wallabies				9	14	1	24

The yields generally on Mr. F. G. Burton's plots were reduced by the depredations of wallabies.

PLOTS AT TOGOOLAWAH.

For some years the Department of Agriculture has endeavoured to interest dairymen and stockowners generally in the matter of fodder provision for their herds during those periods when, by reason of the lack of succulence in the natural pastures, yields from their herds have been considerably lessened, and, in some cases, even reduced within measurable distance of vanishing point.

The practice of arranging with interested farmers to carry out trials designed and supervised by officers of the Department, has met with a good deal of success. The results to date have clearly shown that by early and careful preparation, heavy returns are readily available of rich, succulent, milk-producing fodders, and that a continuity of this class of food can in normal seasons be kept up to tide milk cows over periods during which their productivity is affected by the gradual depression, induced in each animal's system, by being called upon to make use of rough grasses of low nutritive value, at a time when weather conditions were at their worst.

Ocular evidence has shown that improved milk supplies and a correspondingly improved return from the factory is inducement enough for other neighbouring farmers to profit by the example of the one who first adopted the system of growing crops regularly, for his dairy stock—actually, on a farm, an inexpensive method of maintaining an income.

In the present crop trials carried out on Mr. T. Coleman's property at Toogoolawah, no fertilisers of any kind were used. The plots were situated on well-prepared alluvial soil near Cressbrook Creek, which had been under cultivation for a number of years.

The plots were sown on 31st March, 1925, and were harvested for yield-computing purposes on 30th July, 1925, consequently each yield submitted represents four months' growth of fodder, and judged on this basis may be considered as highly satisfactory.

A more vigorous growth was noticeable in the case of Florence wheat and peas or tares and the Skinless barley with a similar mixture, both of which were well out in ear and rapidly maturing; rye had made a dense growth in both instances, but only a few heads were to be seen, and probably a further three or four weeks would be

required to bring it to a similar state of maturity to that obtained by the Florence wheat at date of harvesting. The following yields were recorded:—

	Per acre.			
	Tons.	cwt.	qr.	lb.
Florence wheat and peas	7	14	1	4
Cape barley and peas	9	11	1	0
Skinless barley and peas	10	15	1	0
Rye and peas	8	10	1	12
Algerian oats and peas	8	3	3	20
Canary seed and peas	11	8	0	24
Florence wheat and tares	7	4	2	16
Cape barley and tares	9	0	0	0
Skinless barley and tares	11	1	3	4
Rye and tares	12	13	3	20
Algerian oats and tares	10	15	1	12
Canary seed and tares	8	10	1	12



PLATE 50.—FLORENCE WHEAT AND TARES AT T. COLEMAN'S, TOOGOLAWAH.
Yield—7 tons 4 cwt. 2 qr. 16 lb. per acre.

In view of the fact that some of the plots might be regarded as too immature for the purpose of obtaining the maximum yield, further weighings for comparative purposes were made on the 24th August, with the following results:—

	Per acre.			
	Tons.	cwt.	qr.	lb.
Alberian oats and peas	11	9	3	12
Rye and peas	8	13	2	8
Canary seed and peas	7	17	2	0
Algerian oats and tares	13	19	2	6
Rye and tares	9	9	2	16
Canary seed and tares	13	14	3	8

When selecting fodders for the test, cognisance was taken of their respective periods of maturity so that a continuity in the supply of green fodder might be kept up. Obviously the grower by using judgment in the matter of arranging for succession sowings should readily be able to maintain his supplies, and in this way ensure a more regular state of productivity in his herd.

Observations made respecting the period of development of the different crops were as follows:—Florence wheat and Dun field peas were ready for use earlier than any other single crop or combination, followed by crops in the order named: Florence wheat and tares, Skinless barley and peas, Cape barley and peas, Skinless barley and tares, Cape barley and tares, Rye and peas, Rye and tares, Algerian oats and peas, Algerian oats and tares, Canary seed and peas, Canary seed and tares.

Observations made indicate that it is advisable when arranging for mixtures of crops to confine the sowing of peas to the early-maturing cereals—Florence wheat, Skinless and Cape barley—as the peas begin to lose weight as they approach maturity.

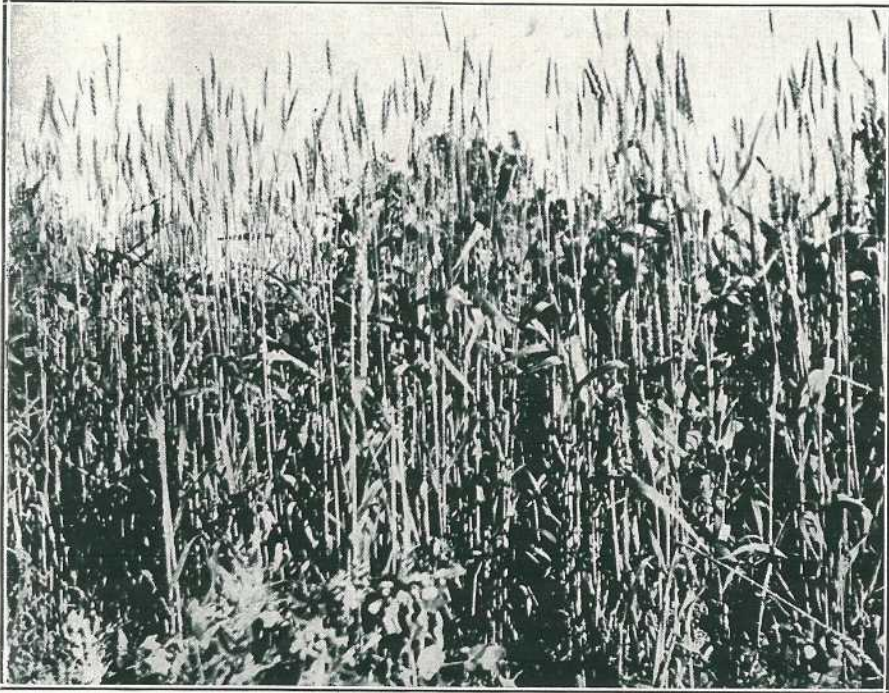


PLATE 51.—FLORENCE WHEAT AND DUN FIELD PEAS AT T. COLEMAN'S, TOOGOO LAWAH.
Yield—7 tons 14 cwt. 1 qr. 4 lb. per acre.

Tares on the other hand have a longer growing period and retain their succulence better than the field peas, consequently they are more suitable for use with Algerian oats, Canary seed, and Rye.

To those dairymen who are interested in maintaining supplies to their respective factories throughout the winter period, the following quantities are recommended for use in connection with the above class of fodders:—

- Wheat 30 lb., Dun field peas or Black Tares 20 lb.
- Barley 40 lb., Dun field peas or Black Tares 20 lb.
- Rye 30 lb., Dun field peas or Black Tares 20 lb.
- Oats 30 lb., Dun field peas or Black Tares 20 lb.
- Canary seed 10 lb., Dun field peas or Black Tares 20 lb.

DRY SEASONS—A COUNTERING FIELD CAMPAIGN.

The loss of national wealth to this State brought about by periods of drought cannot be accurately estimated by figures—but their effects are undoubtedly far-reaching. If action can be taken over certain areas whereby increased production can be brought about, it naturally follows that dry periods are robbed to some extent of their devastating influences and the loss to the State as a whole is decreased. A policy of this kind is naturally educative in its character to all, but when certain sections are dealt with it becomes more particularly of value to those directly interested, and this is increased when illustrations are given for the purpose or proving the policy advocated.

For some time past the Department of Agriculture and Stock has interested itself in increased production of dairy and allied products, and with this object in view has initiated a series of fodder trials in various districts for the purpose of pointing out that if means are adopted for the annual provision of fodder crops for dairy stock and pig raising, the fluctuations which have in the past taken place in the supply of these products will be considerably reduced if not entirely removed.

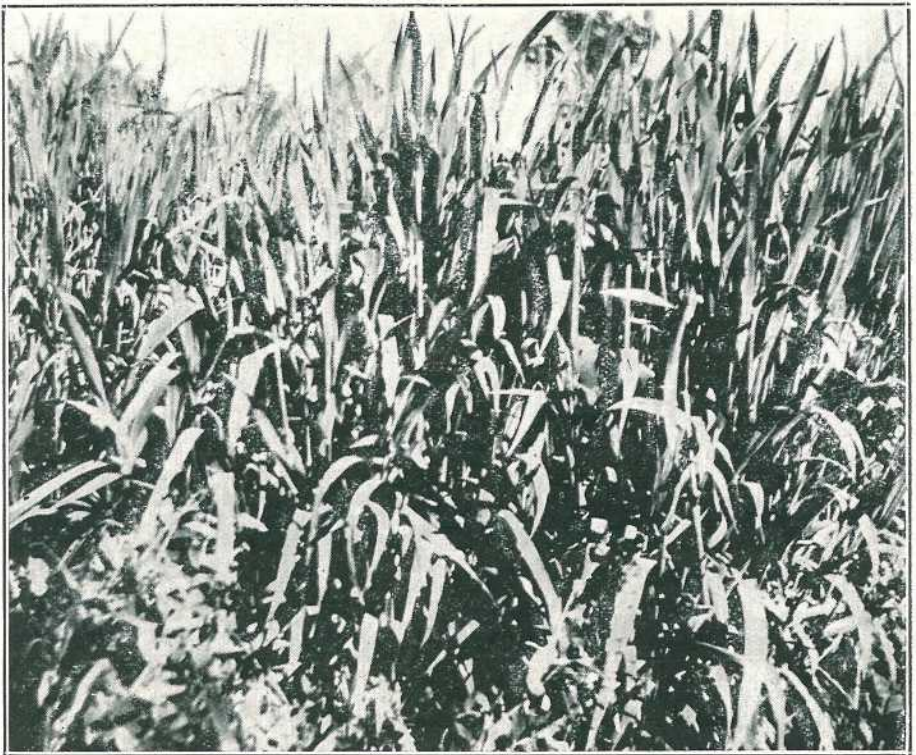


PLATE 52.—CAPE BARLEY (in shot blade stage) AND DUN FIELD PEAS AT
T. COLEMAN'S, TOOGLOOLAWAH.
Yield—9 tons 11 cwt. 1 qr. per acre.

Losses to dairymen and others, brought about by lessened production during dry periods, are often serious, and attention is drawn to the fact that these can be considerably reduced by adopting the policy of careful soil preparation and the sowing of crops calculated to fill the void caused by the absence or decreased supplies of natural grasses and herbage.

It was with such an object that dairy and pig fodder trials were established on the farms of Messrs. F. W. Thiedeke and Peel Caswell, of Beaudesert and Wangalpong respectively, and results obtained so far from portions of these plots

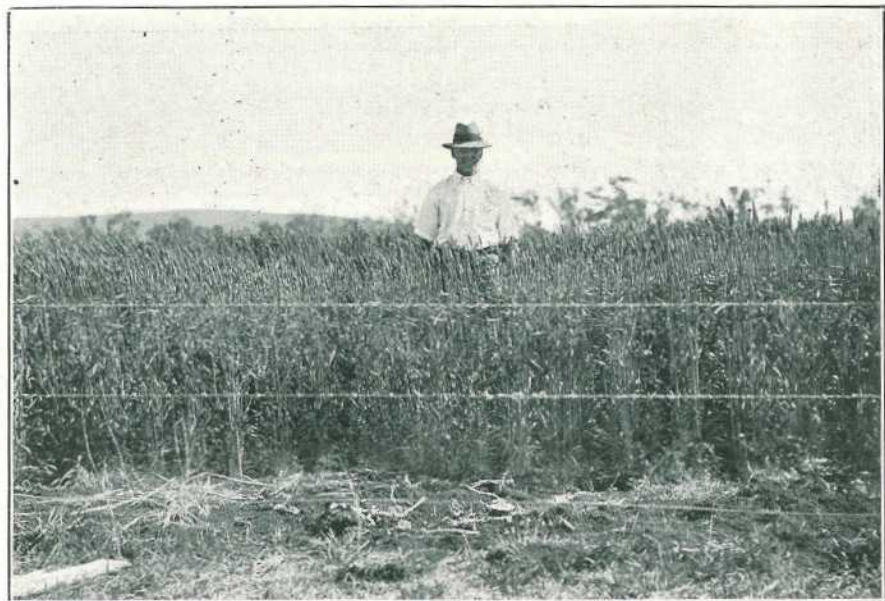


PLATE 53.—PEAS AND PILOT WHEAT AT F. W. THIEDEKE'S, BEAUDESERT
(FODDER PLOTS).

