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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Current Issue.

The place that agricultural education is occupying in the public mind is recognised by the amount of space devoted to it in this issue. An important Ministerial statement on the proposed abolition of the Queensland Agricultural College, at Gatton, and the creation of a modern Agricultural High School in its place outlines a progressive educational scheme; an abridged report of a noteworthy public lecture on the relation of science to agriculture, by Professor Goddard, of the Queensland University, is included in this section. A review of the work of our Sugar Experiment Stations is continued. A useful contribution on cream grading, and details of a comprehensive project for the marketing of Queensland fruit are also notable features. The development of the Burnett lands, and the various projects for water storage in that district, revives interest in the question as to whether we have yet fully considered the possibilities of the regulated use of water in districts in which irrigaton may be applied, and makes the publication in this issue of the first article of a series on "Irrigation in Queensland" opportune. The regular features are as usual full of information for farmers engaged in the sections of the industry to which they respectively apply.

World's Farmers in Congress.

The Eleventh International Agricultural Congress, at which some very important problems affecting the world's fundamental industry were discussed, assembled in Paris in May. Over 200 delegates from various countries contributed to the deliberations. M. Chéron, the French Minister of Agriculture, touched on one of the major difficulties of the present day when he referred to the tendency to beat down the prices paid to farmers as a disastrous policy, which would result in the abandonment of the land by people who were unable to make ends meet, and cause the world's commerce to suffer. In all countries the prices of primary produce, with few exceptions, are near, or even below, pre-war parity, whereas the growers have to pay from 75 to 100 per cent. above pre-war rates for the manufactured articles they require. The post-war readjustment has penalised the country for the benefit of the towns; but the present state of affairs is too unfair to be stable. There is little hope, it is feared, of the people of industrial centres acting voluntarily to restore a more equitable

economic balance. In Queensland, however, farmers have now an opportunity, through the operation of recent far-reaching legislation, of obtaining something more like a fair deal, and their economic future may be shaped largely by their own hands. An obvious additional aim is to make efficient agricultural organisation truly federal and establish a co-operative and co-ordinated system throughout the Commonwealth.

The Middleman's Margin.

A writer in "The Nation and the Athenæum" (14th April, 1923) quotes from a recent very interesting book entitled "Food," by Sir Charles Fielding, the late Director-General of Food Production in the United Kingdom, as follows:—

"To sum up the subject of unaccounted-for and seemingly unwarranted difference between producers' receipts and consumers' payments, there seems to be an excess of £175,000,000 now paid by the consumer and kept in the hands of the distributors, viz.:—

For bread	£52,000,000
For meat	£78,000,000
For milk	£45,000,000
	£175,000,000

over and above what is paid to the farmers, the railway, and in excess of the reasonable working cost of the miller, baker, and butcher, and after allowing about 10 per cent. profit on the cost of commodities they purchase and deal in."

Sir Charles Fielding also shows the part of the price paid by the householder which is obtained by the farmer, who has twelve months' work with his animals, till they are fit for slaughter or to milk, and the part which finds its way into other pockets, viz.:—

"Farmer gets of the price paid for bread	35 per cent.
Farmer gets of the price paid for meat	40 per cent.
Farmer gets of the price paid for milk	47 per cent.
Miller, baker, and transporter get of bread price ..	65 per cent.
Butcher and allies get of meat price	60 per cent.
Milk combine and transporter get of milk price ..	53 per cent."

The foregoing table, though perhaps not entirely applicable to Queensland conditions, provides ample food for thought by those who might possess a lingering doubt as to the necessity of complete organisation in our own agricultural industry.

New Agricultural Legislation Foreshadowed.

In the first session of the new Parliament the Government policy of agricultural betterment in Queensland will, it is anticipated, be extended further along the road to organised and stabilised industry. Among land and agricultural measures understood to be on the stocks are proposals relating to the regulation of co-operative companies to provide that they be genuinely co-operative and not proprietary, the provision of water supplies for farming groups, to fodder conservation, to the storage and marketing of maize, to agricultural education, to an amendment of the Main Roads Act providing for control of roads in new settlement areas, and to other rural matters not fully provided for in existing legislation.

The Future of the Sugar Industry.

In the course of the month the Prime Minister's sugar proposals were submitted to the growers for consideration by the Premier (Hon. E. G. Theodore), and the replies received from the sugar districts indicate a general, though reluctant, acceptance of the Commonwealth policy, coupled with a protest against the inadequacy of the Federal offer. A pool has since been constituted and a Pool Board appointed, the members of which are Messrs. W. Short (General Manager, Bureau of Central Sugar Mills), G. H. Pritchard (representing the Australian Sugar Producers' Association), and T. A. Powell (representing the United Canegrowers' Association). On behalf of the pool, Mr. Theodore has consented to take over the stocks of sugar in the hands of the Commonwealth, approximately 50,000 tons, subject to stocktaking and book values.

Our Future Stock Breeders.

Apropos of the activities of the Queensland State Educational authorities in the direction of providing for sound grounding of country scholars in rural subjects it is interesting to note and quote what a writer in the "Breeders' Gazette" has to say on the value of catching our future stockbreeders when they are young. He

claims that enlivening and sustaining the interests of youngsters in stock matters are among the most effective means of spreading the gospel of better stock, and are alike beneficial to the producer and user. The idea is to reach the raiser of poor grade or scrub stock, with a view to demonstrating in a practical manner by himself the advantages of feeding and raising a calf or a pig, or any animal or pure breeding alongside a scrub or grade. A few months' feeding, the scales, the price, and the use of a lead pencil tell the story and bring about, unconsciously perhaps, the preparation of a death warrant for the uneconomical scrub. This is ground gained—gained by an actual demonstration by the owner on his own farm by following his own methods. The results convince beyond any question. Breeders' associations, national or local, may well afford ao devote much time to boys and girls' calf and pig club plans, with a view to facilitating the organisation of such clubs in every district where there is a desire for one. It would mean much to the improved live stock; it would mean more for the boy and girl who joined the club, for it would give them a greater interest in the work of the farm, something worth while to work with in which they have an added interest because it is new and different. Their thoughts would be centred on their work, and when they finished the work in hand they would have a better idea of what goes to make up the type of animal of the breed, and would want no more of scrub stock. Moreover, it would broaden their vision. They would see things in farming and the development of farm animals that were not before apparent. They would become interested, and interesting work is never drudgery. The more intelligently one applies himself to his work, the better and greater the results. The first thing is to make the work interesting. One thing that the junior clubwork has done is to make the feeding of good live stock interesting to farm boys and girls. Boys and girls of to-day are the men and women of to-morrow. Anything that will increase their interest in their work, or cause them to strive to excel, tends to a progressive and contented people, and the creation of a better atmosphere. It aids in rearing the right kind of men and women to carry on the rural interests of the country.

Farmers' Enterprises: A New Zealand View.

The chairman of the Bank of New Zealand (Sir George Elliot) had something to say recently ("Dominion," 16th June, 1923) on co-operation generally among farmers. Reviewing the development of co-operation in the Dominion during the period 1895-1921—a period of rising prices—he said that, had the co-operative companies consistently adhered to the lines upon which they were inaugurated, they would have reached a sound financial position. Bad leadership had, however, brought about in some instances a total loss of shareholders' funds, and in others a very unsound state of affairs. Co-operative freezing companies were the greatest sufferers. Certainly some of the losses could not, even under the best of management, have been avoided, owing to the sudden and heavy fall in the value of meat; but, unlike proprietary and joint stock concerns, most co-operative companies made little or no attempt in prosperous times to reduce their heavy liabilities or to make adequate provision for contingencies. Instead, they launched out on a most extravagant scale on borrowed money, so that when straitened times came several had to close up, whilst others were staggering along under a great burden of debt. The principles of co-operation had much to commend it; it could be made of great value to farmers, but only if sound financial principles were followed. Some of the dairy companies in the Dominion were in a thoroughly satisfactory position, thanks to directorates that had recognised the necessity for building up capital and reserves and keeping down indebtedness. Those companies had come through the depression with ease, and it would be well if the example they had set were taken to heart by others. Proprietary and joint stock concerns were making inroads in the business of co-operative companies, and would continue to do so unless the latter kept their finances on a sound footing and conducted their affairs on business lines.

Proposed Milk Pool.

A project for the creation of a metropolitan district milk and cream pool and the establishment of central distributing depôts is now under Ministerial consideration and the review of those concerned in the industry. The project has advanced to the stage of favourable recommendation from the Council of Agriculture to the Government. Pending submission of the scheme to the Cabinet, the Minister for Agriculture and Stock (Hon. W. N. Gillies) is seeking the views of the metropolitan local authorities. The Minister proposes to meet the local authorities in conference with the object of placing the plan before them, as it is really their job to supervise and control the distribution of milk supply on modern lines for the city and its suburbs. The suggestion is that a pool be created for five years. The scheme provides against overlapping by vendors in distribution, for the protection of the consumers, and a guarantee of reasonable rates to the producer.

IRRIGATION IN QUEENSLAND—I.

By H. E. A. EKLUND, late Hydraulic Engineer, Queensland Water Supply Department.

Subjoined is the initial chapter of a comprehensive survey of irrigation possibilities in Queensland. Mr. Eklund was formerly in the State Service as an Hydraulic Engineer and as Executive Engineer in charge of the Inkerman Irrigation Works in North Queensland, and is now engaged on an important water supply project in South Australia. The widespread interest now centred upon land settlement in Queensland, and the general practical development of the forward Government policy in relation to agricultural extension and the enrichment of rural life in this State, makes the publication of Mr. Eklund's observations particularly timely. The review will be continued through succeeding issues of the Journal.—Ed.

INTRODUCTION.

Apparently the first, or among the first attempts, to place on record information regarding the irrigation possibilities of Queensland was made by Major A. J. Boyd, F.R.G.S. The information compiled by him, though printed, does not appear to have become widely known, and much valuable and interesting matter, therefore, escaped notice at the time. In the following pages much of Major Boyd's compilation has been condensed and revised, and this attempt to bring before the public the success of, and necessity for, irrigation in Queensland is due to a suggestion made by Major Boyd. Being unable to clothe the facts in the easy and pleasing style that is characteristic of the former editor of the "Queensland Agricultural Journal," I have rather endeavoured to show possibilities than to record history. Originality is not claimed for this work. It may rather be classed as an attempt to collect, from many sources, and summarise such facts, figures, and particulars as have been made the subject of numerous inquiries. I hope that this endeavour will be of some use to those who are not masters in the art of irrigation.

IRRIGATION IN QUEENSLAND—SECTION I. HISTORICAL.

Irrigation may be defined as the science of artificially supplementing an insufficient rainfall in order to obtain the best possible result from cultivation of the soil. Though agricultural in its object, it forms a special branch of engineering, on account of the works needed to obtain and control the supply of water. Efficient irrigation in its fullest sense is a modern achievement, but it is possible that the ancients who practised the art knew more about it than can be gleaned from existing records. The earliest mention of irrigation on a large scale appears to be an inscription by a Babylonian monarch (Hammurabi: about 2200 B.C.), who thus records his engineering achievements:—"I have made the canal of Hammurabi a blessing for the people of Shumir and Accad. I have distributed the waters by branch canals over the desert places. I have made water flow in the dry canals, and have given an unfailing supply to the people. I have changed desert plains to well watered lands. I have given them fertility and plenty, and have made them an abode of happiness."