Weight—10 tons 13 cwt. 2 qr. 19 lb. per acre.



PLATE 54.—PEAS AND FLORIDA WHEAT AT F. W. THIEDEKE'S, BEAUDESERT
(FODDER PLOTS).

Weight—11 tons 17 cwt. 2 qr. 20 lb. per acre.

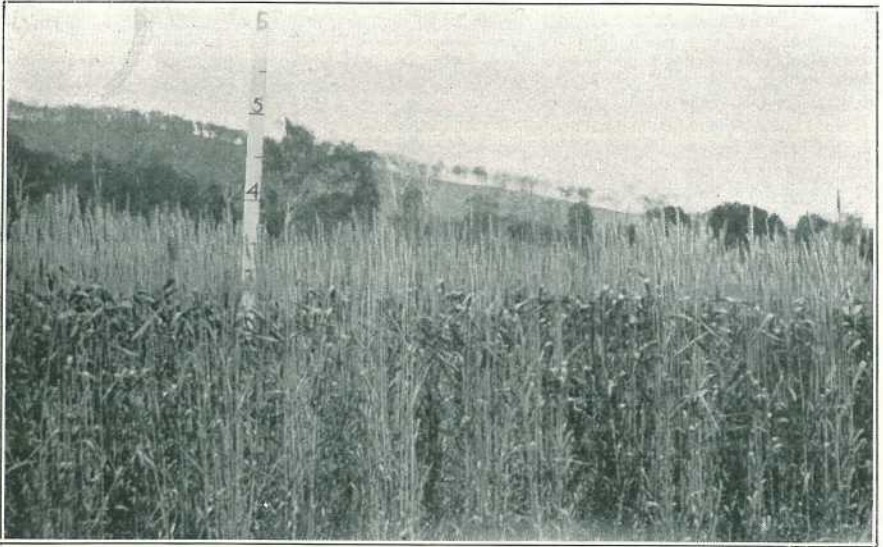


PLATE 55.—PILOT WHEAT AND PEAS AT P. CASWELL'S, WANGALPONG
(FODDER PLOTS).

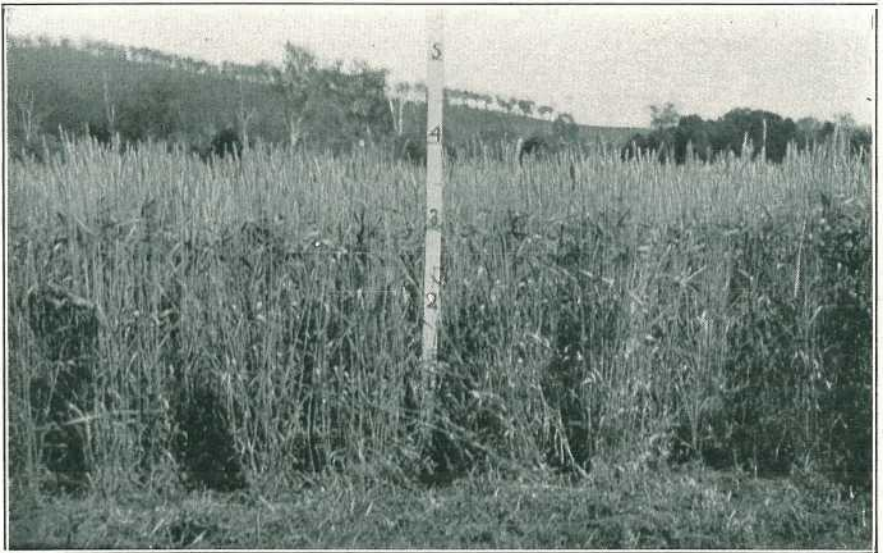


PLATE 56.—FLORIDA WHEAT AND VETCHES AT P. CASWELL'S, WANGALPONG
(FODDER PLOTS).

have proved the soundness of the principle involved. Both farmers are capable agriculturists whose methods of cultivation leave little to be desired, and who are fully seized of the importance of fallowing and thoroughly preparing their land prior to seeding operations. The results obtained on the comparatively low rainfall experienced at Wangalpong speak for themselves; and whilst the soil at Beadesert is of a heavier nature than that met with in parts of the Canungra Valley, the heavier rainfall experienced more than compensated for the difference in soils and their moisture-retaining qualities.

The plots were planted on the 9th and 10th June at Mr. Thiedeke's at Beadesert, whilst those at Mr. Caswell's, at Wangalpong, were planted on the 12th and 14th of June. Rainfall experienced between the 9th June and 23rd September (the date of harvesting) at Mr. Thiedeke's being 3.66 inches, but it must be noted that a fall of 1.06 inches was experienced on 7th June, two days prior to planting. At Mr. Caswell's the rainfall received between the 12th June and 24th September totalled .91, the previous rains to that date being 1.25 inches, registered on 14th and 17th May.

The following weights of green fodder were recorded:—

	Mr. F. W. Thiedeke, Beadesert.				Mr. P. Caswell, Wangalpong.			
	Tons.	cwt.	qr.	lb.	Tons.	cwt.	qr.	lb.
Florida wheat and peas ..	11	17	2	20	7	6	1	22
Florida wheat and tares ..	10	8	3	13	7	4	0	5
Pilot wheat and peas ..	10	13	2	19	8	5	2	17
Pilot wheat and tares ..	10	4	0	7	6	12	0	5
Skinless barley and peas ..	11	8	0	8	6	4	3	10
Skinless barley and tares ..	4	16	0	3	7	1	2	16
Cape barley and peas ..	6	2	1	21	4	18	1	20
Cape barley and tares ..	9	7	1	1	4	16	0	3
Rye and peas ..	5	15	0	27	4	16	1	20
Rye and tares ..	8	0	3	11	3	7	0	25

The varieties of wheats used in the trial were Pilot, a Bunge-Florence crossbred, and Florida, a Bobs-Florence crossbred, both of which were raised at Roma State Farm. These varieties made excellent growth, and were remarkably even throughout the trials. At the time of harvesting both varieties were in the flowering stage, averaging 3 feet 6 inches in height.

At Wangalpong both Pilot and Florida showed signs of flag-rust, but at Beadesert no signs of rust were apparent. This was probably due to local conditions and to the fact that humidity in the Canungra Valley is greater than in the more open areas around Beadesert.

Cape Barley.—This crop made fair growth, and when harvested was in the shot-blade stage—the height averaging 1 foot 9 inches of good healthy growth. From the general appearance of the crop a later cutting will give a heavier yield.

Skinless Barley was a clean and attractive crop, averaging 3 feet in height, which had made a remarkable growth of foliage. When harvested the grain was in the soft dough stage.

Rye.—In each case this crop made rapid growth, and was in the flowering stage when harvested, averaging 3 feet in height. Generally speaking, growth was somewhat on the thin side, and heavier quantities of this cereal should be sown when the season is somewhat advanced, as it was in this particular instance.

Field Peas in all plots made fair average growth of 1 foot 6 inches in height. When harvested they showed signs of wilting, thus reducing the weight per acre that under other conditions would have been recorded.

Vetches, usually rather slow in maturing when compared with peas, made favourable growth.

The pig fodder plots were not sufficiently far advanced in growth on 23rd September to justify their harvesting, consequently this matter was deferred till 24th November, but during this period a further rainfall of 326 points was received and recorded as follows:—25th September, 32 points; 28th September, 166 points; 16th October, 46 points; 25th October, 9 points; 16th November, 73 points; total, 326 points.

As a result increased growth was in evidence compared with that shown on the occasion of the previous visit.

As in the case with the dairy plots, Mr. Caswell had given careful attention to the cultivation of the various fodders, and an entire absence of weed growths was noticeable.

The various yields recorded can be regarded as valuable illustrations of what can be accomplished by careful and systematic cultivation of crops that are suited for purposes of economic pig feeding and can be produced at little cost to the grower.

The following are the yields recorded:—

	Per acre.			
	Tons.	cwt.	qr.	lb.
Thousand Headed kale	11	15	3	3
Dwarf Essex rape	6	9	2	16
Yellow Globe mangels	29	8	1	20
Long Red mangels	23	19	2	12
Purple Top Swede turnips	14	18	0	27
Elephant Swede turnips	12	13	3	18
Sugar beet	17	6	2	12
White Belgian carrots	12	13	3	18

The Dwarf Essex rape suffered somewhat from the attacks of Aphis, whilst the foliage of the Swede turnip was subjected to the attentions of the Rutherglen Bug; otherwise the crops were excellent in every respect.

QUEENSLAND SHOW DATES.

Following is a list of show dates for 1930, so far approved by the Queensland Chamber of Agricultural Societies:—

	FEBRUARY.		Wallumbilla	20-21
Stanthorpe	5-7		Springsure	21-22
Killarney	28—1 Mar.		Kilkivan	21-22
	MARCH.		Biggenden	22-23
Allora	5-6		Maryborough	27-30
Clifton	12-13		Toogoolawah	30-31
Tannymorel	15			JUNE.
Milmeran	18		Marburg	3
Pittsworth	20		Gin Gin	5-7
Goondiwindi	20-21		Lowood	13-14
Warwick	25-28		Gladstone	18-19
Toowoomba	31—3 Apr.		Mount Larcom	20-21
	APRIL.		Rockhampton	25-28
Dalby	8-9			JULY.
Oakey	11		Mackay	1-3
Sydney Royal	15-26		Gatton	9-10
Miles	16		Townsville	8-10
Chinchilla	22-23		Rosewood	18-19
Beaudesert	30—3 May		Caboolture	17-18
	MAY.		Nambour	23-24
Goombungee	2		Esk	25-26
Taroom	5-7		Maleny	30-31
Mundubbera	7-8			AUGUST.
Boonah	7-8		Royal National Association ..	11-16
Blackall	13-15		Crow's Nest	27-28
Roma	13-14			SEPTEMBER.
Gayndah	14-15		Beenleigh	19-20
Ipswich	20-23		Rocklea	27

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.:—

Grasses and Clovers.

E.B. (Tailevu, Fiji)—

We do not know the grass you describe, it sounds a bit like Rhodes Grass (*Chloris Gayana*) which might do well in some parts of Fiji, and seed of it is procurable through any reputable seedsman either at Sydney or Brisbane.

We are not at all sure of this, and would suggest that you send a specimen seed head and leaf for identification.

In regard to grasses in North Queensland, on the coast where conditions are somewhat similar to those of Fiji, the outstanding grass from a dairying point of view is the Para Grass (*Panicum barbinode*), generally known in Queensland as *Panicum muticum* or Giant Couch. Of similar habit, but of rather finer growth, is the Kikuyu (*Pennisetum clandestinum*). Both the Para and Kikuyu are almost invariably grown from cuttings, not from seeds. A bigger grass that could be used for combined grazing and cutting you might try Soudan (*Sorghum soudanense*) and Elephant Grass (*Pennisetum purpureum*). Seeds of both of these are procurable, of course, from any reputable seedsman in either Sydney or Brisbane. We do not think you will have any success at all with clovers in Fiji, as these are essentially temperate plants. The only clover that does any good at all in Queensland is the ordinary White Dutch, *Trifolium repens*. Lucerne should do quite well on arable land. Allied to the clovers are the Medick Burrs or Burr Trefoils, Medicago species, or which the commonest is *Medicago denticulata*, very common in Queensland and New South Wales, though we do not know whether seed is stocked by nurserymen. These plants are not of annual duration, but come up with the winter rains, and provide feed during winter and spring when other grasses and herbage are more or less absent or at a stand still.