Irrigation has probably been practised in certain localities in China continuously since about the time of Confucius. In Europe it appears to have fallen into disuse during the warring ages, but the concentration of population on fertile areas of uncertain rainfall necessitated an attempt to ensure uniformity and certainty in the return of cultivated products. That these attempts have been crowned with success can be seen wherever irrigation is properly practised.

As an indication of the extent to which irrigation is practised, it may be mentioned that in India over 40,000,000 acres are intensively cultivated by artificial application of water. In the United States, where irrigation, as compared with other countries, is of recent origin, no less than 10,000,000 acres are dealt with; and in Europe at least 15,000,000 acres are irrigated lands.

The necessity for irrigation generally, in Australia, is governed not so much by a concentration of population as by the uncertainty of rainfall. The interior portion

of the Australian continent is liable to severe droughts, and over great portions of coastal areas the rainfall is capricious. Particularly is this the case with Queensland; yet practically all the other States of the Commonwealth, notably Victoria and New South Wales, have established large irrigation schemes, and during drought it is from these irrigated areas that Queensland must obtain her produce, though our climate, with water, is better suited to quick growth and abundant crops than that of the Southern States. The reason for this being that given water, the humidity, essential to good growth, is greater because of the higher temperature. Many attempts to explain this fact have been made, but no description is better than that offered by a French authority on irrigation—M. Auguste de Gasparin—who thus illustrates it:—

"Two units of humidity multiplied by two of heat give four, but four of heat by four of humidity give sixteen. Such is, in fact, the rate of progression in which are manifested the advantages produced by the association of these two essentials to vegetable growth."

It is a matter for comment, therefore, that more has not been done to foster this agricultural refinement in Queensland. While railways, for instance, may be good security for money-borrowing purposes, the fact remains that they are, themselves, not productive. It is, after all, to the primary producer that any State must look for its wealth, and if there are neither people nor produce to be carried, railways may not be as good an investment as is generally supposed.

As will be shown later, Queensland offers better facilities to the agriculturist than many of its own inhabitants appear to be aware of, and with railways already extending for over 5,000 miles the possibilities for marketing any produce grown are fair.

The point may be raised that irrigation can only be successfully practised from snow-fed rivers on account of the enormous storage capacity needed when depending on any source not perennial. This may be true as a generalisation, or in cases where a supply to large areas from one source is being contemplated, but the argument does not hold good if an abundant supply of ground water is obtainable, or, if such natural facilities exist that sufficient storage can be obtained at a cost bearing correct proportion to the rest of the scheme. Critics must also remember that the larger portion of Queensland is situated in the tropics, and the coastal ranges are within the area where monsoonal rains are experienced. These downpours largely take the place of snow in colder regions, and though more sudden and boisterous, and perhaps more trying on engineering works, they are just as efficacious as the melting snow in supplying the required volume, the run-off of such storms necessarily being large.

Another argument often used against irrigation is that we have not yet the population. The reason that so few people settle on the land as agriculturists is that farming is generally considered too uncertain. Unless farming can offer a fair inducement, young men will prefer the city and a certain, if less profitable, employment, but the growth of our cities will be limited unless backed up by closer settlement in the country. Closer settlement in the country will only take place when the farmer knows that his labour will give a return, and this certainly will never appear until water conservation (and also irrigation) is more generally practised. As our pastoral industry remained a speculative investment with odds against it until the artesian supplies were made available, so will our agricultural pursuits remain a gamble until irrigation is employed wherever possible.

It is not essential that irrigation should be practised on a large scale to be profitable or individually successful. In many localities sufficient ground-water can be obtained to enable each farmer to have a private installation, as has been done on the Lower Burdekin, or on the River Don at Bowen, and several other districts. The results in cases are not so good as they should or might be, but more scientific methods of applying the water and a system of carefully recording both applications and results would soon cause a general and marked improvement.

The financial difficulties to be overcome by a State undertaking a large irrigation scheme are almost invariably more troublesome than the engineering problems in connection with any particular project. Very large schemes require correspondingly large amounts of money spent, and the interest accumulating on this money usually becomes a national bugbear before the scheme is sufficiently advanced to show any return whatever, let alone catching up to and holding the interest in check, or showing profit. Any irrigation settlement as a whole cannot show as a successful venture until at least the majority of the settlers are privately successful. A sufficient portion of the area must also be occupied before the scheme can be considered to be potentially successful. One of the greatest difficulties is to obtain a sufficient number of settlers with irrigation experience who understand how to make a success of their

individual efforts from the start. Much time is generally lost in teaching and helping the less apt farmers, who require "nursing" through the experimental stage. This reacts on the scheme as a whole until the "nursing" stage is passed, for on the success of the irrigator depends the success of the scheme. For these reasons any State desirous of making a success of artificial agriculture should eliminate the necessity for the nursing stage by educating its farmers to become efficient irrigators, and encouraging private effort before the launching of a big scheme takes place.

Such education could readily be given to the farmers in this State, where provisions already exist for group settlements, which by the nature of their constitution are self-supporting from the start.

In a State like Queensland, where adequate water supplies are of such vital importance, one would think that water supply engineering would be considered a science of some consequence. If such were the case, and if the remuneration paid for such services were proportionate to the knowledge and skill necessary, it is possible that greater value would be placed on any advice given by engineers. It is an infallible axiom that anything we obtain is valued at the price paid. Hence a doctor or a wise lawyer will never give free advice. Why should an engineer? And yet engineers are generally expected to give free advice, the result being that it is a much more difficult matter to find a good engineer than a good doctor or lawyer. To relieve this difficulty in the future, it would pay the State to encourage water supply engineering by offering travelling scholarships to University students in this branch of technical science, just as much as it would pay some chambers of commerce to offer large scholarships to students in technical chemistry.

There is much work to be done before a large irrigation scheme can be intelligently designed for Queensland, past effort in this direction, if any, having apparently been spasmodic and undirected. It is yet extremely doubtful if the essentials for a successful, purely gravity scheme exist, and nothing else appears to have been considered in connection with any preliminary investigations made. There are, however, many localities in Queensland where smaller areas have the appearance of promising good results by an adoption of correct methods, and it is possible that once an attempt has proved successful, administrative eyes will be opened to possibilities in this direction, and a vigorous and needful water conservation policy may be the result.

"The farmer is the one indispensable man. His industry is the industry of society. The real and fundamental prosperity of any State is vested in the soil."

An idea appears to be entertained by many that irrigation is an expensive luxury—too costly to be indulged in by the average farmer. It may be stated at once that though irrigation is *the most expensive* method of farming, it is also the *most profitable when intelligently practised.*

There are just three things about water in connection with production that our familiarity with this commodity has apparently caused us to forget:—

1. It is the cheapest element to produce when its actual value is considered.
2. It is the most essential thing to production, whether primary or secondary.
3. It is the most productive agent, and chemically and physically the most active substance known.

In connection with farming, where water in abundance is readily available without the necessity for expenditure on storage or conservation works, the outlay on a pumping plant is an investment which should be made in the nature of an insurance policy. The subsequent cost of irrigation may then be found to bear about the same ratio to profits as would the premium to the amount on a life policy. Especially is this the case during a drought, when produce brings a good price and any attempt at raising a crop without irrigation would prove an abortive experiment. In one case, where over £40,000 were spent on an irrigation plant, the undertaking is said to have paid for itself in two seasons.

It is not now possible to ascertain who made the first attempt at irrigation in this State. The credit would probably fall to some Chinese gardener. It is, however, fairly certain that it was first practised on a larger scale by the sugar-growers in the Lower Burdekin district, and the lead in that locality appears to have been given by Brandon and Spiller, the owners of the Pioneer sugar plantation.

(*The next article will cover irrigation on the Lower Burdekin and in other Queensland sugar areas.*)

THE ENTERPRISING FARMER AND FINANCE.

CO-OPERATIVE BANKS AND THEIR USES.

BY F. W. STRACK, F.A.I.S., F.C.I.S. (ENG.).

An address on the history and working of Co-operative Banks was read at the Convention of the Chamber of Agriculture, held at Hamilton (Vic.) on 11th April. Mr. Strack is an acknowledged authority on banking, and his remarks will be followed with interest. We have curtailed portions of the history of the establishment of Co-operative Banks in order to give full space to the practical details.

This subject is much in the air nowadays, and it is as well for men on the land to know something about the matter, for such banks are designed solely in their interests.

It is beginning to dawn upon the farmer that he has not been getting that fair deal in financial matters that he is entitled to. Honest men will admit that it is only through the hard work of the men on the land that any work at all is available to men in our cities. Sixty-six pounds out of every £100 of our Australian national wealth is supplied by primary producers, yet the Savings Banks in 1921 loaned only £20 in every available £100 to men on the land, while the trading banks probably did no better; therefore the time is ripe for more assistance and consideration to be given to those producers, and at the moment politicians in every State are falling over each other to assure the farmer that Codlin is his friend and not Short. They are talking loudly of helping him with loans, and all sorts of financial schemes are in the air, but all to be under control of red tape Government departments.

Now all this is the experience of other countries, and the only really successful efforts to help the producers has come from the men themselves, in some form of co-operation. This has taken the form of Co-operative Banks, and we will proceed presently to inquire as to how these institutions are worked and how they meet the long-felt want of those who produce so much of a nation's wealth, and yet who do not get the proper financial help at the proper time. The system of loans that can be called up at a moment's notice is the worst that can be devised, so far as farmers are concerned.

The trading banks do not, and cannot, lend on long terms. In Australia we are subject to periods of drought, when crops fail and stock die. But these troubles pass in time, yet it often happens that in the very midst of one of these trials money is "tight," or the loan the farmer has from his bank is called up, and he is at once in financial straits.

This is all wrong, and the only remedy is some arrangement whereby he shall be tided over the bad times; this remedy lies in the long-term loan. We are rather prone in a young country to try to get rich too quickly—we want to buy our farm and add acre to acre and clear it of all debt in one lifetime, whereas the next generation should be required to do its share. Again and again we see a man working like a slave, year in and year out, struggling to have his farm free to hand down to his children. He sacrifices himself, and his wife does the same, for years, but when he passes away his son takes life much more easily. He discards father's old spring cart and buys a motor-car, forgetting the long and weary struggle his parents have made in their efforts to pass down the property free of debt.

The long-term loans would distribute the work, the worry, and the debt a little more evenly, to the advantage of each generation.

Many European nations have grappled with the problem, and have gone a long way to solve the difficulties of financing the men on the land. The main lessons to be learned from a study of the world's land credit systems are the tremendous benefit to farmers of long-dated loans, and the ease with which money can be obtained by the issue of debentures secured by the solidarity of groups of land-owners, or by the assets of a co-operative association properly supervised and carefully managed.

The only really successful co-operative associations for long-term credits in other parts of the world are those where only members are borrowers. Experience of many years and in many countries proves that such associations are the best for

obtaining long-term loans at low rates of interest and on easy terms. The association issues debentures, and in exchange its members—the borrowers—give it a mortgage over their property.

A co-operative society such as a village bank or people's bank of a European country, is an association of individuals, and not a combination of capital. It rests on self-help.

Speaking generally, the European Co-operative Banks have from 50 to 150 members, who buy one share of about £2 10s., paying for it by instalments spread over two years. Where no shares are issued the members are jointly and severally liable for all debts of the association. In case of loss, a creditor can sue any one of the members whom he thinks can pay, and he can take them in turn until his debt is satisfied. But as there are no shares the reserves grow steadily, and it is very rare that any individual member is called upon to pay the association's debts. In these societies outside deposits are not always taken, and the security required for loans is much like that of the ordinary trading bank, except that the character of the applicant is taken into account, so that under proper safeguards a loan may be made to a person with no property, but whose asset is a good character.

Now, in a new land like ours we move about from place to place more than they do in the older lands, and our lands do not so often remain in the one family. This has the effect of making us more careless of our character and of our probity. In the result, therefore, personal character here is not usually an asset available as security for a loan.

The European farm mortgage is generally from ten to seventy-five years' duration, equal instalments being paid with interest quarterly, half-yearly, or yearly. The rate varies according to circumstances, but from ½ to 1 per cent. is added for a sinking fund when periodical repayments are made. These sinking fund amounts are reinvested with the society, and, of course, carry interest.

In France, true amortisation is the rule; that is, so much principal and interest is payable at stated intervals, so that as principal is paid off interest payments decrease until finally the last payments include scarcely any interest, but mostly principal.

In European associations a custom is growing up for borrowers to take out a life insurance policy, which the society holds against long-term loans, so that if the borrower dies the debt has not to be carried on by his descendants.

Co-operative banking is making headway in British India, and wherever established these banks quickly stamp out the awful usury that is so prevalent in India. What militates against their more rapid spread is the inordinate love of the native for hoarding gems and ornaments. Since time began he seems to have a craving for precious stones and metals, and seeks to obtain them even though he may be living in the greatest squalor and poverty.

The associations have either limited or unlimited liability of members, and where the liability is limited no member may hold more shares than of a face value of 1,000 rupees (about £70). After devoting quarter of the profits to reserve, the remainder may be divided. Where the liability is unlimited, all profits go to reserve until it reaches a certain percentage of the liabilities outstanding.

Neither class of association takes deposits from non-members or lends money to them. Most of them buy and sell for their members in addition to doing all their banking.

In Japan, mutual assistance amongst farmers is a practice as old as amongst Europeans. As a rule, their co-operation is for the sale of produce and the purchase of requirements, but pure co-operative credit societies number over 10,000, with a membership of over 1,000,000. Just before the war the rates of interest were excessive in Japan, and the co-operative associations granted from 6 to 13 per cent. for deposits, charging from 12 per cent. to 18 per cent. for loans.

As 87 per cent. of the farmers of Japan keep a family of four or five on the produce of less than 5 acres, it is a marvel how they can pay such high rates for monetary assistance.

In Ireland, in 1918, there were 236 rural co-operative credit societies, but sixty of them were practically moribund, and no progress has been made since.

Neither in England nor Wales does rural co-operative credit show much vitality. The reasons assigned for the slow growth are the reluctance of the farmers to borrow, and so exhibit their financial needs to their neighbours, and they do not like the idea of unlimited liability.

In Scotland, up to a year or two ago at any rate, the idea had not caught on, mainly because the ordinary banks afforded more facilities to the small man than in any other part of the Empire. May I venture to suggest that no Scotchman would

appreciate his neighbour knowing all about his financial position, though perhaps he is not averse to knowing his neighbour's affairs.

In North America, the first co-operative bank was started in Quebec in 1900. Its first receipt was the sum of 5d. By 1914 its assets equalled £61,000. Of its 7,200 loans, about 1,200 were for £2 or less, and none exceeded £20, while it has never lost 1d.

A very large number of these People's Banks sprang up in Quebec, and they now have about 25,000 shareholders, with 10,000 borrowers, with loans of from 5s. to £200, aggregating over £500,000, and averaging £52 per loan—total capital, £200,000.

These banks raise their capital by selling shares at £1 each, in instalments. They deal very little in mortgages, but lend mostly on personal security.

In other parts of Canada, seven years ago, several of the Provincial or State Governments took power to provide money for loans to farmers.

In Nova Scotia the Government will assist in rather an unusual way. Thus, if a loan company advances a farmer 80 per cent. of the value of his property, the Government will guarantee the loan company to the extent of 40 per cent. of the value, but repayments must first go in reduction of the Government guarantee. Loans for machinery and plant are freely granted, and have proved a great boon to farmers.

In New Brunswick the Farm Settlement Board has power to buy and sell real estate and personal property for *bonâ fide* settlers. The Government has power to raise loans in order to supply the board with funds.

In Ontario, under the Farm Loans Act, the Government lends funds to any municipal corporation, which in turn lends it out to farmers in its district, but at least half of each loan must be for permanent improvements. The corporation takes a debenture for each loan, and the debenture is held by Government. A special rate is levied on the particular property to meet the annual interest and sinking fund.

The loan must not exceed 60 per cent. of the value of the property, and under certain conditions the loan may be repaid at any time.

In 1919 the Government lent about £1,000,000 towards the purchase of seed, machinery, live stock, buildings, creameries, mills, &c.

Many other parts of Canada have their People's Co-operative Banks, and in the United States there are numbers of Federal Land Banks or Farmer Loan Associations; these must have a minimum capital of £150,000 before the law allows them to start. Loans from the bank run from £20 to £2,000, borrowed only by members. The term is from five to forty years, repayment being on the amortisation principle; that is, fixed regular payments of principal and interest.

With all of these associations, however, the Government has a finger in the pie, and there is the usual red tape, with all its vexatious accompaniment of delay, expense, and want of human sympathy.

In conclusion, it appears that co-operation in farm loans to be successful must have—

Undoubted means of ascertaining the value of the property.

Low legal expenses.

Economy in working the institution.

Safeguards for the lenders.

Restrictions against thriftless borrowing.

Reduced to a few words—the system of co-operative banks can be explained as associations of producers lending their own money to each other on long easy terms, assisted perhaps by outside deposits and Government loans.

Farmers usually have little idle cash, as they can do better with it on their farms. The Co-operative Bank attracts them rather than the ordinary bank, because it is far more economical, and profits do not leave the district to go out of the country. Moreover, the Co-operative Bank attends to all his financial dealings, whether sales, purchases, or investments, particularly in insurance in all its forms; above all, it helps to eliminate that parasite—the middleman.

As to long-term loans—the only danger is the temptation to borrow unnecessarily owing to the day of reckoning being so far off, but there are two classes of farmer that it is a boon to—the young man and the old—the young man, because it enables him to make a start on virgin land, and to buy the property out of the annual produce of the soil; the older man, because, having pioneered and borne the heat and burden of the day, he can use a larger portion of his income for his own comfort in advancing years, leaving the next generation to do its share of paying for the property.

—Extract from "Australian Farming."

SUGAR: FIELD REPORTS.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report, under date 27th June, 1923, from the Northern Field Assistant, Mr. E. H. Osborn:—

Invicta Mill, Haughton Valley.

In this district conditions had been slightly better than in Ayr, as the local rainfall had been 7.61 inches, against that of 1.47 inches for the same period at Ayr, but which was, of course, quite inadequate to allow the cane to do its best. In consequence the crops were very backward. Quite a number of the farmers had installed tractor-driven pumps for irrigation purposes.

There are now twelve tractors at work in the district.

Mr. J. Humphreys had some very good plant and first ratoon Badila growing on unirrigated land. Considering unfavourable weather, this is a very good crop. Mr. R. W. Walton also has some very fair cane, mostly N.G. 24, N.G. 24B, and B.208, growing upon sandy loam. This farmer uses a 6-inch and 4-inch pump driven by a tractor, but so far had only watered once. Up to the time of visit, grubs had not shown up to any great extent in the area, but Messrs. Wight, Snow Brothers, and Nelson, who had all used arsenic previously, are still satisfied by their ratoons that its use was of benefit to them.

Rollingstone, Ingham Line.

This area has also been short of its customary rainfall, the total fall for the year (up to 8th May) being 17.77 in. only. As most of the soil is of a light, loamy nature, a fairly heavy precipitation is required for good cane-growing.

Despite the dry conditions some good crops were seen upon several farms, notably upon Mr. C. Barney's property, where a splendid stand of July-planted Tableland Badila was much admired.

Nearby, some Plant Tableland Badila cane of about six weeks of age had struck very well. Mr. V. Tilbey, too, had some very good Badila and H.Q. 426 upon his farm, as also had Mr. G. T. Peebles, of Coolbie. Nearer Rollingstone, Messrs. Barnes and Webster are hoping to have about 100 acres under cane for 1924. They are now working up a block that has had a green crop ploughed in, and which looks well. These growers are using a tractor for most of their work.

Bambaroo.

Conditions here were rather better than in the Rollingstone area, the rainfall for the same period being 21.02 in. Quite a number of new settlers are hereabouts, and although the present year will be a poor one from a growers' point of view, yet the number for next season will be much greater. Last year about thirty growers supplied the Giru mill with cane grown between Rollingstone and Toobanna. With any sort of favourable weather about sixty suppliers will be represented in 1924.

Some very fair H.Q. 426 and Badila first ratoons were seen upon Mr. A. Holland's place. A 12-acre block of six weeks old Plant Badila looked very pleasing. Adjoining the latter is a 28-acre block of deep scrub land, now being cleared of bananas for cane-growing by Mr. Holland. The farms of Messrs. Talbot, Hecht, Ross, and Melvin looked very well, when the scanty rainfall is considered. Two of these growers, Messrs. Talbot and Hecht, have used manure with their first ratoons with appreciable results.

On account of these areas being so scattered it was impossible to get around as many places as one would have wished. In the Rollingstone area much valuable assistance was given me by the courtesy of the Local Producers' Association, and in the Bambaroo area by Mr. D. W. Ross.

Herbert River Area.

This sugar centre was reached in the middle of May, and was found to be on the light side as far as the rainfall was concerned. So far at Ingham the registration had been:—January, 6.46; February, 4.38; March, 5.79; April, 6.84; May, 0.63 in., or a total only of 24.12 in. Naturally the cane was on the backward side, and will probably cut under the earlier estimates.

This dry weather, although unfavourable to this year's growth, has enabled a very large area of ground to be planted early for next season, the resultant strike in most cases being very good. Most of this young cane is very clean, and with favourable conditions should result in a heavy crop for 1924. Although the pasturage

so far looked very fair, there was very little water in the creeks or river. For instance, Gredge's Crossing has been fordable with a vehicle continuously this year, whilst in an average year this is very rare during the first months of each year.

Pests.—Prior to my visit a good deal of damage had been done to the crops by caterpillars. In one place the leaves had been stripped from stools, showing 5 and 6 feet of cane. Although not very bad in any one place, the presence of grubs in scattered areas seemed more noticeable than in former years. The dry conditions being experienced helped, of course, to accentuate this.

Liming.—The use of lime is steadily increasing in this large area. One Halifax grower (Mr. E. C. Biggs) used 1 ton of earth lime to the acre in 1921. Last year he used 2 tons per acre, and he intends using the same quantity this year. His plant cane that had been treated now looks remarkably green and healthy.

Tractor power.—Tractors have been the means of several growers getting fairly large areas planted in good time this season. One farmer with 60 and another with 50 acres of forward young cane, each attribute its healthy appearance to their being able to take full advantage of the weather conditions.

Varieties.—H.Q. 426 (Clarke's Seedling), Badila, H.Q. 409, the Gorus, Black Innis, D.1135, Nanemo, Korpi, Oramboo, and Q.813 are all being grown in this area, the last seven in much smaller quantities. Of these varieties, Q.813 is steadily gaining favour. Mr. Blackburn, of Macknade, is satisfied with it after a two-years' trial. He has planted out some 13 acres this year, and mentions that it is the only variety where he has not had to supply. Most of his March planting of this cane shows far better growth than canes of other varieties of a similar age planted elsewhere, especially when the very medium quality of the soil whereon it is planted is taken into consideration. Readers of the Journal will recollect that for two years in succession this cane has had the second highest average density in the Proserpine area, and last season held the record for the year at Mossman, with an average density of 15.59 c.c.s.