A plant that has overrun a good deal of North Queensland of recent years is *Stylosanthes mucronata*, known as Wild Lucerne. Like Burr Trefoil it is of annual growth, but is a summer not a winter feed. It provides excellent forage comparable to lucerne in nutritive value. I do not think seed is stocked by seedsmen in the ordinary way, but if you wrote to the Instructor in Agriculture, at Townsville, N.Q., he might be able to put you in touch with a supply. This officer (Mr. N. A. R. Pollock) should be able to give you some useful information about fodders for your part of the world, as conditions in his district are comparable to those in Fiji.

Grass for Golf Links.

INQUIRER—

The best all-round grass for golf links near Bowen would be the Common Couch (*Cynodon dactylon*). The Blue Couch (*Panicum didactylum*) should also do well in the locality. A grass that lies flat on the ground in North Queensland and makes a fairly close turf is the broad-leaved form of *Paspalum platycaule*. This does particular well near the sea. We do not know that seeds are obtainable, but the plant is easily propagated by roots.

PIG RAISING.

(Selected from the outward mail of the Senior Instructor in Pig Raising, Mr. E. J. Shelton, H.D.A.)

Paralysis in Pigs.

A.E.C. (Inglewood)—

Tell us more about the symptoms of the trouble, and describe your methods of handling and feeding your pigs. Bush ticks are often the cause of paralysis in young pigs. Ordinary hog lice do not actually poison the pig, but their continual irritation results in loss of rest and in reduced condition.

Seaweed as Fertiliser.

H.A.P. (Karragarra Island)—The Agricultural Chemist, Mr. J. C. Brünnich, advises as follows:—

The composition of seaweed varies very considerably. Roughly speaking, the seaweed has about the same value as a good stable compost, and it would be always best to collect it in stacks and allow it to rot. Mr. Brünnich's analysis of your sample:—

	Per cent.
Moisture and organic matter	= 76.9
Salt (NaCl)	= 4.7
Lime estimated as CaO	= 5.8
Nitrogen	= 1.2
Phosphoric acid as P ₂ O ₅	= 0.2
Potash as K ₂ O	= 0.8

This material has some manurial value and would be worth collecting, but could not stand much transport costs. It would unquestionably be much more valuable if allowed to rot and consolidate made into a compost heap.

Pollen Substitutes

R.W. (Gympie)—The Agricultural Chemist, Mr. J. C. Brünnich, advises as follows:—

Freshly prepared maize meal is undoubtedly superior to commercial maize meal as a pollen substitute, and it is unquestionably the finely ground germ which is the most valuable part. The germ is really a part of the ovum and the composition of this and pollen closely related. A good quality of pollen contains about 5 per cent. water, 30 per cent. proteins, 5 per cent. starch, 15 per cent. sugars, 40 per cent. other carbohydrates, fats, wax, ash, &c., and is naturally rich in vitamins, which are present only in very minute amounts, but which are the most indispensable and most difficult to replace. Bees when starving for pollen, use all kinds of substitutes, and their instinct does not show which are the best, they have been known to collect sawdust, coal dust, soil, &c. When giving substitutes like flour, of which rye flour appears to be the best, and other meals, it will be difficult to ascertain with absolute certainty which is the best, unless all other sources of real pollen are excluded. Milk has been found valuable, but decomposes too quickly, but I think it very probable that milk powder, like "true food" mixed in small amounts with flour or pollard would be found valuable. An ideal food would be the yolk of an egg, if it could be mixed with flour, dried and ground up again. Any strong heating must be avoided as it is likely to destroy vitamins. I have no hope in fungus spores, smut, &c., being ever utilised, and in many cases would be dangerous, as spores are frequently poisonous.

TWO MILLION TREES.

Two million young rubber trees are now being planted in the Dunlop Plantations, Malaya, section by section as the heavy tropical jungle is cleared and its soil prepared over an area of 16 square miles.

In ten years' time it is expected that the new trees will yield an annual crop of 5,000 tons of rubber. At present 8,500 tons of rubber a year is being tapped from 4,000,000 trees.

Every other day a very thin strip of bark is cut from each tree and the fluid rubber drips into the cup below. As each cup receives, on the average, only half an ounce of dry rubber daily, between 600,000,000 and 700,000,000 cupfuls of it have to be collected in the course of twelve months.

One third of the native workers are Chinamen, but the bulk of them are Tamil specially recruited from the south of India. Temples for their worship are built by the Dunlop organisation, which also provides houses and hospitals for them, schools for their children, and rice at cost price.

Golf courses have been laid down for the European staff, whose Rugby team is making a bid for the championship of Malaya.

Early next year the dense jungle is to be tackled over a further 16 miles on the Dunlop territory, which is more than 125 miles in extent.

General Notes.

Staff Changes and Appointments.

Mr. P. L. Barry has been reappointed Government Representative on the Tambo Dingo Board.

Mr. M. Maloney, of Meandarra, has been appointed an Acting Inspector of Stock at Meandarra.

Mr. C. H. S. Wills, of Aramac, has been appointed Government Representative on the Aramac Dingo Board.

The appointment of Mr. O. H. Webb as Acting Inspector of Stock has been cancelled as from 31st December, 1929.

Mr. Charles Bradbury has been appointed an Officer under the Animals and Birds Acts, as from 28th December, 1929.

The appointment of Mr. J. J. Shelvey, as Inspector of Stock at Crow's Nest, has been confirmed as from 6th June, 1929.

Messrs. C. N. Morgan, W. G. Hancock, and A. J. Browne have been appointed Temporary Inspectors under the Diseases in Plants Act.

Mr. R. J. T. Kidd, Inspector of Stock, Normanton, has been reappointed Government Representative on the Carpentaria Dingo Board.

The appointment of the Officer in Charge of Police at Sapphire as an Acting Inspector of Stock has been cancelled as from 31st January, 1930.

The appointment of Mr. J. L. Hodge as Instructor in Sheep and Wool, Department of Agriculture and Stock, has been confirmed as from 4th June, 1929.

The appointments of Messrs. W. J. Sheahan and E. C. Dunn as Inspectors under the Diseases in Stock Act have been confirmed as from 6th June, 1929, and 4th June, 1929, respectively.

Mr. F. C. Shaw, of Maryborough, has been appointed a Temporary Inspector of Slaughter-houses from 2nd January to 4th February, 1930, during the absence of Mr. E. C. Todd, on leave.

Messrs. V. A. Spyve and J. D. Ferricks, Police Constables, have been appointed Inspectors under the Slaughtering Act as from 13th December, 1929, and 26th December, 1929, respectively.

Messrs. T. I. Parker and William Law, of Goodna, and Mr. H. M. Johnstone, of Ashgrove, have been appointed Honorary Rangers under the Animals and Birds Acts, as from the 14th December, 1929.

Acting Sergeant T. Smith, of Surat, has been appointed an Inspector under the Brands Act; Constable R. J. Nesbit, of Kalbar, has been appointed a Slaughtering Inspector; and the Officer in Charge of Police at Atherton has been appointed an Acting Inspector of Stock.

Mr. J. H. Buzacott has been appointed Assistant Entomologist, Bureau of Sugar Experiment Stations, Department of Agriculture and Stock, as from 1st January, 1930; and Mr. N. G. Cassidy has been appointed Research Assistant, Bureau of Sugar Experiment Stations.

Mr. W. D. Cameron has been reappointed Government Representative on the St. George Dingo Board; Mr. R. C. Lethbridge has been reappointed Government Representative on the Booringa Dingo Board; the Police Magistrate, Ingham, has been reappointed Government Representative on the Kennedy Dingo Board; Mr. T. Law has been reappointed Government Representative on the Adavale Dingo Board; and the Inspector of Stock at Charleville has been reappointed Government Representative on the Warrego Dingo Board.

Pineapple Levy, Term Extended.

Regulations providing for a levy to be made on all pineapples marketed in Queensland were passed on 14th January, 1926, and extended until 24th January, 1930, on 15th March, 1929. The levy is made by the Committee of Direction of Fruit Marketing, and is at the rate of $\frac{1}{4}$ d. per case, or, in the case of being sold loose, at $\frac{1}{4}$ d. per forty-two rough or ripley pineapples, or at the rate of $\frac{1}{4}$ d. for every twenty-four smooth pineapples. A regulation has now been passed extending the levy to include all pineapples marketed in Queensland until 24th January, 1931.

A Laidley Sanctuary.

An Order in Council has been passed declaring Reserve R. 132, known as Dyer's Swamp, Laidley, as a Sanctuary under the Animals and Birds Acts; thus it will be unlawful for any person to take or kill any animals or birds in this area.

Egg Board Election.

Nominations will be received by the Returning Officer, Department of Agriculture and Stock, Brisbane, until 20th February, 1930, for election for one year as from 1st April, 1930, as growers' representatives on the Egg Board. Five such representatives are to be elected, and each nomination is to be signed by at least ten growers of eggs who own fifty fowls or more.

Atherton Tableland Maize Board.

Nominations will be received by the Returning Officer, Department of Agriculture and Stock, Brisbane, until 5 p.m. on 17th February, 1930, for election as growers' representatives on the Atherton Tableland Maize Board. Five such representatives are to be elected by growers who, subsequent to 24th March, 1929, grew for grain within the Petty Sessions District of Atherton, Herberton, or Chillagoe, at least 1 acre of maize and delivered the product of same or part of same to the Board for sale. Each nomination is to be signed by at least ten growers as above.

Canary Seed Board.

The definition of "Growers of Canary Seed," as stated in the Order in Council dated 23rd December, 1927, constituting the Canary Seed Board, in paragraph 4, has been amended. The definition now reads as follows:—

"(4.) The class of persons who shall be deemed to be growers of such commodity and eligible to vote at any referendum or election in connection with the said Board shall be persons who have grown or have growing canary seed for sale within a period of twenty-four months prior to any election or referendum held in connection with the said Board."

Over-Production of Milk.

Better attention to breeding had raised the average annual milk yield of all recorded from 599 gallons in 1917-18 to 673 gallons in 1927-28. So said Mr. J. F. Blackshaw, of the Ministry of Agriculture, before the Auctioneers' and Estate Agents' Institute (England). Dairy farming had in a comparatively few years grown from a localised industry to one which now represented more than 30 per cent. of the whole farming industry. There was some reason to think that unless the public could be induced to drink more milk, or unless more satisfactory provision were made for the manufacture of milk into products, the milk industry might, in the near future, suffer from over-production.

Another Thrice 2,000 Galloner.

Major C. F. Case's wonderful British Friesian cow Blieking Mist has added to her fame by completing her third 2,000-gallon yield.

Blieking Mist was bred by Mr. Thomas H. Case, but her working life has all been spent in the herd of Major C. F. Case, of Cockthorp, Wells, Norfolk. Born on 6th September, 1923, she has calved four times and milked as follows:—

14,551 lb. in 337 days in milk, 1926; 20,130 lb. in 310 days, 1927; 21,754½ lb. in 342 days, 1928; 20,527½ lb. in 248 days, 1929; total, 76,963 lb.

Blieking Mist has thus produced, with her first four calves, and in a total period of less than four years, 7,696 gallons of milk. Moreover, she has set up a new British record for production at six years old, her total output at such age being 7,325 gallons, an achievement which displaces Mr. James Calwell's wonderful Irish Friesian cow Ballyhill Brineen, who at the age of six had given 6,837 gallons.

Blieking Mist was reserve champion in the Open Milking Trials at the Royal Show at Harrogate in July last, on which occasion she gave 78 lb. of 3.37 per cent. milk, from which 2 lb. 12¼ oz. of butter were made. She also came second in the Open Butter Tests at Harrogate, and second in the last of the "Harold Jackson Trophy" competitions, her average annual yield for three successive years being 1,805.7 gallons, just insufficient to beat an eight-year-old cow that averaged 1,806.4 points over the same period.

Both the sire and the dam of Blieking Mist carry the blood of the bull Beebles Lodewijk, that sired no fewer than ten 2,000-gallon cows.—"Live Stock Journal" (England).