Innisfail.

This area was visited at the end of May, the conditions there being most promising. The rainfall had been sufficient for a good growth of cane, and in consequence the Goondi area looked very fine. Some splendid crops were seen, notably upon the newer lands of the Upper Daradgee, and again lower down the river upon Mr. H. Stone's property. This property will probably average a 35-ton crop throughout, for plant and first ratoons. Generally speaking, the crop to be harvested this year should be nearly a record one, as the tonnage per acre will probably be very high. When it it remembered how many years a large proportion of the area has been under cultivation, it certainly speaks well for the fertility of the Johnstone River lands.

As mentioned previously, manuring is carried on to a large extent in this locality. It will be remembered that owing to cold and, later on, to dry weather, the 1922 crops, although manured well, did not give the expected results. One grower, in speaking of this, expressed the opinion that although his crops were on the light side last year, yet his ratoons are now showing the effects of such manuring.

Pests.—In the Goondi area there are very few traces of grubs to be seen this year, nor is the presence of borers as apparent as in other years.

South Johnstone.

Up to time of writing the rainfall recorded at South Johnstone amounted to 64.22 in., which, although light, had been sufficient to enable the cane to make very fair growth. Probably the best cane is to be seen upon No. 7 Branch (Myers') and at Miskin's, whilst some very solid cane was also seen upon No. 1 Branch, and at the end of Kalbo. In this direction some very good first ratoon Badila twelve months old was noticed upon Mr. T. Zampatti's ground, a lot of it lying down already.

Pests.—Very little damage has been done by grubs this year in the area. The only place showing any effects is in the vicinity of the 12½-mile on the Nerada line, where some 40 to 50 acres have been slightly damaged.

Cane Varieties.—Quite a few of the newer canes are being now grown in the South Johnstone area, among them E.K. 1, E.K. 28, H.Q. 458, H. 146. Most of them are more forward than the usual varieties that are being generally planted. Some very fair Green Goru, 24B, Red Goru, N.G. 24, Striped Goru, and N.G. 24A was seen upon the red soils.

On the same soils and upon the Nerada line some very good 7R 428 (Pompey) carries an exceedingly heavy crop of plant cane about twelve months old.

Tractors.—Several new ones of different makes have been put in use here since my last visit some months ago; the owners all speak well of their machines.

The Southern Field Assistant (Mr. J. C. Murray) reports to the Director of Sugar Experiment Stations, under date 5th July, 1923, as follows:—

Bingera.

The cane on this area looks better generally than the other centres visited. This applies to both scrub and forest loams. On the red forest loams at Bingera South the cane looks particularly vigorous; in fact, it has in many instances the appearance of hardly having received a check from the dry weather. Varieties outstanding in the Bingera district are 1900 Seedling, Q. 813, H.Q. 285, and Black Innes. Other canes mentioned in previous reports are growing, but the varieties named will probably give the best returns.

Farmers are trying most of the standard fertilisers on scrub soils, with positive or negative results according to the rainfall, while on the forest loams the most consistent returns are being obtained with bone dust. It costs approximately £9 per ton to get this fertiliser landed at Bingera railway siding. Farmers are advised in this area to work an interchange of plant as much as possible, forest loam plants to scrub and *vice versâ*. This is a factor, combined with careful selection of sets, in preventing deterioration. There is very little disease in this area, although D.1135 in patches is showing signs of gumming. Leaf mottling occurs at intervals, but there were no canes noticed showing secondary symptoms of "leaf stripe."

Gin Gin.

The crop in this district looks well, considering the adverse weather conditions. The cane is green and full of growth, although the stick is short. However, cane that is being milled after, say, September, should give a fair tonnage. This applies particularly to the 1900 Seedling.

Varieties that present a good appearance in this area just now are 1900 Seedling, H.Q.285, Q.813, and D.1135. The farmers are advised to concentrate more on growing these than the first-named canes as much as is reasonably possible. Although 1900 Seedling is an excellent cane in many respects, it is a mistake for a farmer to have all of this variety. If this cane is cut early the stool often bleeds and the subsequent stools suffer from what might be called "debility," and the c.c.s. value is not the same as if the cane is cut in October. It is wise, therefore, to have a small acreage of an early maturing cane with 1900 Seedling. During this coming season the growers are recommended to work into the soil any available vegetable matter.

Childers.

This important sugar centre is suffering considerably from the effects of the dry weather. The cane is green, however, and if the winter is not too severe it should make good growth by the end of September. As is usual with this district, the farms are clean and present a well-ordered appearance. There is very little disease in the cane as far as could be observed, and parasites that make sugar-cane their host were not greatly in evidence. Green manuring is being carried on fairly extensively, and the growers are actively interesting themselves in local experiments with varieties and fertilisers. Local fertilising experiments are very important on these lands.

Farmers who are growing D.1135 in the Childers district and intend to go on doing so would be well advised to try to get a change of plants from, say, the Bauple or the Nambour districts. They are advised to try more extensively H.Q.285 and Q.813. It is not advisable for any grower to devote all his area to raising 1900 Seedling.

Maryborough.

Cane looks well in this district. The rainfall since January has been very well distributed, and on Tinana Creek and The Island Plantation some really splendid crops of D.1135 and 1900 Seedling are to be seen. Growers in these localities are now taking cane-growing more seriously than heretofore, but as yet the areas under cane are but a small portion of what could be profitably planted.

Farmers in the Maryborough district still have a number of old varieties which it would be profitable to discard in favour of those which are more resistant to disease. The growers on The Island are getting excellent results from filter-press refuse obtained from Millaquin. This material has small manurial value, but it improves the texture of the soil and consequently creates a greater feeding area for plant roots. Lime and green manures would be very beneficial on most of the Tinana Creek cane lands.

Growers here should never hesitate, if it is at all possible, to spend a little time and capital on chipping and otherwise combating weed growth. Proper application of labour at the right time always pays handsomely in sugar-cane.

A better organisation of the harvest facilities is required in the Maryborough district. This would probably mean a much greater output of cane. Economic harvesting means lessening that all-important factor to the Queensland farmer, the cost of production.

Pialba.

The farmers here have no reason to be disappointed with their prospects. The cane is green and healthy, and although the stick in most instances is not long, there are patches of very fine cane showing. This applies particularly to the Q.813. One farmer has the whole of his available cane land under this variety, while others have a fair portion under. The rich scrub land that divides the mountain area from the coast is being gradually cleared, and some that has already been planted is showing excellent cane.

Varieties doing well at Pialba include 1900 Seedling, Q.813, Q.970, Q.1098, M.89, D.1135, and Shahjahanpur No. 10. Greater interest is being taken in obtaining the best canes, and it is probable, if the farmers work with enthusiasm in this direction, that the district will soon be yielding much more.

Farmers are advised to go in more for local experiment with fertilisers, and to communicate with the Bureau of Sugar Experiment Stations on matters upon which they wish information.

As mentioned in previous reports, greater work could be done with liming and planting leguminous crops in the Pialba district than is being done at present.

Useful crops as green manure are cowpea, Mauritius beans, velvet beans, tares, vetches, rape, soya beans, and maize. Speaking generally, growers are more concerned at the economic outlook than any other factor. Unless the position is consolidated fimly and quickly, the advance of the industry will receive a setback from which it may take years to recover.

SHEEP BLOW FLY PEST.

A REVIEW OF EXPERIMENTS SINCE 1913.

By W. G. BROWN, Sheep and Wool Expert.

In the course of the very serious outbreak of the pest in 1913, when from 23 to 75 per cent. of the sheep were attacked in the Central District, a commission of inquiry was sent out to investigate the conditions.

A report was furnished by Major A. H. Cory, Chief Inspector of Stock, and Mr. Edmund Jarvis, Assistant Entomologist, in 1913. In that report it was stated that the owners of over 1,000,000 sheep were interviewed, and various opinions as to control were expressed. These were shown in the published report of these gentlemen.

A recommendation was made that the Department should experiment, for the purpose of finding some means to either abolish or at least control the pest. Accordingly, sheep were purchased and sent to Gindie State Farm, and several methods were tried out. Numerous specifics, of all kinds, were tried and found—some valueless, some fairly effective, and a few good.

In 1918 the Commonwealth Institute of Science and Industry took over the experiments, and working on the lines of the Gindie results, they succeeded in giving a reasonable protection, at a very moderate cost, for the sheep men. It is not practicable in the present review to give all the measures taken in detail, as the work extended over seven years. It was observed early in the operations that the problem was very complex. For instance, it came to be seen that specifics that gave good results at first were found to be useless later. Paddocks badly infested in one fly season were found comparatively free later. The life histories of the various flies worked out by the entomologists varied, and were found to be very incomplete. They could not say whether flies were local; that is, whether they stayed where they were hatched, or travelled for miles; or whether the presence of carrion was essential for their propagation. Neither of these questions has been answered to-day, and they are both most important factors in the solution of the problem. At the end of over seven years of experimentation, we can look back and say that four methods were tried, and it may be interesting to give them in their order. They were—

(*a*) Methods to drive flies away from the sheep;
(*b*) Methods of attacking and destroying flies;
(*c*) Methods of combating the flies by parasites; and
(*d*) The method of attracting flies to sheep and poisoning them and their progeny on the animal.

(*a*) Taking them in the above order, it was obvious that if the flies could be kept away from the sheep there would be no infestation. Consequently, every effort was made to get a specific which would drive away the flies. Not one was found to do that. After repeated trials, sheep were still attacked. It should have been known

that a female fly full of eggs must get rid of her burden, and nothing can prevent her placing them somewhere. In the presence of a sheep and the absence of carrion, the conclusion was forgone, unless a prohibitory influence could be found. None was found.

(*b*) Then it was thought that if the flies were attacked and destroyed, the end would be gained. Traps of various kinds were invented and tried, and one in particular caught flies by the hundred thousand, and a solution of the question appeared to be in sight. It was found by experience, however, not only in the experiments, but by the wide-spread use of traps all over Queensland, that however many flies were caught there still remained more than enough to cause just as serious losses as were sustained before traps were tried. Traps were, therefore, abandoned.

(*c*) Then the question of natural parasites presented itself. In 1913 Mr. Edmund Jarvis discovered a parasite (*Nasonia Brevicornis*) which parasitised the pupæ of flies. These wasps were found in a district (Longreach) where from 23 per cent. to 75 per cent. of the sheep had been attacked. Later they were found in several other districts in Queensland, and by Mr. W. Froggat, Government Entomologist of New South Wales. Thus it did not seem very hopeful that a parasite such as *Nasonia Brevicornis* would be of much value, considering that so many losses were sustained in the districts where it was so numerous. Yet in the hope that it would be helpful the parasite was cultivated and issued. Results were nil, or nearly so.