Banana Levy, Term Extended.

Regulations making provision for a levy on bananas were passed on 1st September, 1927. Such levy is payable by growers of bananas marketed in Queensland, and the rate of the levy is fixed at 1d. for every £2 or part thereof of the net proceeds realised from sales. The levy, which is made by the Committee of Direction of Fruit Marketing, operated until 31st December, 1929. A regulation has now been passed to include all bananas marketed until 31st December, 1930.

Rating of Agricultural Land.

The following interesting opinion is given by "Local Government," the organ of the Local Authorities Association of Queensland:—

Case.

I am instructed to write and inquire if an owner of agricultural land in the town area is entitled to differential rating? If so, must the land be used for agricultural purposes?

Opinion.

In my opinion the owner of the agricultural land referred to is not entitled to be rated at a lower rate than the general rate as of right, but if the local authority is of the opinion that the land is not in demand for building sites or residential areas and is being reasonably used for the purpose of primary production it may levy a lesser rate. (See section 233, as amended by the Act of 1923.)

Small Goods Sales—Amended Regulations.

An amendment has been passed to Regulation 49, under the Diseases in Stock Act, which provides that any small goods may be stored or sold in the same room as is used by the owner or occupier of a butcher's shop for the storage or sale of meat. The regulation now provides that small goods may be stored or sold by any person who does not sell or offer for sale fresh beef, except veal from carcasses of not less than 40 lb. or more than 80 lb. dressed weight, or mutton of any description.

The effect of this will be that small goods shops will be restricted to the sale of the following articles:—Bacon, brawn, brains, bread, butter, cheese, cooked meats, dripping, eggs, fish (smoked or cured), ham, kidneys, lard, mince, pies, pork, poultry (dressed), rabbits (dressed), sausages, scones, tinned and bottled foods, tongues, tripe, trotters, veal from carcasses of not less than 40 lb. or more than 80 lb. dressed weight.

Feeding of Dairy Cows.

Improper feeding of dairy cows is one of the chief causes of unprofitable dairying.

It is not contended that the heavy loss to the dairying industry brought about by insufficient feed during an adverse season could be wholly avoided by up-to-date methods of feeding, observes a recently issued pamphlet of the Department of Agriculture, but it can safely be stated that by the practice of proper methods of farming the dairyman would be in a much better position to face a period when providence does not treat him too kindly. Top-dressing of pasture land, conservation of surplus fodder, and the utilisation of farm-grown fodder crops in such a manner as to ensure their maximum feed value are practices which must be employed in order to obtain the best results. Most farm crops, with the addition of a small amount of concentrates, form excellent balanced rations, and by feeding the various fodders in this way their full nutritive value will be utilised by the animal and waste in feeding will be eliminated. Waste by improper feeding of farm crops is very commonly observed on dairy farms, whereas if these crops were utilised in the correct manner better results would be obtained from the herds at very little extra cost.

Hand-feeding of dairy cows is, comparatively speaking, not carried out very extensively in this country, and in many instances where the practice is being adopted the rations fed are prepared in such a manner, and with so vague a knowledge of the correct method of preparing a true balanced ration, that waste in feeding is the result. The cutting of valuable fodder crops and throwing them in the paddocks for the cattle to eat is still a general practice with many farmers. This method is not only wasteful, from the point of view of utilising the full nutritive value of the fodders, but is objectionable from another standpoint. Dairymen have no doubt noticed that by adopting this method of feeding their cows the herd is continually being disturbed by the strong robust animals with a keen appetite, who endeavour to obtain more than their share of the feed, with the result that the younger and weaker animals in the herd are deprived of their nourishment.

The A.I.F.

It is not generally known that the place of birth of members of the A.I.F. who sailed from Australia for the Great War was as follows:—Queensland, 28,253; New South Wales, 88,250; Victoria, 92,553; South Australia, 27,761; West Australia, 8,042; Tasmania, 13,104; United Kingdom, 64,221; New Zealand, 4,214; other British countries, 2,246; foreign countries, 3,437; total, 331,781. It will be seen from this summary that 77 per cent. of the men of the A.I.F. who left Australia for the front were native-born. The percentage of casualties to Australians engaged was 67½ per cent.

The Anti-Waster.

He is obsessed with the tremendous waste that goes on all around him. He declares that enough good, nutritious food is flung into the rubbish bins in Brisbane every day to feed all the unemployed in the State. "We are a recklessly wasteful people," he says. "Look at that high-powered car, slipping by there, with only the flapper driver. The power that could easily pull a ton is wasted in carrying a six-stone flapper. How much land could that extra power, if usefully employed, plough up in a day? A big able-bodied man served me with a necktie this morning, and I saw a little sickly fellow down on the wharf tugging at an outsize truck. No organisation of mechanical or human forces anywhere! The whole universe seems to be run on the same wasteful lines. Have you ever considered the enormous amount of solar energy released by the sun every day, and how infinitesimal a portion of it is absorbed by the planets—the rest wasted in space? And yet they talk about the conservation of energy!"—"The Professional Officer."

The Moral Code of "Woodbine Willie."

The Dean of Canterbury ("Dick" Sheppard), writing of his friendship with "Woodbine Willie" (the Rev. G. A. Studdert-Kennedy), says:—

"There has never been anyone in my life who at all resembled him. To me the outstanding qualities which made his friendship so lovely were his deep love of humanity, his intense sympathy and generosity, and his magnetic humour and wit."

In a letter that "Woodbine Willie" sent to his wife while serving in France as to the training of his little son, it is written:—

"1. Make him a sportsman. Encourage him to play games and always to play the game.

"2. Teach him to despise cowardice and never to be afraid of anything or anyone save God.

"3. Teach him as soon as you can what his body is for, about his powers of procreation, and about the necessity of cleanliness in body and mind.

"4. Teach him to tell you everything about himself, and specially everything of that sort.

"5. Teach him that being a gentleman means using your life to serve and help your fellow men as much as ever you can, and that it is dishonourable to desire only to make money and be comfortable. If he has brains, teach him that he must use them to lead men on to better things, and to teach them a gentleman should choose one of the poorly paid but honourable professions.

"6. Teach him to love and reverence women. Encourage him when young to have plenty of girl friends, and to treat them as comrades and never to play with them and deceive them. Teach him that the man who deceives a woman is a scoundrel and that he must try to live straight.

"7. Last, and most important, about his religion. Teach him to love Jesus Christ as the pattern God-Man. Teach him that and leave him free. Don't force his religion in any way, especially if he has brains. There are bound to be in these coming years very rapid developments in Christian thought; let him go his way, and do not be pained or shocked so long as he keeps his love to Jesus Christ. If he wants to become a priest, let him, but never force him in any way. Only teach him constantly that a gentleman must give, not get, must serve and not be served.

"Guard him from vulgarity and snobbishness, and never let him speak contemptuously of anyone or anything except a coward.

"I think that is all. Kiss him for me and give him my blessing, and when he is old enough tell him my life story as you would tell it, knowing that I tried hard most of the time to do right, and when I sinned I was sorry in my heart, as I am now.

"I don't believe I am going to be killed, but I don't know, and any way I am content, so long as God can comfort you."

Dreams and Realities.

"The only real things in life are the dreams," declared Mr. C. G. Ammon, M.P., Financial Secretary to the Admiralty, in a recent speech. "The men and women who make history are the dreamers. There was hardly anything they enjoyed in their social or everyday lives that had not first of all been seen by the dreamer, who then had to make the practical man realise there was money in the idea. As long as a nation or people keep their eyes on purely practical things, that nation is doomed to certain extinction, whether it be immediate or somewhat delayed."

Can Any of Our Readers Beat This?

Discussing pig matters recently with Mr. Walter Skinner, of Jandowae East, via Jandowae, Queensland, we ascertained that his returns from bacon pigs sold during 1929 equalled £3 per cow; that is to say, the dairy herd in regular use numbered 100 head and the returns from the pigs for the year were £300—equal to £3 per cow—the bulk of the pig food being skim milk plus farm-grown crops, greenstuff, &c. We have not the figures per cow or per pig but just a bare outline of the results, and it would be of interest to hear whether any of our readers have kept records of their returns from pigs. Mr. Skinner keeps four or five sows and a boar and occasionally purchases odd lines of store pigs at times when his own stock is depleted by sales or otherwise, and he is quite satisfied there is good money in pigs if they are handled along correct lines.

To Reduce Costs in Tractor Farming.

Looking back over the past ten years, one must marvel at the tremendous advances made in mechanical transportation. Almost daily we are being thrilled by the spectacular feats of speed and endurance on land and sea and in the air. One wonders where it all will end, and how soon the day will come when the uttermost speed has been attained and machines reach such a stage of perfection that the poor human being, with his many limitations, cannot control them.

There is one unit of transport, however, about which we hear very little. It is not heralded for its feats of speed; neither do we read at length of prolonged endurance tests in which it is featured, but, nevertheless, this machine is wonderful in what it can endure, and remarkable in the speed at which it accomplishes large quantities of everyday work. We are referring to "the Tractor." There is no doubt that during the past few years tremendous strides have been made in the perfection of the modern tractor. Time was when a tractor was a large piece of intricate machinery, cumbersome to handle and expensive to run; to-day, however, it is a machine of remarkable economy and efficiency, and there is no doubt that it is an absolute boon to the farmer. Tractor manufacturers have been constantly improving, with a view to obtaining more and more work at less cost. Weight has been reduced, traction has been wonderfully improved, compressions have been made higher, and every facility for ease of working has been adopted. The result is a machine which takes the place of a team of horses, and does the work quicker, cleaner and cheaper, and can, if need be, work twenty-four hours a day for seven days in the week.

With the increased efficiency of the tractor motor must naturally come increased efficiency in the fuel with which to run it. The farmer to-day is demanding the highest quality kerosene in order that he may enjoy, not only the greatest economy, but the greatest ease of working from his tractor. In the old days, when a tractor was only used for the heavy work of the farm, practically any sort of kerosene "would do"; to-day, however, the tractor is a utility job, and its operations range from the full-power job of pulling a plough through clayey land to the lightest job of cutting chaff. The result is the need of a kerosene which will accomplish both jobs and all those in between with ease, and the farmer is fortunate in having supplies of the "New Cross" kerosene within easy reach at over 500 Shell Company depots throughout Australia. This kerosene is a fuel which not only excels in power and economy, but which can be thoroughly depended on to give excellent idling and starting results under the worst possible weather conditions. To the farmer who is sowing or doing light work, where frequent stops are necessary, this facility of idling is essential, and it is with this important point in view that the "New Cross" was evolved.

Another big advantage of this new fuel is the very small percentage of crankcase dilution which occurs. In the past, the dilution of the crankcase oil by unburnt kerosene fractions has been a cause of constant worry and expense to the tractor owner: this is now practically eliminated.

Dipping Deeper.

"There is nothing like a sip of somebody else's philosophy. The biography of some great man or woman, or a collection of letters or memoirs—are so scandalous—gives just the right incentive to go and do likewise when the holidays are done. 'Contact with great minds,' it is familiarly called, and it has in truth as bracing an effect as a draught of fresh air. It also serves to counteract the false ideas that the novel may have set agoing. Here is something milled from hard experience, not the wild dreams of a romantic. Something rather hard to bite on may prove more welcome than you think on a wet day. Everyone hates the wasted feeling that a wet day in the country brings. Novels only make it the more irksome, and belles lettres are apt to seem a little futile, too. The wet day is often the day for something practical. A book, then, on political economy, bird lore, or ancient history—the subject matters less than its serious treatment—may prove a godsend." —E. F. Osborn, in the "Morning Post."

When Digging Post Holes.

Post holes should be from 22 inches to 24 inches in depth. They should not be made too big, as this involves unnecessary labour both in digging, filling, and ramming; nor will the post have such a firm grip in the ground. The holes should be a little more than large enough to receive the posts comfortably and leave room for the rammer to work to the bottom of the hole.