(*d*) In 1916 it came to be known that the Manager of Orion Downs, Springsure District, was using a method which gave at least 90 per cent. of protection to his sheep for a longer or shorter period. This method consisted of jetting a poisonous solution—namely, Cooper's Sheep Dip, at quadruple strength into the breech of the sheep, where 90 per cent. of the attack is made by flies. This was tried at Gindie and found good, but somewhat costly. When the experiments were taken in hand by the Institute of Science and Industry, and Mr. Russell, of Dalmally, handed over plant and 25,000 sheep for experiments, a number of the specifics tried at Gindie and found useful, with several new ones, were applied. Among them was the Orion Downs formula. Mr. Russell considered the matter and came to the conclusion that it was only the arsenic in the dip which gave the results, and suggested that trials with plain arsenic should be substituted. Knowing little of the effects of the poison at that time, the Committee was chary of using the strength required as contained in four packets of Cooper's Dip per 100 gallons of water, but Mr. Russell said to the Committee: "Here are the sheep and the plant, go as far as you like."

A good proprietary sheep dip in solution ready for use contains about 0.2 per cent. of arsenic, or 2 lb. of arsenic to 100 gallons of water; therefore, if the Orion Downs formula of four packets of 10 lb. each be used in each 100 gallons of water, a total amount of 0.8 per cent. of arsenic is jetted into the breech of the sheep. Mixed with this quantity of arsenic was sulphur and other ingredients. From the time that plain arsenic of not less than 90 per cent. quality was used, it became evident that a method had been evolved which gave protection for a certain period (about 12 weeks). The next thing to be considered was the effect of arsenic as jetted on to the breech of the sheep. Various strengths were applied, up to 1.5 per cent., or 15 lb. to the 100 gallons of water, and the sheep treated with this extreme proportion carefully watched for weeks. In no case was there found any ill-effect, either on the animal or the fleece. It was found, however, that increased strength did not give increased protection after a certain point in the percentage of arsenic in the solution was reached. It was found that 0.7 per cent., or 7 lb. per 100 gallons, was quite as efficient as higher percentages. By analysis of the wool taken weekly from the jetted sheep it was learned that from the very day of the jetting process the amount of arsenic in the wool decreased, until at the end of about three months there was only a negligible amount of the poison left. This accounts for the fact that no more than three months' protection could be given. On the commercial side of the proposition it has been found that one-fifth of a penny will cover the cost, this including reasonable charges for labour.

The net result of the latest experiments is this:—If sheep be jetted with a solution of from 5 lb. to 7 lb. of arsenic per 100 gallons, the arsenic being dissolved in either equal parts of carbonate of soda or half that quantity of soda ash, the animals are protected for about three months. It does not matter how much growth of wool is on the sheep's back. The more the better.

Another result is that after jetting a mob of sheep dead flies of all kinds are to be found in the yards and in the paddocks. All the maggots which have been deposited by the flies do not live long enough to be mischievous. Thus the sheep are not only safe from the maggots, but they act as a fly trap of the first order.

An important matter is that pressure of up to 150 lb. per square inch, varying according to the length of wool to be penetrated, is absolutely necessary.

This process has now been tried in all parts of Queensland, and has never yet failed in giving the protection described. Therefore, until the biologists and entomologists can give us something better, it is safe to say that the problem is solved to the extent of 90 per cent.

CANE PEST COMBAT AND CONTROL.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report dated 26th June, from the Entomologist at Meringa, Mr. Edmund Jarvis:—

PARA-DICHLOROBENZENE PROVED TO BE AN EFFECTIVE FUMIGANT FOR CANE GRUBS.

In my April report the appearance of our experiment plots at Greenhills and Meringa on the 28th of that month was outlined, when the condition of treated cane in both these localities was found to be very satisfactory.

I mentioned that about the end of April several yellowing grub-infested patches had commenced to show up in the check plots at Greenhills, but that no such indication of grubs was observable in the area treated with para-dichlor.

Similarly, on the plots at Meringa one could quite easily pick out the treated from check stools by the decided difference in the colour of the leaves; the treated cane being dark green, while that in check rows continued getting yellower day by day.

During the interval between 22nd April and 17th May, only 36 points of rain fell at Meringa, with the result that an examination of these experiment plots on the latter date yielded still more convincing proof of the effectiveness of para-dichlor. as a cane-grub destroyer; the contrast between green and grub-smitten lines of stools having, during this dry interval of about twenty days, become very marked indeed.

At this time interesting evidence was afforded in connection with the work of injecting these stools on 25th January.

This work was carried out by different men, each using a "Jarvis" injector, and treating separate rows, the cane on that date being less than 3 feet high. In some rows, stools had been accidentally missed, while others had not been injected to the proper depth (owing possibly to the spear having met with a stone or other hard substance). The whereabouts of such missed stools, however, was now clearly revealed, four months after the application, by yellowing of the foliage, due to some of the grubs at these points having escaped fumigation.

By carefully counting all the stools in six of the treated and the same number of untreated rows of cane, the following conclusive results were obtained:—

Plot 1 Treated: (Three rows consisting of 900 stools of cane)—20 stools affected.

Plot 1 Untreated: (Three rows consisting of 900 stools of cane)—575 stools affected.

Plot 2 Treated: (Three rows consisting of 900 stools of cane)—49 stools affected.

Plot 2 Untreated: (Three rows consisting of 900 stools of cane)—779 stools affected.

Note.—Injections in Plot 1 were made 12 inches apart, 4 inches from plants, and 6 inches deep, while in Plot 2 injections were 18 inches apart.

Affected stools occurring in treated rows were often surrounded by, or growing alongside, green injected cane, thus showing that such occurrence was, in many cases, not due to failure of the fumigant at all, but to defects in application. This was very clearly exemplified in the case of a row consisting of 300 stools injected by one operator, and which happened to form one edge of a treated plot. This row presented an unbroken line of green foliage and did not contain a single affected stool, showing that it had been carefully and uniformly treated throughout the entire length. Running parallel to it, and only 4 feet 6 inches away, the edge of the adjoining check plot formed an almost continuous row of yellow grub-eaten cane. The unmistakeable contact between these two rows of cane growing side by side was amply sufficient in itself to prove the effectiveness of the fumigant. The next examination at Meringa was on 27th May, by which time, owing to continuation of dry weather, some of the cane in check plots had apparently succumbed, and much appeared to be dying.

The difference between treated and check stools was naturally still more marked, as injected canes had remained green, indicating the presence of enough moisture in the soil to enable stools having uninjured roots to continue making slow growth.

Between 29th May and 4th June we had a fall of 2.14 inches of rain, which came just in time to freshen up the grub-eaten cane.

The latest inspection of these plots was on 11th June, when the treated cane was seen to be higher than that affected by grubs.

Greenhill Plots.

When last examined on 11th June, we found that the injected cane had continued unaltered during the recent dry spell, without a single stool showing grub-injury; while on either side, in the check plots, decided evidence of grub-infestation was still very noticeable over patches of varying extent.

INTRODUCTION INTO JAVA OF QUEENSLAND CANE-GRUB PARASITES.

The consignment of digger-wasp parasites reported last month as having been sent to Buitenzorg, for introduction into sugar-cane and cassava plantations in East Java, were supplemented this month (May) by additional parcels containing in all 160 cocoons which were spun at our laboratory last month.

A further shipment of 75 cocoons will be forwarded to Java by the next mail boat on 9th July.

This total of 259 cocoons was derived from eggs laid here during March to June by our digger-wasps *Campsomeris tasmaniensis* and *C. radula* on the grubs of grey-back cane-beetles, each parasitised grub being confined in a separate breeding cage. The average temperature during this period was 80.73 degrees Fahr., and the total rainfall about 21 inches.

In return for cocoons sent away, we shall receive from Professor Leefmans those of two species of Scoliid wasps from Java for introduction into our own canefields to combat grubs of the grey-back cockchafer and those of *Lepidiota frenchi*.

Although our digger-wasps in the Cairns district destroy every year a small percentage of the grubs of these cane-beetles, the proportion killed in this way does not vary much, owing to the natural checks imposed on these parasites by their hyper-parasitic enemies—at least three of which are already known to us, and have been studied to some extent at this station.

In all probability these natural checks would not, however, materially affect the increase of introduced digger-wasps, the hyper-parasites of which do not, so far as is known, occur in Queensland.

The establishment of inter-relationship between parasitic insects and their various hosts has not been brought about in a day, but in many cases centuries may have elapsed during such adjustment of the so-called "balance of nature." We may, therefore, reasonably assume that our Queensland hyper-parasites affecting wasps of the genus *Campsomeris* are not likely to attack larvæ of *Dielis thoracica* and *D. javana*, the two digger-wasps we are hoping to establish in our canefields.

POISON BAITS FOR WHITE ANTS.

Experimentation along this line of control work was commenced on 9th May, when a number of poisoned baits were prepared and placed in cages of soil in which specimens of the white ant *Mastotermes darwinensis* had previously nested in tunnels.

The medium used consisted of small pieces of crushed sugar-cane which had been dipped in various arsenical solutions, such as copper arsenate (with and without molasses); sodium arsenite of different strengths, &c.

Best results were obtained from the simplest preparation—viz., arsenite of copper ½ oz., water 2½ pints—which gave a mortality of 100 per cent. after four days.

The pieces of cane were merely dipped in the above solution and laid on top of the soil. The termites evidently came up out of the ground to feed on this bait, but whether they would do so under outside field conditions has yet to be determined.

Arsenious acid (white arsenic) ½ oz., sodium carbonate 1 oz., water 3 pints, proved effective after seven days, giving a mortality of 100 per cent. We are still experimenting in the laboratory with other baits and hope to report results from these and from field tests in the near future.

AGRICULTURAL EDUCATION.

PROPOSED SUPERSESSION OF THE COLLEGE AT GATTON BY AN AGRICULTURAL HIGH SCHOOL—MINISTERIAL STATEMENT.

It is intended to discontinue the operations of the Agricultural College at Gatton as at present constituted, and, in its place, to establish an Agricultural High School and College, to provide a High School education in agriculture for youths from 14 to 18 years of age. The intentions of the Government in the matter are embodied in a recent official statement by the Minister for Agriculture (Hon. W. N. Gillies).

"The Government," Mr. Gillies said, "fully recognises the vital importance of agricultural training as being an important part of the rural organisation and land settlement policy, and it has been forced to the conclusion that the Queensland Agricultural College as at present constituted is not obtaining the best results for the purpose for which it exists. This conclusion has not been reached by the Government as it is at present constituted, but the members of the Government immediately preceding had similar views. I have, as also did my immediate predecessor, given much consideration to the problem, and an adverse report by Public Service inspectors some time ago confirmed the impression that had been formed. I have no desire to animadvert in any way upon the ideas of the Government which founded the college, and am quite ready to believe that then and for years afterwards it served the purpose of its foundation, but times have changed, and there is no doubt, for the number of students who attend and the number who graduate in comparison with the cost of maintenance, the continuation of it on the present basis is not warranted.

"There is at present accommodation at this institution for sixty resident students. The average number during the past five years is forty, and the average net cost per student is £333.

Changed Conditions.

"The war made a difference in the number of students, and other colleges in Australia were affected likewise, but with every allowance for those circumstances the fact remains that the average annual number of students of all kinds—full paying, bursars, soldier, and other short-period students—for the past five years, and the average annual cost of maintenance each year, in the same period, does not indicate a satisfactory condition of things. Moreover, the college has departed in several ways from the original idea of a college; a large herd of the different dairy breeds is kept, far larger than is necessary for college purposes; pig-breeding and dealing is on a commercial scale, a butter factory is maintained, poultry competitions are carried out, and so on.