Dig the full depth straight away; if a little too deep it is easy to put in some loose earth to make the post the right height. Sight the posts from the centre, and fill in and ram the bottom—say, the the first 6 inches—thoroughly. The bottom, and near it, is the place where ramming is most required; as the top is approached less ramming will do. Place earth that remains neatly around the post to allow for subsidence.

Sink post holes, if possible, when the ground is in good condition—not too wet and not too dry. Ground saturated with moisture cannot be well rammed.

Fruit Experiments.

In the heart of Kent, near East Malling, experiments are about to be carried out to improve the transport facilities for fruit, particularly on such long-distance routes as the North Pacific and Australia. A complete model of a ship's hold is being erected by the Cambridge Low Temperature Research Station, which is working in conjunction with the Empire Marketing Board. Although the fruit imports of Great Britain have improved wonderfully lately, and show no signs of decreasing, it is felt that there is far too much wastage in transport, and for some time past big efforts have been made to find improved methods. Most of these have been in the laboratory, where very useful work has been carried out, and a good many valuable discoveries made, but it is now felt that it is high time to try them on a bigger scale, and that it is far cheaper to carry out the work on shore than to fit out the hold of a ship. That can come later, and in the meantime the building at Malling will hold about a hundred tons of fruit. On land, such alterations as may be found to be necessary in the progress of the experiment can be carried out without delay and expense, the installation being sent afloat for a thorough practical trial when something like finality is reached ashore.

Essentials to Happiness.

If you were asked to make a list of the six things you need most for happiness, what would you put down?

Why not make your own list before reading any further? Like every other person in the world, you want to be happy, and doubtless have given more or less thought to the matter.

Dr. William S. Sadler has studied people for twenty years or more, and he says he has found the essentials of a normal happy life to consist pretty much of the following six things:—1, good health; 2, congenial work; 3, discipline or self-control; 4, human companionship; 5, reasonable leisure; 6, religious or spiritual philosophy.

You will notice that he doesn't lay special emphasis on money at all, although some people would place it first. His experience tells him that many people get along happily without any great amount of material wealth. But there are far too many on the poverty line.

People who enjoy good health and who are doing work they love to do in the right way have found heaven for themselves right here on earth.

Equalise the Car Load.

Equal loading is something that is often disregarded with the small light car, especially the four or five seater. When there are three persons in the car, the disposition of the third, supposing the first two are side by side, is important. The driver, naturally, occupies the right side of the front seat. The other passengers, therefore, should be so placed that the greater weight is on the off-side of the car. Thus, a third passenger, if in the back, should sit on the right side. Similarly, with four passengers, the heaviest should be on the off-side.

The camber of the road already draws the car down unduly on the rear springs. This propensity is emphasised and increased if the heavy passenger be seated on the near side. The car is difficult to steer out of the left side of the road and on corners difficulty may be experienced in getting around without much reduction in speed.

Sometimes the heavier load on the near side makes for actual danger. It increases the chance of skidding when the surface is greasy and it prevents recovery. Equal loading should be obtained if possible, and to ensure equal loading on cambered roads, it is desirable to have the greater weight on the off-side of the vehicle, as so much of the driving is on the unlevel left side of the road.

Wheel—Wobble.

One of the most disconcerting faults that can develop in a motor-car is wheel-wobble, a defect usually caused by the vibrations of the road accidentally putting the two front springs in step with their own vibrations. When that occurs, there is an up-and-down see-sawing movement that produces wobble or shimmy, as it is sometimes termed.

Consequently shimmy dampers are sold, which are a kind of shock-absorber, linking either two portions of the steering mechanism, or the steering tie-rod and the front axle.

Some manufacturers have cured this fault of wheel-wobble by shackling their front springs in front, instead of anchoring them on the dumb-irons, so that it is doubtful whether those springs and the steering-rods will set up the same regularity in their vibrations. As a matter of fact, high speed wheel-wobble is very difficult to remedy, as the devices referred to really apply to ordinary low-speed shimmy. Owners of racing cars very often have to take special means to prevent wheel-wobble by putting in a stronger spring on the off-side than that on the near, or else provide entirely independent springing.

The firm of Rolls-Royce for years realised that every axle was prone to develop wheel-wobble, even on the back axle, and always carried an extra leaf or a stiffer spring on the off-side of the chassis, to counteract any possible shimmying effect that might develop with springs of the same flexibility.

Profitable Breeding Sows.

Mr. B. Henwood, of Besters, in South Africa, writing in the "Farmers' Advocate," mentions that one of his pedigreed Large White sows had a litter of twenty-one recently—all alive and healthy. She has now had three litters and is only two years and five months old. Her first litter was one of ten, and she reared them all, her second of fourteen and she reared eleven, and now twenty-one, which makes an average of fifteen per litter. Is this a record, especially taking into consideration her age? She is a big and well-grown sow, and does her litters well. Ever since starting with pigs, I have always bred only from pigs which came from big litters and whose sires were from big litters. If more breeders of pigs, whether pure or crossbreds for bacon, paid more attention to size of litters of their breeding stock pig-breeding would pay better than it does. Mr. Shelton, Senior Instructor in Pig Raising, has given us these other records of large litters:— (1) A Chester White sow farrowed ninety-six pigs in six litters. The last three litters she farrowed eighteen pigs per litter. (2) Twenty-one pigs per litter—breed of sow unknown. (3) Twenty-three pigs per litter—breed of sow unknown. This last sow gave birth to five litters with a total of eight-five pigs. (4) Twenty-five per litter by a Poland-China sow. (5) Mr. D. E. Hollis, Hollisdale, N.S.W., reared a sow (Tamworth-Berkshire Cross) which had six litters, totalling 105 pigs. She farrowed nineteen pigs on the 28th August, 1928. Three of the pigs went to 140 lb. and the litter averaged 130 lb. Then on the 7th January, 1929, this sow farrowed twenty-six pigs, all alive.

Get to Know Your Cows.

A very great advantage derived from keeping milk records, especially if it is done by someone directly interested in the welfare and profit of the herd, is this: Cows are particularly sensitive animals, and the yield of milk is influenced to a great extent by the treatment they receive, both as regards feeding and their general management; therefore anyone who keeps the record has a great opportunity of discovering the cause from which a certain cow fails in her yield of milk, and he is in a position to put the matter right before any harm is done.

The causes of cows falling off in their milk without any apparent reason are many. For instance, a timid cow may be tied up next to a masterful one, or a new man or lad may be employed who is an indifferent milker, or a cow of a nervous temperament may be receiving such rough treatment as will quite account for her milk falling off.

Again, it may be that the food does not suit some individual cow, and this can be remedied by a slight alteration. Each or all of these reasons can be detected very soon by one having to be in the cowshed in order to keep the records, and which possibly might not otherwise be discovered so quickly, if at all, and anyone doing this would find themselves amply repaid at the end of the year.—S.R., in the "Live Stock Journal" (England).

Milling Values of Wheat.

There are various factors which lower the value of wheat from a milling aspect. Among them are the presence of smut, damaged grains, damaged patches, and bleached, sprung, and shot wheat.

Smut.—The fungus disease known as smut, or bunt, has a very serious residual effect on wheat from a milling point of view. Smutty wheat is treated harshly by millers, as it is difficult to handle, and, although certain "smutting" machines will make a fair sample of infested grain, it is at a considerable cost. There is no excuse now for smutty wheat, however, as practically complete control is secured by proper treatment of the seed. The most satisfactory is the dry copper carbonate process.

Damaged Grains.—The presence of these in a sample of wheat reduces the milling value very considerably; they have serious effects on the quality of the flour, causing a bad colour, imparting an objectionable taint, and reducing its keeping qualities. Furthermore, these damaged grains cannot be removed.

The most serious are those that have been heat damaged, but fortunately they are not common under Australian bagged conditions. They are mostly caused by harvesting the wheat while it is unripe, but the majority of growers are sufficiently alive to the necessity of harvesting when the grain is matured, thus largely obviating the danger of this objectionable condition. This trouble is frequently caused by standing bags of wheat in the paddock without placing sufficient logs (and in some cases none at all) for a foundation. If the ground is damp, or if rain should fall the bottoms of the bags become wet and the wheat is spoilt.

Damaged Patches.—These are viewed seriously, and to remove them it frequently occurs that a section of the bag is cut away with the bad grain adhering. This causes the bag to be valueless and is productive of much waste of grain, and is a source of considerable expense, whereas a little care would have saved to the grower the full original value of the wheat.

Bleached, Sprung, and Shot Wheat.—These defects are all caused by excessive external moisture conditions when the grain is just ripening or ripe, and they might be described as three stages of the one complaint—each causing a reduction in value according to the severity of the damage. Such weathering is difficult to control, being largely dependent on climatic conditions. An alleviation may be secured by close attention to the sowing of suitable varieties at the right time, by harvesting as expeditiously as possible when the grain is ready, and by sowing fine type varieties free from grain of a different maturing period, so that all ripens at the one time.

Bleached wheat is recognised by its loss of colour, for it has a pale, anemic, and lifeless appearance, with an attendant considerable loss in weight.

Sprung wheat is distinguishable by the above symptoms, together with a bloated appearance of the germ, whilst shot wheat is similar, but with the germs sprouted. Each of the three defects is disliked by millers, the wheat being difficult to store for any length of time, and the flour being much reduced in strength.

Breeding Sows—Size of the Litter.

The size of the litter produced by each sow is determined by several factors—heredity, breed, nutrition, physical condition, frequency of breeding, age of sow, and season of the year. Although the mode of inheritance or the ability to produce large litters is not definitely understood, there is little doubt but that the majority of factors governing the number of ova released and developed in vigorous sows are hereditary. Sows bred twice a year do not produce as many pigs per litter as those bred only once, unless they receive special care; but in herds where the physical condition of the sows is kept at a very high level, these differences do not exist. It is sometimes noticed that young sows do not have as many pigs as older sows. Heavy, fat sows do not have as many pigs as sows in moderate condition; neither do very thin, ill-nourished sows.

There is a very close relation between the size of the litter and the normal weight of the pig at birth. If the litter is five or less, individual pigs weigh as much as 3 lb. or better apiece; if it consists of six to eight pigs, the average is usually 2 lb. to 2½ lb.; if the litter consists of ten or more, the average weight is not likely to exceed 1½ lb. to 1¾ lb. per pig.

Clutch Carelessness.

Clutch carelessness probably causes more wear on cars than any other one thing. A clutch let in with sudden force will make the driving wheels turn a little on their tapering axle ends. Looseness at this point actually becomes a safeguard; otherwise pinion and ring gear would have to endure excessive strain.

Universal joints are strained by sudden application of power, especially if they are worn to a point where they are loose.

Sudden acceleration is more apt to strain the clutch and the rest of the drive, although it also frequently loosens the rear wheels from the axles, injures the universal joints, strains the spokes of the wheels, and increases tyre wear.

Clutches are designed for easy operation, and if the engine be speeded beyond the point where the car itself can immediately follow, the clutch plates will slip. This causes them to heat and may permanently damage them. Often when the clutch slips it will heat and expand, resulting in sudden gripping that is damaging to the whole drive mechanism.

The Speedometer—its Accuracy Affected by Tyre Wear.

The accuracy of motor speedometers is now practically taken for granted, but if actual scientific tests were made it is possible that their recordings would be approximate only. In most instances, however, the speedometer is so nearly accurate that it is of immense value for all ordinary purposes. On the other hand, speedometers may become inaccurate, and generally they err, after long use, on the side of increasing speed reading.

Again, tyre wear will affect the reading. Given a tyre with, at first, a good thick tread, which has worn down considerably, the reading will be rather excessive. If the tread wears half an inch in diameter the car will travel approximately one and a-half inches less for each rotation of the wheel. This will increase the speedometer reading by a small amount. If the owner is in doubt about the accuracy of his speedometer he can easily check it between mile posts. If it is much out, he should have it overhauled and reset. Wear of tyres will affect the mileage register to the same degree as the speed reading.

Kicking the Bucket—Treatment of Nervous Cows.