"Several methods of improvement were considered and discussed, but without practical result, because they could not be carried out upon the lines of what is really required—the broadening of agricultural education, bringing it within the reach of all who so desired, from the usual time of leaving the State school, and at the same time providing for the higher education in agriculture, preparatory to the time when there would be an opportunity for a student to take an agricultural course at the University.

The New Proposals.

"After full consideration by the Government, a special committee was appointed by the Governor in Council, consisting of Mr. E. Graham, the Director of Dairying; Mr. H. C. Quodling, the Director of Agriculture; Mr. R. M. Riddell, Inspector of Technical Colleges; Mr. R. A. Wearne, Principal of the Central Technical College; with the Under Secretary for Agriculture and Stock Mr. E. G. E. Scriven, as chairman. This was a committee of advice with respect to the reorganisation of the college, and briefly their more important recommendations were:—The establishment of a Queensland High School and College, and a Rural School for day scholars to link up with the High School. Bursaries to the High School for boys of fourteen

years who have obtained State and State High School scholarships, the first twenty annually to be free of all cost of maintenance, but preference in selection to be given to State school scholarships. Extension scholarships from the junior course to a senior standard. Travelling research scholarships, instruction by correspondence, reservation of land for students who have graduated honourably, reorganisation of the Queensland Agricultural College, of the accommodation, and the erection of additional buildings.

"The report of the committee was approved by Executive on the 14th June.

An Early Change.

"The Committee recommends that the Queensland Agricultural College be terminated, and that in its place an Agricultural High School and College be established, the intention being to provide a High School education in agriculture for boys of, say, from fourteen to eighteen years, who then, it is hoped, would enter the college at the regulation age and complete the agricultural education, so far as opportunities are provided. The date of the change has been fixed for the 1st September next, and the Department of Agriculture, in conjunction with the Public Service Commissioner, are now taking the necessary action accordingly."

THE MARKETING OF FRUIT.

A COMPREHENSIVE QUEENSLAND PROJECT.

A project of wide importance to orchardists, aiming at the improvement of the marketing of Queensland fruit, was explained by Mr. J. D. Story, I.S.O., the chairman of the Administrative and Publicity Committees of the Council of Agriculture and Public Service Commissioner, to metropolitan Press representatives recently.

"Much attention," said Mr. Story, "is being given at present throughout the Commonwealth to the fruit industry, and particularly to the question of marketing. According to Commonwealth statistics, the estimated annual value of the Commonwealth fruit industry exceeds £6,000,000; the Queensland figure exceeds £1,000,000. The decade, 1910-1920, showed an increase of Commonwealth fruit acreage of approximately 60 per cent.; the Queensland figure is also about 60 per cent. Owing to young plantations coming into bearing the production is estimated to have increased about 300 per cent., and it is still increasing. Many returned soldiers have taken up fruitgrowing. In view of the increased production, it is generally recognised that special attention must be given to the organisation of marketing arrangements on sound lines, if adequate returns are to be secured to the fruitgrowers."

A Policy for the Fruit Industry.

Questioned respecting the action taken by the Council of Agriculture, Mr. Story stated that the general question of the marketing of Queensland fruit had received the earnest attention of the Council; that existing local arrangements had been closely studied and critically examined, and that the director (Mr. Macgregor), in company with the chairman of the Southern Queensland Fruitgrowers' Society (Mr. Burtt), had visited Sydney, Melbourne, and Adelaide, and made exhaustive inquiry into the methods of the marketing of Queensland fruits in the Southern cities. A review of the whole industry was then prepared for the Council by the director, and this review formed the basis of an examination by a special committee of the Council into the various aspects of the fruitgrowers' problems. The committee had the assistance also of the Trade Commissioner (Mr. Austin) and the Director of Fruit Culture (Mr. Benson).

The outcome of the deliberations was the formulation of a policy for the fruit industry.

Principal Recommendations.

Some of the principal recommendations were:—

That an Act of Parliament should be asked for, covering the organisation of fruit marketing.

That an endeavour should be made to use local organisations and corporations already in existence and existing agencies of distribution as far as practicable.

That local organisations should be allowed to trade in fertilisers, fruit cases, and other growers' requisites by consent of the central organisation, but the activities of the central organisation to be confined to the marketing of fruit.

That each local organisation should be a member of the central organisation to control marketing in Brisbane, Sydney, Melbourne, Adelaide, and elsewhere.

That the central growers' organisation should be controlled by a committee of direction, to be elected annually by members of the local organisations, and one member nominated by the Council of Agriculture, the committee of direction not to exceed ten in number, and to be comprised as follows:—Banana growers, 2; pine-apples, 2; citrus, 2; deciduous, 2; small fruits, 1; and a nominee from the Council of Agriculture; the committee of direction to control matters of general policy, but it to be permissive for the committee to delegate certain powers to an executive of three, to be elected from among their own number; that the growers' representatives on the committee of direction be elected by growers on a sectional basis, and that the members of the committee of direction retire annually, but be eligible for re-election.

Other Suggestions.

Further recommendations were:—

That the central organisation be a non-profit, non-capital organisation.

That the proposed Act vest in the committee of direction control of the marketing of all Queensland fruit as from a date to be fixed.

That a vigorous policy should be pursued to attain the objective that all fruit transmitted to market will pass through either community packing sheds, or, alternatively, a form of inspection in cases in which the application of the packing shed principle is impracticable or undesirable.

That provision should be made for the institution of packing sheds on the requisition of the growers concerned.

That the fruit should be marketed under the growers or community brand, and at the outset growers be invited to nominate those agents by whom they desire their fruit to be handled, and in order that as little disturbance as possible may result, an endeavour be made by the committee of direction to the effect that fruit which has been marketed by growers for years through one agent shall still go through that agent.

That agency or other representations should be established in the larger towns in Queensland, such as Gympie, Maryborough, Rockhampton, Bundaberg, Mackay, Cairns, Mount Morgan, Toowoomba, Roma, and Goondiwindi, as well as in such places outside the State as Newcastle, if necessary.

That consideration should be given to the running of a special fruit train on country railways, and that consideration also be given to instituting negotiations with the Commissioner for Railways with a view to railway station-masters acting as agents on a small commission basis.

That encouragement should be given to the establishment of co-operative retail shops by growers' societies, but not under the committee of direction.

That marketing, both in the sphere of the local and central organisations, be conducted on a non-profit basis, growers securing full benefit of freight concessions and any other savings.

That provision should be made for this scheme to be operative for a term of three years, and to continue thereafter, unless on requisition of 500 growers a ballot be demanded, and a majority of registered growers demand discontinuance.

A Conference Called.

Mr. Story added that an exhaustive pamphlet containing a review of existing methods of marketing of Queensland fruit, with concrete proposals for the reorganisation of the industry, had been prepared by direction of the Council, and this pamphlet is being issued to Local Producers' Associations in fruit-growing districts. A conference of delegates of these associations would be held in the Council of Agriculture Building on Thursday, 19th July, to consider the proposals of the Council. This conference of fruitgrowers was likely to be one of the most momentous of fruit conferences ever held in Queensland, and in view of the important issues involved the delegates should carefully study the proposals beforehand, and come to the meeting fully equipped to discuss them in all their phases. The conference had been called so that the Council, when it approached the Government, would be in a position to assure it that it had the support of the growers, for whom it was devised. Provided that the producers approve of the scheme, the Government would be asked to legislate on the lines indicated, or with such modifications as the conference may have recommended, and the Council of Agriculture approved.

FRUIT FLY COMBAT AND CONTROL.

WESTERN AUSTRALIAN EFFORTS—REMARKABLE RESULTS CLAIMED FROM GROWER'S MASSED ATTACK.

The Western Australia Minister for Agriculture (Hon. H. K. Maley) has made available the following report received from the officer in charge of fruit industries (Mr. G. Wickens):—

The results of the efforts at Spearwood (W.A.) to control the fruit fly are of great interest to fruitgrowers. The plan was first outlined by the district orchard inspector (Mr. C. Simmons), who told the growers at a meeting he was certain much better results would be obtained if the growers combined and paid someone to apply bait to the trees regularly once in every ten days, instead of depending upon carrying out this work themselves. A majority of growers at the meeting favoured giving the suggested innovation a trial; the Minister for Agriculture agreed to assist by lending a spray pump, donating £15 towards the provision of fruit fly bait, and instructing that Mr. Simmons should personally supervise the work.

"Fifty-seven orchardists came into the scheme, the portion of the district covered being approximately one mile and a-half by three miles. A man was engaged, who provided a horse, cart, and labour for 25s. per day.

"Baiting commenced on 21st October, 1922, before the ripening of the first stone fruits, and has been continued once in every ten days until 10th February, the trees of each variety being treated as the fruit ripened sufficiently to render it liable to attack by fruit fly.

"The trees were baited in the usual way—that is, they were not covered with the material, as a customary when treating most insect pests, but a small quantity only was sprayed on the leaves on two sides of each tree, missing the fruit as much as possible. This is why I refer to the operation as baiting instead of using the usual word 'spraying.' The bait used is known as 'Newman's fruit fly bait,' and is put up in tins ready for use, 10 gallons of water being added to 1 gallon of prepared bait.

"The conditions obtaining this season are ideal from the fruit fly's point of view. There is an exceptionally heavy stone fruit crop, and, prices being low, growers (I am not now specially referring to Spearwood) are not so careful in picking up fallen fruits, nor are the trees so carefully cleared of all ripe fruits, as when fruit is scarce and prices high.

"Consequently, there is, unfortunately, in many orchards in districts within 50 miles of Perth, where the infection is worst, abundant material in which the pest can, and does, propagate and spread. I am mentioning this specially because it makes the results obtained at Spearwood all the more noteworthy, where out of the fifty-seven orchards treated, there were only two in which infected fruit was found this season, and the loss in these was limited to about four cases in one instance, and half a dozen fruits in the other.

"The Spearwood growers set out to prove two things—firstly, whether fruit fly could be kept under control by systematically baiting the trees; and, secondly, whether the cost, when combining and paying a man to do the work, was less than with each man attending to the application of bait in his own orchard.

"So far as the former is concerned, it has been proved to be a fact in this State a number of times both by the entomologist of this department (Mr. Newman) and also by individual growers, but, where the Spearwood effort differed from previous ones was the co-operation of growers to keep a whole district free.

"So successful have the operations been that growers in the area treated, with the two slight exceptions mentioned above, have gathered the whole of their stone fruit free from fruit fly, commencing with early Newcastle apricots in November, and finishing with Elberta peaches on 10th February. The cost has worked out very low, being less than 3d. per treated tree for the season, including labour and material.

"It is particularly worthy of mention that, while the orchards in the co-operatively treated area are free from fruit fly, there are some very close to its boundaries where fruit fly is plainly in evidence, and this notwithstanding that the owners of the latter are supposed to be applying bait exactly in the same way as is being done for the combined growers by the man who is paid to do the work.

"The Spearwood growers are to be congratulated upon the result of their efforts, as is also Mr. Simmons, the officer of this department, who initiated and practically organised the movement."

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1923.