Beating a cow with a milking stool when she kicks or switches her tail at milking time is sometimes "adding insult to injury," observes the veterinary expert of "Hoard's Dairyman." Who is to blame for her fear of the milking act, for it is that which incites rebellion or reflex acts indicative of nervousness. It is more the milker than the cow. Considering the exceeding tenderness and sensitiveness of the teats at the first time of "freshening" and the strength and hardness of the hands of the son of toil who does the milk extracting, is it to be wondered at that pain is induced by the act, and that it is never forgotten by the animals? There is a certain number of cows allotted to each milker, and if he doesn't get them stripped in a given length of time he is accounted inefficient. The consequence is that he gets into the habit of hurried, willy-nilly, "come on with your milk" manipulation of the teats

of each animal, heifer and adult cow alike, very different from the process followed by the calf in sucking milk. The teats are squeezed, bruised, pulled and stripped by the man, all of which cause excruciating pain, at first; but after a time the skin of the teats becomes calloused, more or less, and suffering abates or subsides. But the memory of it remains, and is expressed by kicking, stepping back and forth, setting a foot in the pail, switching viciously, or "holding up" the milk.

It would be a blessing to every heifer could she be "broken to milk" by a woman—gentle, motherly, sympathetic woman. The work certainly should, in every instance, be most carefully, gently, and patiently done. Were that the rule there would be few nervous, kicking, or otherwise fractious and bothersome cows, and there would be a greater yield of milk in the long run.

Recognising the inducing causes of the vices mentioned, prevention should be the order of the day on every dairy farm. It is impossible, in most cases, to cure confirmed vice, like kicking, but it may be temporarily prevented. There is no remedy for the ultra-nervous and sensitive cow or heifer; but some good may be done by more gentle milking, applying unsalted lard, vaseline, or benzoated oxide of zinc ointment to the teats each evening if they are tender or sore, allowing some relished feed to detract attention at milking time, and setting the cow's calf, or possibly some other very young calf, at her head before starting to milk.

There are many ways of stopping the kicking act. Of these may be mentioned buckling a strap around the cow's hind legs, just above her hocks; fastening a surcingle around her body, just in front of the udder, padding it where it crosses the milk veins and tightening it as required; tying the cow's head as high as possible at milking time; laying a heavy weight upon the loins, such as a sack of grain; tying up a fore leg; putting on side-line hobbles, such as are used on a horse; and, lastly, disposing of the chronic kicker to the butcher, for fussing with such a beast may not pay.

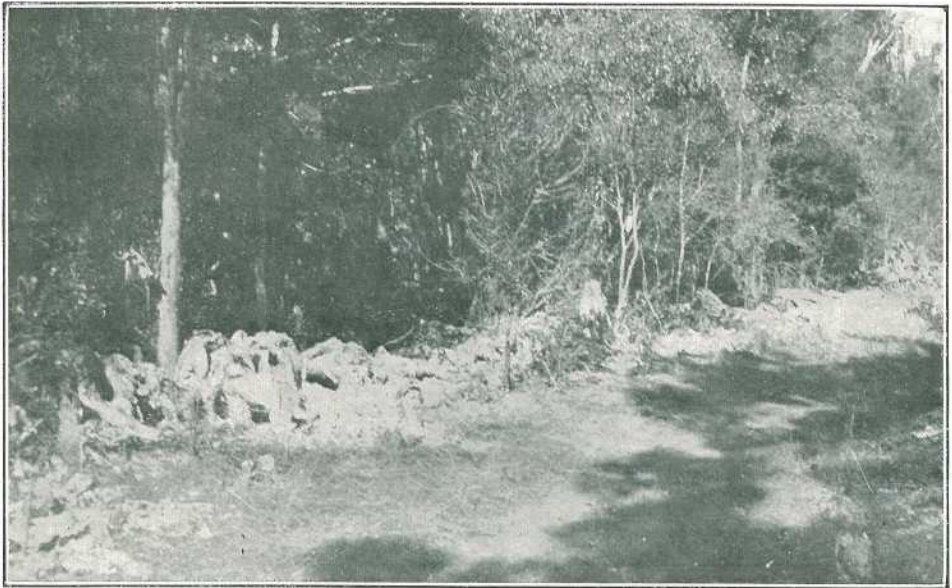


PLATE 57.—DESTROYED PEAR ON A ROAD NEAR MUNDUBBERA.

Biological control is an important activity of the Prickly-pear Commission. The Commission's policy of a widespread distribution of caetus-destroying insects has been, and is, of ever-increasing assistance to landholders by the control they exercise over the fruiting of pear. The reinfestation of cleared areas from seeds carried by birds and beasts was in the past a factor that made many landholders despair, as they were thus faced by a never-ending expenditure in maintaining their areas free from pear.

The Home and the Garden.

OUR BABIES.

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

The following is taken from a little book published by the National League for Health, Maternity, and Child Welfare of England.

CHARACTER TRAINING.

IT is important to feed and clothe children in the best possible way. But it is much more important to train their characters in the best way.

Why do we especially want to train children well?

- (1) To build up in them strong and noble characters.
- (2) To make them fit to face life.

Mothers should begin to train their babies as early as possible. No baby is too young to know whether he can manage his mother, or whether his mother can manage him. Teach a baby at once that he will not get all he wants because he cries for it. A little crying will not hurt him, but to give him everything he cries for will hurt him very much. It will make his character weak, undisciplined, self-willed, uncontrolled.

The child's mind grows with his body, and as the one needs right conditions, so does the other, or it will be stunted.

Observe Nature's Methods.

How can we train and educate the mind and thus influence the character? To do this, we should interfere as little as possible with nature's methods. A baby has great power of concentration; he will look steadily at one thing for a long time, he will make a movement over and over again until he can control it. He should be left undisturbed; he should not be spoken to only for the sake of seeing him smile. Excepting during his regular occupations—his meals, sleep, and going out—he should not be disturbed when he is absorbed. When awake in his cot he should be able to see what is going on around him. This will always be enough to occupy him. As he gets older he should be taught to occupy himself, not to want constant attention from his mother. He will be much happier and give less trouble if he can occupy himself, but he will never learn to do it if he is taken up and amused whenever he cries. To help him to gain a habit of self-occupation is to help to educate his mind and character.

A baby's mental business is to learn all he can about the world in which he lives, and he does not like to be interrupted whilst learning. Do not speak to a child unnecessarily when he is absorbed and good.

We learn and grow by trying and succeeding. Therefore, unless it is hurtful to himself or to others, do not prevent a child from doing what he can for himself, thus teaching him self-reliance.

Mistaken Kindness.

One morning a child of two and a-half years came to breakfast. There were many delightful things he wished to do. He would climb on to his high chair, unfold his feeder, and painfully tie the tapes round his neck in front, and then turn the feeder round. He would take a spoon and crack his own egg. But instead of letting him do all these things, and so gradually learn how to do them, a grown-up rushed at him, tied his feeder and broke his egg, and he broke into a howl of disappointment.

Too often, out of mistaken kindness, people thwart a child when he tries, and enjoys trying, to attain his end by himself.

Do not indulge children, it makes them soft and selfish.

Do not nag or be harsh to them. You may make them cowardly and deceitful. Always be gentle, but always be firm.

Let your yes be yes, your no, no. Never shake children or box their ears or frighten them.

Moral education helps children to learn self-control, and remember you want to make them fit to go out into life, where they will need a great deal of self-control, where they will not find everything made easy for them, where they will not be spoilt and get everything they want.

Regularity in good habits when children are small, is a very important part of moral education, because through good habits a child learns to make a right choice, to choose the good and refuse the evil.

Let him hear only kind words and pleasant voices. Let that to which he is accustomed be right, that to which he is unaccustomed be wrong. If he is never told to do unreasonable things he will see that obedience to the reasonable actions he is asked to do is right; and he will be more likely to refuse wrong when it comes his way.

The Cultivation of Good Habits,

Some day he will certainly have to choose between right and wrong. He can only choose rightly if he knows the meaning of right-doing. And whilst he is small this knowledge comes through good habits and trust in the kindness of those he loves best. The first time he makes a good choice he shows control over his will.

Therefore teach children from the beginning:—

- (1) How to be obedient.
- (2) How to be self-controlled.
- (3) How to be unselfish.
- (4) How to be pure.
- (5) How to be truthful.

Teach them to be unselfish by encouraging them to do things for you and for others; by making them think of other people first, not of themselves first. Do not always slave for them, but show them how they can help you. A mother often makes her children selfish by doing everything for them and saving them trouble. That mother is not really a good mother. A good mother thinks chiefly of what is best for her children's characters, not of what is easiest and pleasantest for them.

To cultivate and practise good habits, bodily, mental, and moral, is to build up a great and good character; and the famous old saying bears this out:—

“Sow an action, you reap a habit.
Sow a habit, you reap a character.”

Therefore teach your children to do right actions over and over again, until the right actions become habits; and the habits are built into a character.

THE ROSE.

“The rose is the national flower of England, and, supreme as it is among flowers, it feeds our pride in our country and in our selves as no other flower. Flowers quicken the sense of beauty so greatly that the right love of them is almost one with the sense of romance, and for the romance that lies in the extravagance of beauty no flower will bear comparison with the rose. Few types of women, even, will sustain that comparison, although there are many types of roses. The rose bursts upon us in the full pride of the summer, and is one with it, and is almost the essence of it. After it the summer has nothing further to reveal, for the gold of autumn is but decay, and even the carnation that might hold its own with any other flower, though it challenges the rose, and vies with it in every feature of scent and colour, equals it in none, and is by every single one of its charms sealed the rose's vassal. The rose, too, is among flowers the only fit emblem of life.”—From “Samuel Langford, Unusual Criticisms,” edited by Mr. Neville Cardus.



PLATE 58.—MRS. IRENE LONGMAN, M.L.A., QUEENSLAND'S
FIRST WOMAN LEGISLATOR.

Mrs. Longman, who represents Bulimba in the State Parliament, is prominent in every progressive movement for the welfare of Australian women and children, and is interested particularly in the Country Women's Association and kindred bodies having for their object the recognition of the value of women's influence in our national industries and in our great work of nation building.

THE FIRST NEED.

"At the moment there seem no sort of doubt that the first need of the country is houses," writes Dr. Alington, headmaster of Eton, in the "Evening Standard"; "without decent housing it is a waste of time to talk of health, education, or wages, for the most elaborate schemes for looking after young people's physical or intellectual condition must fail if boys or girls have no decent houses to go to, and high wages are no real attraction to a decent father of a family if they do not mean that he can give his wife and children a proper home to live in. Surely the function of the church is clear; it should devote itself, in season and out of season, to declaring that it is the duty of every Christian man or woman to secure that the people of this country are decently housed, and that they have no right to any peace of mind until, at least in their own particular district, that result is secured. Can anyone doubt that if the church had concentrated on this elementary truth ever since the war the conditions to-day would be very different from what they are?"

MARKET GARDENING.

RADISHES.

These may be sown throughout the year, choosing showery, genial weather.

Sow thinly in rows. Succession sowings may be made every three or four weeks. Liberal waterings must be given during dry weather, as rapid growth is necessary in order to obtain crisp and good-flavoured roots. A light rich soil, with moist and open situation, in cool climates is recommended; but in hotter and drier districts a somewhat shady situation is desirable. Radishes should be used as soon as large enough, as when old they become soft and tough.

Varieties recommended are—Red Turnip; Scarlet Turnip, white tipped; French Breakfast; Long Scarlet.

RHUBARB.

Rhubarb requires a rich, deep, and well-drained soil, and may be propagated from seed or by division of the roots—preferably the former. Seed should be sown in early spring, either in drills 3 feet apart or in a seed-bed. That sown in drills can be thinned out to 15 inches apart, leaving the strongest plants. A heavy mulching of stable manure and copious watering, if the weather be dry, are necessary to keep the plant in rapid growth.

Being a gross feeder, liberal applications of liquid manure can be made.

All weed-growths should be kept in check, and any plants showing signs of running to seed-heads should have these cut back at the first signs of forming. Where the plant is treated as an annual, all the leaves may be gathered as soon as large enough, but where its perennial use is desired, care should be taken to leave sufficient leaves for development of the plant.

Variety recommended—Victoria.

SPINACH.

Of the two varieties of spinach (the round and the prickly) grown for market, the prickly is the more hardy. For this reason, the latter is generally sown for the winter, and the round for summer crops.

The ground for spinach must be worked deep, and, as quick growth is necessary, the soil cannot be too rich. Sow the seeds in rows about 1 foot apart (some prefer the rows 2 feet apart). When the young plants have made four or six leaves, thin them out to from 9 to 12 inches apart. While growing, plenty of water is required to bring the crop to perfection, and the ground must be kept free from weeds.

Sow the "prickly" from March to May, and the round in August and September. Guano, lime, and salt are excellent for this crop.

The leaves will be ready for cutting in from 80 to 100 days from sowing.

SWEET CORN.

A vegetable of easy growth and one to which more attention should be given, owing to the fact that maize or corn is the staple grain grown in this State.

The soil required is one which is suited for any form of maize, and the cultivation is practically similar, with the difference that plants may be left closer in the rows.

The cobs should be taken as soon as the grains are fully formed, and before they begin to harden—what is known as the "milk" stage is the correct period. Cobs should be cooked whole, either roasted or boiled, and form a welcome addition to the vegetable diet so necessary in this climate, and where other forms of vegetables are frequently difficult to obtain. Seed may be sown in spring and early summer. The varieties recommended are—Country Gentleman; Stowell's Evergreen.

SWEDE TURNIP.

Although considered a farm crop suited to the needs of stock, swede turnips, when taken at the proper stage, form a welcome addition to the list of vegetables that may be considered as profitable to grow.

Turnips thrive under identical conditions of soil and climate, but swedes can safely be thinned out to greater distances, whilst the distances apart of the drills require to be somewhat greater. Swedes lend themselves to storage where such is desired, but this should be undertaken only where a favourable situation is procurable.

Sow in early autumn. The varieties recommended are—Elephant or Monarch; Champion Purple Top; Laing's Garden Swede.

SWEET POTATO.

The ideal soil for this crop is a sandy one, well supplied with organic matter. In a soil of this character the plants possess almost the hardness of weeds, and the root develops well, being even in shape and quality.

Light loams, alluvial loams, and scrub soils are also suitable, but the greater amount of clay present the more unsuited is the soil for the growth of sweet potatoes.

Cultivation is similar to that for potatoes, and although often planted on the flat, better results are usually obtained from growing on ridges from 3 feet to 3 feet 6 inches apart.

Where early plants (late July or early August) are required they can be obtained by placing the selected tubers in a hot-bed.

The tubers are laid on the hot-bed and covered with sifted sandy soil and leaf-mould with a proportion of fine cinders mixed through the mass—keep moist but not wet.

The tubers will be induced to sprout with the bottom heat. Cease watering a few days before the time you plant out, so as to toughen and harden off the shoots. When about to plant, gently break the forward shoots from the tubers, and keep them in a bucket with the bottoms immersed in a thin clay puddle.

Plant out to the required distances in the field, taking care that only about an inch of the top of the shoots appear above the surface. The soil must be well firmed around the base of the shoots to encourage them to start into growth. The tubers will throw out a second growth, which can be used for planting out succession crops.

Preference is given by some growers to long cuttings, 18 to 24 inches in length, which are rolled round the hand before planting out.

A point of great importance is to see that the soil is thoroughly compacted about the base of the shoot and more particularly so during dry weather. Subsequent cultivation must be given to keep down weed-growths and conserve moisture.

Plants set out early in October should produce tubers fit for the table by the end of December. The period of growth, however, will be largely determined by the weather and the variety grown.

The mature stage can be determined by cutting one of the potatoes. If the cut surface dries white and does not turn greenish-black around the edges, the potato is fit to eat; if a milky juice exudes, which on exposure to the air turns black, the potato is immature.

During the latter part of its growth the sweet potato largely increases in weight; therefore, where bulk is an important factor, the tubers should be left in the ground as long as possible after they become fit for the table.

If tubers, after digging, are allowed to dry in the sun for a few hours and are then stored in dry sand they will keep good for some time.

Varieties recommended are—Pierson; Big Stem Jersey; Pink; White Maltese; Yellow Spanish.

CABBAGES AND CAULIFLOWERS.

With the sowing season for cabbage and cauliflower at hand, the results of recent variety trials at Bathurst Experiment Farm, New South Wales, will be of interest to growers of these crops.

The best early cauliflower during the past season, reports the "Experimentalist," was Maitland Market, followed by Early Phenomenal, Early Snowwhite, and a strain of Special Giant, in the order named. Maitland Market has proved the best early cauliflower under test to date, and it is intended to take this variety as the standard early variety at this centre.

The best late cauliflower was a strain of Six Months Special Giant, followed by Phenomenal Mainerop and departmental strains of Six Months Special Giant. Six Months Special Giant has proved the most satisfactory main crop variety in tests at this centre, and is well worthy of adoption as the standard main crop variety.

Succession has proved the best main crop cabbage to date at this centre; the local strain this season was far superior to the European strain, while the Departmental strain was somewhat superior to the commercial strain. Succession is of the Drumhead type, and the hearts are generally large and firm. The most satisfactory early variety was Enkhuisen Glory, which is of the Ballhead type: this variety had a very solid heart of medium size and showed excellent keeping qualities in the field, quite satisfactory hearts being harvested in late September. Winningstadt was considered the most satisfactory early to midseason variety after Enkhuisen Glory. It is a medium-sized early variety, with a pronounced pointed heart and the hearts are very solid and keep well in the field.

The best method of raising plants of cabbage and cauliflower is to sow the seed in drills in the seed-bed, allowing about 4 in. between the rows. Plants raised in this manner are usually sturdy, and differ from the lanky plants obtained from beds where the seed has been thickly broadcasted. The seed should be sown thinly, and each ounce of seed should sow a length of about 200 ft. The seed-bed should be about 4 ft. wide, and should allow of half being weeded from each side. A bed large enough to produce plants for one acre when seed is broadcasted would be 20 ft. long and 4 ft. wide. It is always advisable to put in sufficient seed to raise more plants than are actually needed. This allows for loss by pests, faulty germination, and the transplanting of healthy plants only.

The young plants should not be forced in the seed-bed, and should receive plenty of light so that stocky plants will be produced.

Under ordinary conditions plants should be ready for transplanting in six weeks from sowing, during cooler weather conditions taking a little longer. If possible, a dull day should be chosen for this work; should the weather be hot it should be done either early in the morning or late in the afternoon and the plants should be given some protection in the form of light bush or fern covering.

The distance of planting will vary according to the variety used. For smaller varieties of cabbage, 2 ft. 6 in. by 2 ft. is sufficient, and for larger sorts 3 ft. by 2 ft. If the soil is of poor quality the plants should be given more room, and should be planted 3 ft. by 3 ft.

Cauliflower plants should be set 3 ft. by 2 ft. in the case of first earlies, and up to 3 ft. by 3 ft. in the case of late varieties.



PLATE 59.

A measured quarter-acre of prickly-pear in this country in the Charleville district was poisoned at a cost of 17s. 3d.

Orchard Notes for March.

THE COASTAL DISTRICTS.

If the weather is favourable, all orchards, plantations, and vineyards should be cleaned up, and the ground brought into a good state of tilth so as to enable it to retain the necessary moisture for the proper development of trees or plants. As the wet season is frequently followed by dry autumn weather, this attention is important.

Banana plantations must be kept free from weeds, and suckering must be rigorously carried out, as there is no greater cause of injury to a banana plantation than neglect to cultivate. Good strong suckers will give good bunches of good fruit, whereas a lot of weedy overcrowded suckers will only give small bunches of under-sized fruit that is hard to dispose of, even at a low price.

Cooler weather may tend to improve the carrying qualities of the fruit, but care must still be taken to see that it is not allowed to become over-developed before it is packed, otherwise it may arrive at its destination in an over-ripe and consequently unsaleable condition. The greatest care should be taken in grading and packing fruit. Only one size of fruit of even quality must be packed. Smaller or inferior fruit must never be packed with good large fruit, but must always be packed separately as required by regulation.

The marketing of the main crop of pineapples, both for canning and the fresh fruit trade, will be completed in the course of the month, and as soon as the fruit is disposed of plantations which are apt to become somewhat dirty during the gathering of the crop must be cleaned up. All weeds must be destroyed, and if blady grass has got hold anywhere it must be eradicated, even though a number of pineapple plants have to be sacrificed, for once a plantation becomes infested with this weed it takes possession and soon kills the crop. In addition to destroying all weed growth, the land should be well worked and brought into a state of thorough tilth.

In the Central and Northern districts, early varieties of the main crop of citrus fruits will ripen towards the end of the month. They will not be fully coloured, but they can be marketed as soon as they have developed sufficient sugar to be palatable; they should not be gathered whilst still sour and green. Citrus fruits of all kinds require the most careful handling, as a bruised fruit is a spoiled fruit, and is very liable to speck or rot. The fungus that causes specking cannot injure any fruit unless the skin is first injured. Fruit with perfect skin will eventually shrivel, but will not speck. Specking or blue mould can therefore be guarded against by the exercise of great care in handling and packing. At the same time, some fruit is always liable to become injured, either by mechanical means, such as thorn pricks, wind action, hail, punctures by sucking insects, fruit flies, the spotted peach moth, or gnawing insects injuring the skin. Any one of these injuries makes it easy for the spores of the fungus to enter the fruit and germinate. All such fruit must therefore be gathered and destroyed, and so minimise the risk of infection. When specked fruit is allowed to lie about in the orchard or to hang on the trees, or when it is left in the packing sheds, it is a constant source of danger, as millions of spores are produced by it. These spores are carried by the wind in every direction, and are ready to establish themselves whenever they come in contact with any fruit into which they can penetrate. Specking is accountable for a large percentage of loss frequently experienced in sending citrus fruits to the Southern States, especially early in the season, and as it can be largely prevented by the exercise of necessary care and attention, growers are urged not to neglect these important measures.

Fruit must be carefully graded for size and colour, and only one size of fruit of one quality should be packed in one case. The flat bushel-case (long packer) commonly used for citrus fruits does not lend itself to up-to-date methods of grading and packing, and we have yet to find a better case than the American orange case recommended by the writer when he came to this country from California in 1892, and which has again proved its superiority in the recent shipments of oranges from the Southern States to England. Failing this case, a bushel-case suggested by the New South Wales Department of Agriculture is, in the writer's opinion, the most suitable for citrus fruits, and were it adopted it would be a simple matter to standardise the grades of our citrus fruit, as has been done in respect to apples packed in the standard bushel-case used generally for apples throughout the Commonwealth. The inside measurements of the case suggested are 18 in. long, 11½ in. wide, and 10½ in. deep. This case has a capacity of 2,200 cubic inches, but is not included in the schedule of the regulations under "*The Fruit Cases Acts, 1912-1922.*" The half-bushel case, No. 6 of the Schedule above referred to, is 10 in. by 11½ in. by 5½ in. inside measurements with a capacity of 1,100 cubic inches. The case should

be suitable for oranges and the half-case for mandarins. No matter which case is used, the fruit must be sweated for seven days before it is sent to the Southern markets, in order to determine what fruit has been attacked by fruit fly, and also to enable bruised or injured fruit liable to speck to be removed prior to despatch.

Fruit fly must be systematically fought in all orchards, for if this important work is neglected there is always a very great risk of this pest causing serious loss to citrus growers.

The spotted peach moth frequently causes serious loss, especially in the case of navels. It can be treated in a similar manner to the codlin moth of pip fruit, by spraying with arsenate of lead, but an even better remedy is not to grow any corn or other crop that harbours this pest in or near the orchard. Large sucking-moths also damage the ripening fruit. They are easily attracted by very ripe bananas or by a water-melon cut in pieces, and can be caught or destroyed by a flare or torch when feeding on these trap fruits. If this method of destruction is followed up for a few nights, the moth will soon be thinned out.