Good rain fell on 4th June, and then a cold snap set in, the temperature falling to 33.5 degrees. During the rest of the month cold westerlies prevailed, which kept the birds indoors most of the day. However, in spite of the weather, the laying was very good. In the light breeds, C. H. Singer's pen made the best score, with 132 eggs, while in the heavy breeds Jas. Potter's Black Orpingtons laid 126 eggs. The following are the individual scores:—

Competitors.	Breed.	Jne.	Total.
LIGHT BREEDS.			
*C. H. Singer	White Leghorns	132	341
*W. and G. W. Hindes	Do.	125	322
*N. A. Singer	Do.	126	321
*S. L. Grenier	Do.	109	309
*Ancona Poultry Club	Anconas	118	297
*Oakleigh Poultry Farm	White Leghorns	110	291
Jas. Hutton	Do.	100	290
*Rock View Poultry Farm	Do.	106	288
*O. Goos	Do.	106	284
*J. W. Newton	Do.	94	280
*Beckley Poultry Farm	Do.	101	275
F. Sparsholt	Do.	100	261
*J. W. Short	Do.	90	254
*J. M. Manson	Do.	104	254
*R. C. J. Turner	Do.	95	252
*Bathurst Poultry Farm	Do.	105	250
*Mrs. L. Andersen	Do.	105	250
G. Marks	Do.	101	250
Jas. Harrington	Do.	83	240
G. E. Rogers	Do.	91	237
*H. P. Clarke	Do.	106	236
*Geo. Williams	Do.	97	235
*Arch. Neil	Do.	90	227
*A. C. G. Wenck	Do.	101	226
*Mrs. R. E. Hodge	Do.	95	220
W. A. and J. Pitkeathly	Do.	65	213
*H. Fraser	Do.	81	211
Jas. Earl	Do.	80	206
*C. A. Goos	Do.	104	206
W. Becker	Do.	80	200
C. Quesnell	Do.	72	189
Chapman and Hill	Do.	72	188
W. and G. W. Hindes	Brown Leghorns	71	185
*Mrs. E. White	White Leghorns	79	179
E. Ainscough	Do.	74	168
*J. Purnell	Do.	81	144
Parisian Poultry Farm	Do.	68	140
*N. J. Nairn	Do.	62	118
HEAVY BREEDS.			
*W. Becker	Chinese Langshans	105	314
*R. Burns	Black Orpingtons	118	298
*Jas. Hutton	Do.	113	294
*Jas. Ferguson	Chinese Langshans	120	290
*Mrs. A. E. Gallagher	Black Orpingtons	114	285

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	June.	Total.
HEAVY BREEDS—*continued.*			
*Jas. Potter	Black Orpingtons ...	126	283
J. R. Douglas	Do.	113	281
R. Conochie	Do.	96	266
*E. Walters	Do.	104	265
*H. M. Chaille	Do.	115	254
*Mrs. A. Kent	Do.	108	252
*E. F. Dennis	Do.	115	248
Beckley Poultry Farm	Do.	84	243
W. T. Solman	Do.	100	237
*R. Holmes	Do.	100	227
*Parisian Poultry Farm	Do.	91	227
*T. Hindley	Do.	101	223
*J. H. Jones	Do.	74	208
Jas. Ferguson	Plymouth Rocks ...	105	200
*Rev. A. McAllister	Black Orpingtons ...	82	194
G. E. Rogers	Do.	104	191
H. B. Stephens	Do.	84	185
W. F. Ruhl	Do.	92	176
W. G. Badcock	Ch. Langshans	78	174
*C. C. Dennis	Black Orpingtons ...	112	170
V. J. Rye	Do	72	145
Jas. Ferguson	Rhode Island Reds ...	67	91
F. J. Murphy	Black Orpingtons ...	51	77
Mos. Stephens	Do.	51	71
Total	...	6,374	15,406

* Indicates that the birds are being single tested.

DETAILS OF SINGLE HEN PENS.

Competition.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
C. H. Singer	53	76	55	44	50	63	341
W. and G. W. Hindes	46	63	44	43	62	64	322
N. A. Singer	48	61	58	58	47	49	321
S. L. Grenier	48	51	57	51	53	49	309
Ancona Club	48	47	59	43	45	55	297
Oakleigh Poultry Farm	57	53	40	45	54	42	291
Rockview Poultry Farm	52	58	52	50	40	36	288
O. Goos	43	54	55	40	43	49	284
J. W. Newton	50	49	45	31	49	56	280
Beckley Poultry Farm .. .	52	36	31	50	51	55	275
J. W. Short	38	44	48	52	45	27	254
J. M. Manson	39	31	53	52	40	39	254
R. C. J. Turner	33	46	43	46	30	54	252
Bathurst Poultry Farm	41	47	38	48	39	37	250
Mrs. L. Andersen	25	48	51	54	35	37	250
H. P Clarke	50	20	48	34	41	43	236
Geo. Williams	50	52	26	39	35	33	235
Arch Neil	37	26	23	46	56	39	227
A. C. G. Wenck	37	27	39	45	32	46	226
Mrs. R. E. Hodge	24	37	24	45	48	42	220
H. Fraser	42	28	29	29	39	44	211
C. A. Goos	36	52	36	35	23	24	206
Mrs. E. White	28	23	44	35	24	25	179
J. Purnell	26	10	38	12	38	20	144
N. J. Nairn	36	11	30	18	11	12	118

EGG-LAYING COMPETITION—*continued.*

DETAILS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
W. Becker	52	64	59	51	46	42	314
R. Burns	58	34	47	35	77	47	298
Jas. Hutton	55	52	59	46	40	42	294
Jas. Ferguson	54	53	46	45	48	44	290
Mrs. A. E. Gallagher	46	56	47	48	45	43	285
Jas. Potter	29	58	47	46	43	60	283
E. Walters	54	59	32	33	38	49	265
H. M. Chaille	38	52	51	51	26	36	254
Mrs. A. Kent	37	64	45	60	34	12	252
E. F. Dennis	56	39	36	36	48	33	248
R. Holmes	36	29	37	31	43	51	227
Parisian Poultry Farm	13	34	44	47	48	41	227
T. Hindley	38	51	49	52	19	14	223
J. H. Jones	36	34	40	38	15	45	208
C. C. Dennis	32	38	13	29	28	30	170

CUTHBERT POTTS, Principal.

NATIONAL UTILITY POULTRY BREEDERS' ASSOCIATION COMPETITION, ZILLMERE.

REPORT FOR MAY.

A total of 2,077 eggs were laid at the above competition during May, an average of 15.73 eggs per bird. Two birds were troubled with warts and two have had bowel trouble, and colds have affected the laying of two other pullets. Otherwise, all the birds are in good health. No. 87 was replaced owing to sickness. The following birds have been moulting—Nos. 21, 32, 47, 52, 82. Nos. 96, 110, and 111 have been broody.

Pen No.	Owner.	May.	Total.	Pen No.	Owner.	May.	Total.
WHITE LEGHORNS.							
62	Miss L. M. Dingle	26	52	43	Kelvin Poultry Farm	21	38
75	W. Shaffrey ...	24	46				
15	W. J. Berry ...	25	45	16	W. J. Berry ...	21	38
14	Enroh Pens ...	23	45	65	R. Duff	22	37
42	W. Wakefield ...	21	44	18	A. W. Ward ...	21	37
8	Oakleigh Poultry Farm	20	43	76	W. Shaffrey ...	19	36
				45	F. R. Koch ...	16	35
40	J. Earl	21	43	30	W. and G. W. Hindes	17	35
33	A. S. Walters ...	20	42				
72	W. H. Forsyth ...	24	41	3	T. H. Craig ...	23	34
41	W. Wakefield ...	21	41	31	H. Needs ..	16	33
66	R. Duff	20	41	7	Oakleigh Poultry Farm	20	33
64	S. Lloyd ...	21	40				
61	Miss L. M. Dingle	21	40	28	H. T. Britten ...	20	32
27	H. T. Britten ...	21	40	36	J. T. Webster ...	14	32
22	M. F. Newberry ...	20	40	55	G. Baxter	18	32
81	J. E. G. Purnell ..	20	39	70	R. Shaw	23	31
13	Enroh Pens ...	20	39	51	Kidd Bros. ...	22	31
50	J. Harrington ...	22	38	38	G. Williams ...	21	31
49	J. Harrington ...	20	38	20	W. Wi t	21	30
48	R. D. Chapman ...	23	38	10	R. C. J. Turner ...	15	30

NATIONAL UTILITY POULTRY BREEDERS' ASSOCIATION COMPETITION, ZILLMERE—*continued.*

Pen No.	Owner.	May.	Total.	Pen No.	Owner.	May.	Total.
	WHITE LEGHORNS—*continued.*						
54	H. Holmes ...	21	29	39	J. Earl	11	21
57	H. Fraser ...	14	28	67	J. and G. Green ...	15	20
26	E. Stephenson ...	16	28	73	A. Hodge ...	16	19
35	J. T. Webster ...	13	26	6	P. J. Fallon ...	13	18
84	L. Andersen ...	19	26	58	H Fraser ...	6	17
4	T. H. Craig ...	23	26	34	A. S. Walters ...	12	17
56	G. Baxter ...	20	25	5	P. J Fallon ...	13	17
59	G. Scaletti ...	13	25	77	W. Smith ..	13	16
29	W. and G. W. Hindes	20	25	17	A. W. Ward ...	8	15
				11	A. Neil	6	15
71	W. H. Forsyth ...	21	24	12	A. Neil	15	15
24	Parisian Poultry Yard	14	24	78	W. Smith ...	9	14
				23	Parisian Poultry Yard	14	14
19	W. Witt	15	24				
37	G. Williams ...	17	24	68	J. and G. Green ...	10	11
2	Carinya Poultry Farm	21	24	46	F. R. Koch ...	2	11
				83	L. Andersen ...	7	9
74	A. Hodge ...	9	23	79	W. Bliss	7	9
69	R. Shaw	14	23	85	A. Cowley ...	2	7
44	Kelvin Poultry Yard	19	22	86	A. Cowley ...	0	6
				80	W. Bliss	5	5
25	E. Stephenson ...	15	22	21	M. F. Newberry...	0	5
53	H. Holmes ...	22	22	9	R. C. J. Turner ..	4	4
63	S. Lloyd	18	22	47	R. D. Chapman ..	0	2
32	H. Needs ...	6	22	82	J. E. G. Purnell...	0	1
1	Carinya Poultry Farm	19	22	52	Kidd Bros ...	0	0
				60	G. Scaletti ...	0	0
	BLACK ORPINGTONS.						
95	J. Potter	30	57	105	W. Smith ...	23	27
92	J. Pryde	25	49	110	T. Brotherton ...	6	26
112	H. M. Chaille ...	23	48	106	W. Smith ...	19	26
119	J. Harrington ...	23	47	98	W. Shaffrey ...	23	23
102	Enroh Pens ...	24	46	117	E. C. Raymond ...	18	22
96	J. Potter	19	44	93	H. B. Stephens ...	10	21
89	K. Macfarlane ...	25	42	101	Enroh Pens ...	20	20
113	E. Walters ...	21	40	118	E. C. Raymond ...	18	20
115	C. C. Dennis ...	24	39	108	E. F. Dennis ...	17	20
120	J. Harrington ...	18	39	94	H. B. Stephens ...	18	19
104	L. Pritchard ...	25	37	116	C. C. Dennis ...	13	13
99	S. Donovan ...	20	35	114	E. Walters ...	11	11
109	T. Brotherton ...	29	32	87	Parisian Poultry Yard	11	11
88	Parisian Poultry Yard	24	30	103	L. Pritchard ...	10	10
111	H. M. Chaille ...	6	29	100	S Donovan ...	0	9
91	J. Pryde	24	29	97	W. Shaffrey ...	4	7
107	E. F. Dennis ...	23	27	90	K. Macfarlane ...	1	1
	OTHER BREEDS.						
131	W. H. Forsyth (S.W.)	26	41	123	J. Ferguson (Anc.)	10	10
				122	Parisian Poultry Yard (B.L.)	9	9
126	J. Ferguson (Lang.)	23	39				
128	A. S. Walters (B.R.)	12	36	121	Parisian Poultry Yard (B.L.)	9	9
125	J. Ferguson (Lang.)	22	23	129	R. A. Girling (Min.)	0	4
130	R. A. Girling (Min.)	11	17	124	J. Ferguson (Anc.)	0	1
127	A. S. Walters (B.R.)	10	16	132	W. H. Forsyth (S.W.)	0	0

ZILLMERE EGG-LAYING COMPETITION FOR JUNE.