Strawberry planting can be continued during the month, and the advice given in last month's notes still holds good. Remember that no crop gives a better return for extra care and attention in the preparation of the land and for generous manuring than the strawberry.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

The advice given in these notes for the last few months regarding the handling, grading, and packing of fruit should still be carefully followed. The latter varieties of apples and other fruits are much better keepers than earlier-ripening sorts, and as they can be sent to comparatively distant markets, the necessity for very careful grading and packing is, if anything, greater than it is in the case of fruit sent to nearby markets for immediate consumption. Instruction in the most up-to-date methods of grading and packing fruit has been published by the Department, which advice and instruction should enable the growers in that district to market their produce in a much more attractive form.

The same care is necessary in the packing of grapes, and it is pleasing to note that some growers are packing their fruit very well. Those who are not so expert cannot do better than follow the methods of the most successful packers.

As soon as the crop of fruit has been disposed of, the orchard should be cleaned up, and the land worked. If this is done, many of the fruit-fly pupæ that are in the soil will be exposed to destruction in large numbers by birds, or by ants and other insects. If the ground is not worked and is covered with weed growth, there is little chance of the pupæ being destroyed.

Where citrus trees show signs of requiring water, they should be given an irrigation during the month, but if the fruit is well developed and approaching the ripening stage, it is not advisable to do more than keep the ground in a thorough state of tilth, unless the trees are suffering badly, as too much water is apt to produce a large, puffy fruit of poor quality and a bad shipper. A light irrigation is therefore all that is necessary in this case, especially if the orchard has been given the attention recommended in these notes from month to month.

Farm Notes for March.

Land on which it is intended to plant winter cereals should be in a forward stage of preparation. Sowings of lucerne may be made at the latter end of the month on land which is free from weed growth and has been previously well prepared.

The March-April planting season has much in its favour, not the least of which is that weeds will not make such vigorous growth during the succeeding few months, and, as a consequence, the young lucerne plants will have an excellent opportunity of becoming well established.

Potato crops should be showing above ground, and should be well cultivated to keep the surface soil in good condition; also to destroy any weed growth.

In districts where blight has previously existed, or where there is the slightest possible chance of its appearing, preventive methods should be adopted—i.e., spraying with "Burgundy mixture"—when the plants are a few inches high and have formed the leaves; to be followed by a second, and, if necessary, a third spraying before the flowering stage is reached.

Maize crops which have fully ripened should be picked as soon as possible and the ears stored in well-ventilated corn cribs, or barns. Selected grain which is intended for future seed supplies should be well fumigated for twenty-four hours and subsequently aerated and stored in airtight containers. Weevils are usually very prevalent in the field at this time of the year and do considerable damage to the grain when in the husk.

The following crops for pig feed may be sown:—Mangel, sugar beet, turnips and swedes, rape, field cabbage, and carrots. Owing to the small nature of the seeds, the land should be worked up to a fine tilth before planting, and should contain ample moisture in the surface soil to ensure a good germination. Particular attention should be paid to all weed growth during the early stages of growth of the young plants.

As regular supplies of succulent fodder are essentials of success in dairying operations, consideration should be given to a definite cropping system throughout the autumn and winter, and to the preparation and manuring of the land well in advance of the periods allotted for the successive sowings of seed.

The early planted cotton crops should be now ready for picking. This should not be done while there is any moisture on the bolls, either from showers or dew. Picked cotton showing any trace of dampness should be exposed to the sun for a few hours on tarpaulins, bags, or hessian sheets, before storage in balk or bagging or baling for ginning. Sowings of prairie grass and *phalaris bulbosa* (Toowoomba canary grass) may be made this month. Both are excellent winter grasses. Prairie grass does particularly well on scrub soil.

Dairymen who have maize crops which were too far advanced to benefit by the recent rains, and which show no promise of returning satisfactory yields of grain, would be well advised to convert these into ensilage to be used for winter feed. This, especially when fed in conjunction with lucerne or cowpea, is a valuable fodder. Where crops of Soudan grass, sorghum, white panicum, Japanese millet, and liberty millet have reached a suitable stage for converting into ensilage, it will be found that this method of conserving them has much to recommend it. Stacking with a framework of poles, and well weighting the fodder, is necessary for best results. All stacks should be protected from rain by topping off with a good covering of bush hay built to a full eave and held in position by means of weighted wires.

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.

Date.	February, 1930.		March, 1930.		MOONRISE.	
	Rises.	Sets.	Rises.	Sets.	Feb., 1930.	Mar., 1930.
1	5.27	6.44	5.48	6.23	7.10	5.57
2	5.28	6.44	5.48	6.22	8.4	6.50
3	5.29	6.43	5.49	6.21	8.58	7.46
4	5.29	6.43	5.49	6.20	9.51	8.42
5	5.30	6.42	5.50	6.18	10.45	9.40
6	5.31	6.41	5.50	6.17	11.45	10.41
7	5.31	6.41	5.51	6.16	p.m. 12.48	11.45
8	5.32	6.40	5.51	6.15	1.54	12.48
9	5.33	6.39	5.52	6.14	2.59	1.51
10	5.34	6.38	5.52	6.13	4.5	2.54
11	5.34	6.38	5.53	6.12	5.9	3.52
12	5.35	6.37	5.54	6.10	6.6	4.43
13	5.36	6.36	5.54	6.9	6.52	5.24
14	5.37	6.36	5.55	6.8	7.33	6.2
15	5.38	6.35	5.56	6.7	8.8	6.36
16	5.38	6.34	5.56	6.6	8.42	7.10
17	5.39	6.34	5.57	6.5	9.15	7.44
18	5.40	6.33	5.57	6.4	9.47	8.18
19	5.40	6.32	5.58	6.3	10.24	8.55
20	5.41	6.32	5.58	6.2	11.3	9.39
21	5.42	6.31	5.58	6.1	11.46	10.27
22	5.43	6.30	5.59	6.0	...	11.17
23	5.43	6.29	5.59	5.59	12.31	...
24	5.44	6.28	6.0	5.58	1.25	a.m. 12.11
25	5.45	6.27	6.0	5.56	2.18	1.5
26	5.46	6.26	6.1	5.55	3.11	1.57
27	5.47	6.25	6.1	5.54	4.7	2.54
28	5.48	6.24	6.2	5.52	5.3	3.50
29	...	...	6.2	5.50	...	4.46
30	...	...	6.3	5.48	...	5.40
31	...	...	6.4	5.46	...	6.35

Phases of the Moon, Occultations, &c.

7 Feb.	☾ First Quarter	3 26 a.m.
13 "	☾ Full Moon	6 33 p.m.
20 "	☾ Last Quarter	6 44 p.m.
28 "	☾ New Moon	11 33 p.m.

Perigee, 12th February, at 11 p.m.

Apogee, 25th February, at 10.30 a.m.

On the 6th Venus will be on the far side of its orbit, passing from west to east of the Sun. It will then be invisible, barely coming into view after sunset a month later.

About 2 p.m., on the 5th, the Moon will be passing from west to east of Jupiter on its northern side. This will be a good test for keen eyes, or it may be seen with binoculars.

Mercury, on the 15th, being on its greatest western elongation from the Sun, will rise two hours before it.

On the 21st, Neptune, in Leo, will be in opposition to the Sun. They will be rising as the Sun sets.

On the 23rd, at 10 p.m., the Moon will be passing Saturn when both are a long way below the eastern horizon, as they will not rise until 1.25 a.m. (at Warwick) on the following morning. For other places their rising may be reckoned as 4 hours and 19 minutes before the Sun.

Mercury will rise 1 hour and 26 minutes before the Sun on the 1st, or at 4.1 a.m. at Warwick; on the 14th it will rise two hours before it, or at 3.37 a.m.

Mars will rise 1 hour and 17 minutes before the Sun, or at 4.20 a.m. on the 1st; on the 14th it will rise 1 hour and 19 minutes before it, or at 4.18 a.m.

Jupiter will rise at 2.2 p.m. on the 1st, and at 1.23 p.m. on the 14th.

Saturn will rise 2 hours and 33 minutes before the Sun, or at 2.54 a.m. on the 1st; on the 14th it will rise 3 hours and 23 minutes before it, or at 2.14 a.m.

On the 1st of February the Southern Cross will be upside down before 4 o'clock in the afternoon, and three hours later will be coming into view low down in the south-south-east. It will not be upright until about half-past 3 in the morning at places as far east as Brisbane.

As the Sun will be in Capricornus until the 17th, the zodiacal constellations visible after sunset, from west to east, will be—Aquarius, Pisces, Aries, Taurus, Gemini, and Cancer, the latter reaching the meridian before midnight. By the end of the month Orion will set about midnight.

8 Mar.	☾ First Quarter	2 0 p.m.
15 "	☾ Full Moon	4 58 a.m.
22 "	☾ Last Quarter	1 12 p.m.
30 "	☾ New Moon	3 46 p.m.

Perigee, 13th March, at 6.24 a.m.

Apogee, 25th March, at 3.24 a.m.

One hour before sunrise on the 1st March the interesting sight of the two planets Mercury and Mars, only one Moon's-breadth apart, will be worth looking out for. They will be low down, about 17 degrees south of east.

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.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

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 Market Gardening, 1s.
 Queensland Flora (Bailey), 6 vols., 30s.
 Pests and Diseases of Queensland Fruits and Vegetables. Price, 2s. 6d. (Free to orchardists and market gardeners in Queensland.)

BULLETINS.

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 Economic Sugar Bulletin, 5SC.
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Bulletins on the Sugar Industry:—

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 A Ton of Pork in Six Months from One Litter.
 The Gloucester Old Spot Breed of Pig.
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 Rearing and Feeding of Chickens.
 Poultry Club Handbook (Section I.).
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 Cotton Classing.
 Cotton Growing in Queensland (Parts 1 and 2).
 Cotton Research Farm, Biloela—Annual Reports 1925-26 and 1926-27.
 Pink Boll Worm.
 Sheep Maggot Fly Pest.
 Root-Bark Channeller of Citrus.
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 The Banana Weevil Borer in Java, with Notes on other Crop Pests.
 Natural Enemies of the Potato and How to Fight Them.
 Special Cattle Fatality in the Maranoa District and its Relation to the Larvæ of
Pterygophorus analis Costa.
 Pineapple Disease Investigations.
 Records of Australian Thysanoptera (Thrips).
 Records and Descriptions of Australian Ophioninæ.
 A Systematic Note on an Imported Lucerne Pest with Description of two New
 Allied Species.
 Some Hawaiian Experiments in the Biological Control of Insect Pests.
 Progress Reports of Fruit Fly Investigations.
 Sundry Notes on Injurious Insects of the Stanthorpe District.
 Cheese Mites.
 The Leaf-Eating Ladybird.
 Miscellaneous Notes (Mites).
 Notes on the Citrus Orange Bug.
 Notes on the Blue Oat Mite.
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 Plant Bugs Damage to Cotton Seed.
 Cutworm Menace.
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LEAFLETS—*continued.*

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 Cheese—Home Made.
 Concrete Silo, Plan and Specification.
 Peanuts.
 Preserving Fruit on the Farm.
 Sheep Lambing Percentage.
 Sheep Stomach Worm.

Entomological Leaflets.

- No. 1. Some Hints Regarding Entomological Inquiries.
- No. 2. The Queensland Fruit Fly.
- No. 3. The Woolly Aphis Parasite.
- No. 4. The Codling Moth.
- No. 5. The Banana Weevil Borer.
- No. 6. Insects and Their Relatives.
- No. 7. The Banana Thrips.
- No. 8. The San José Scale.
- No. 9. Root Knot or Nematode Root Gall.
- No. 10. The Corn Ear Worm on Tomatoes.
- No. 11. Cutworms and Armyworms.
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- No. 14. Potato Tuber Moth.
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Pathological Leaflets.

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- No. 2. Irish Blight of Tomatoes.
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