Two thousand and fifty-three eggs were laid during June, being an average of 15.55 eggs per bird for the month. The health of the birds generally was very good. Nos. 10 and 58 had bowel trouble and were replaced; there were only two other minor ailments. As is usual in the early months of the competition, the heavy breeds showed a slight advantage over the light varieties. The average for June in the Black Orpington section was 17, against 15½ in the White Leghorns.

WHITE LEGHORNS.

Pen No.	Owner.	June.	Total.
62	Miss L. M. Dingle	25	77
14	Enroh Pens	25	70
75	W. Shaffrey	24	70
15	W. J. Berry	24	69
8	Oakleigh, P. F.	23	66
27	H. T. Britten	21	61
66	R. Duff	20	61
72	W. H. Forsyth	20	61
13	Enroh Pens	21	60
64	S. Lloyd	20	60
50	J. Harrington	21	59
61	Miss L. M. Dingle	19	59
65	R. Duff	22	59
81	J. E. G. Purnell	20	59
48	R. D. Chapman	20	58
49	J. Harrington	20	58
16	W. J. Berry	19	57
18	A. W. Ward	20	57
41	W. Wakefield	16	57
22	M. F. Newberry	16	56
33	A. S. Walters	14	56
76	W. Shaffrey	20	56
30	W. and G. W. Hindes	20	55
3	T. H. Craig	20	54
40	J. Earl	11	54
7	Oakleigh Poultry Farm	20	53
51	Kidd Bros.	22	53
28	H. T. Britten	20	52
54	H. Holmes	22	51
70	R. Shaw	20	51
38	T. Williams	19	50
55	G. A. Baxter	18	50
42	W. Wakefield	5	49
43	Kelvin P.F.	11	49
4	T. H. Craig	22	48
26	E. Stephenson	20	48
59	G. Scaletti	23	48
84	L. Anderson	21	47
19	W. Witt	21	45
20	W. Witt	15	45
29	W. and G. W. Hindes	20	45
57	H. Fraser	17	45
1	Carinya P.F.	22	44
31	H. Needs	11	44
71	W. H. Forsyth	20	44
56	G. Baxter	18	43
69	R. Shaw	20	43
45	F. R. Koch	6	41
63	S. Lloyd	19	41
37	G. Williams	16	40
73	A. Hodge	21	40
2	Carinya P.F.	15	39
25	E. Stephenson	17	39
36	J. T. Webster	7	39
35	J. T. Webster	12	38
74	A. Hodge	15	38
77	W. Smith	19	35
5	P. J. Fallon	17	34
11	A. Neil	19	34
12	A. Neil	19	34
32	H. Needs	12	34
78	W. Smith	19	33
23	Parisian P.F.	17	31
34	A. S. Walters	13	30
53	H. Holmes	8	30
46	F. R. Koch	18	29
67	J. and G. Green	9	29
39	J. Earl	7	28
44	Kelvin P.F.	5	27
83	L. Andersen	18	27
85	A. Cowley	20	27
6	P. J. Fallon	7	25
24	Parisian P.F.	1	25
17	A. W. Ward	9	24
47	R. D. Chapman	17	19
21	M. F. Newberry	11	16
68	J. and G. Green	3	14
58	H. Fraser	11	11
79	W. Bliss	2	11
80	W. Bliss	6	11
10	R. C. J. Turner	9	9
86	A. Cowley	2	8
9	R. C. J. Turner	0	4
60	G. Scaletti	4	4
82	J. E. G. Purnell	0	1
52	Kidd Bros.	0	0

BLACK ORPINGTONS.

Pen No.	Owner.	June.	Total.
95	J. Potter	26	83
92	J. Pryde	25	74
112	H. M. Chaille	23	71
119	J. Harrington	20	67
102	Enroh Pens	19	65
115	C. C. Dennis	26	65
113	E. Walters	23	63
120	J. Harrington	23	62
104	L. Pritchard	23	60
96	J. Potter	12	56
109	T. Brotherton	24	56
89	K. Macfarlane	10	52
107	E. F. Dennis	25	52
105	W. Smith	19	46
110	T. Brotherton	20	46
93	H. B. Stephens	24	45
117	E. C. Raymond	23	45
101	Enroh Pens	24	44

ZILLMERE EGG-LAYING COMPETITION—*continued.*

BLACK ORPINGTONS—*continued.*

Pen No.	Owner.	June.	Total.
111	H. M. Chaille	15	44
118	E. C. Raymond	21	41
99	S. Donovan	4	39
106	W. Smith	12	38
108	E. F. Dennis	18	38
91	J. Pryde	8	37
116	C. C. Dennis	24	37
87	Parisian P.Y.	22	33
114	E. Walters	22	33
88	Parisian P.Y.	0	30
94	H. B. Stephens	7	26
98	W. Shaffrey	0	23
90	K. Macfarlane	20	21
103	L. Pritchard	9	19
97	W. Shaffrey	5	12
100	S. Donovan	0	9

OTHER VARIETIES.

Pen No.	Owner.	June.	Total.
131	W. H. Forsyth (S.W.)	27	68
126	J. Ferguson (Lang.)	21	60
128	A. S. Walters (B.R.)	23	59
125	J. Ferguson (Lang.)	21	44
122	Parisian P.Y. (B.L.)	18	27
127	A. S. Walters (B.R.)	7	23
130	R. A. Girling (Min.)	5	22
123	J. Ferguson (Ancona)	11	21
121	Parisian P.Y. (B.L.)	0	9
124	J. Ferguson (Ancona)	6	7
129	R. A. Girling (Min.)	0	4
132	W. H. Forsyth (S.W.)	0	0
		2,053	3,431

TOOWOOMBA COMPETITION.

Following is the result of the egg-laying competition which is being held under the auspices of the N.U.P.B.A., Toowoomba Branch, at Charlsmith Farm, South street, Toowoomba:—

WHITE LEGHORNS.

No.	Owner.	Total.	Monthly Score.
53	C. A. Keen	75	25
13	D. H. Dippel	74	23
1	J. Hutton	70	23
2	J. Hutton	70	24
15	R. Cole	70	21
48	H. Mansbridge	69	22
56	Enroh Pens	69	21
14	D. H. Dippel	67	21
37	Parisian P.Y.	67	22
10	W. Hindes	67	16
16	R. Cole	66	21
54	C. A. Keen	66	21
7	G. Stilton	63	21
51	A. Walker	62	13
4	J. H. Jones	61	18
44	P. J. Fallon	61	19
5	W. Grant	60	22
20	R. W. Shaw	60	20
50	A. R. Petty	59	22
8	G. Stilton	58	20
9	W. Hindes	58	20
6	W. Grant	55	12
12	S. Chapman	55	19
21	J. W. Short	55	15
11	S. Chapman	54	15
22	J. W. Short	54	21
30	W. Cummings	54	6
29	W. Cummings	54	9
36	H. Manning	53	25
24	J. Goggins	53	17
3	J. H. Jones	52	25
17	G. Laurenson	49	14
18	W. Laurenson	48	18
57	J. W. Newton	46	14
33	Mrs. H. Bliss	46	7
47	H. Mansbridge	46	16
26	W. S. Adams	43	22
28	E. Wiles	42	21
19	R. W. Shaw	40	15
49	A. R. Petty	39	4
27	E. Wiles	37	11
52	A. Walker	37	3
25	W. S. Adams	36	21
46	R. J. C. Turner	34	6
38	Parisian P.Y.	30	0
35	H. Manning	29	24
45	R. J. C. Turner	28	20
34	Mrs. H. Bliss	27	3
58	J. W. Newton	25	0
43	P. J. Fallon	20	4
55	Enroh Pens	18	18
41	S. McBean	15	8
23	J. Goggins	13	1
59	G. E. Rogers	13	2
39	V. Brand	12	12
31	J. Taylor	10	6
32	J. Taylor	5	0
42	S. McBean	4	4
40	V. Brand	3	0
60	G. E. Rogers	0	0

TOOWOOMBA COMPETITION—*continued.*

BLACK ORPINGTONS.

No.	Owner.	Total.	Monthly Score.	No.	Owner.	Total.	Monthly Score.
111	T. J. Carr	81	29	89	W. Wilson	56	23
121	J. Hutton	81	29	113	Ken. McFarlane ..	55	17
112	T. J. Carr	79	27	101	R. W. Shaw	52	22
88	Marville P.Y. ..	79	22	87	Marville P.Y. ..	52	10
127	E. Walters	77	27	105	R. Rivett	51	24
95	T. C. Ollier	76	24	104	E. F. Dennis ..	51	22
97	R. Burns	75	27	124	G. E. Rogers ..	48	26
131	H. B. Stephens ..	72	25	102	R. W. Shaw	45	20
122	J. Hutton	72	25	123	G. E. Rogers ..	43	23
86	T. J. Moloney ..	72	23	85	T. J. Moloney ..	39	8
90	W. Wilson	70	25	96	T. C. Ollier	39	0
103	E. F. Dennis ..	70	22	92	S. H. K. Champion ..	36	25
116	Cliff Lavers ..	69	24	120	Parisian P.Y. ..	34	1
132	H. B. Stephens ..	68	21	106	R. Rivett	32	21
107	R. Holmes	67	26	130	G. Radford	30	4
117	L. E. Maund ..	67	23	99	Mrs. G. H. Kettle ..	29	21
125	C. C. Dennis ..	66	26	91	S. H. K. Champion ..	29	21
83	Woombo P.Y. ..	65	24	119	Parisian P.Y. ..	29	21
128	G. Walters	63	21	93	H. Mansbridge ..	29	8
115	Cliff Lavers ..	62	21	129	G. Radford	26	19
94	H. Mansbridge ..	61	25	98	R. Burns	23	23
109	D. H. Dippel ..	61	18	100	Mrs. G. H. Kettle ..	22	6
84	Woombo P.Y. ..	60	22	108	R. Holmes	15	15
114	Ken. McFarlane ..	58	23	118	Mrs. L. Maund ..	3	2
110	D. H. Dippel ..	57	16	126	C. C. Dennis	3	3

OTHER BREEDS.

No.	Owner.	Total.	Monthly Score.	No.	Owner.	Total.	Monthly Score.
76	W. Becker (Ch. Lang.)	68	24	65	J. W. Short	12	12
73	H. Dibbs (Ch. Lang.)	66	19	71	J. W. Allatt (Camp.)	54	18
75	W. Becker (Ch. Lang.)	53	21	72	J. W. Allatt (Camp.)	5	5
74	H. Dibbs (Ch. Lang.)	46	12	82	C. G. Warrian (B.R.)	55	15
64	T. J. Carr (S.W.) ..	61	19	81	C. G. Warrian (B.R.)	44	19
63	T. J. Carr (S.W.) ..	55	20	77	W. Paulsen (B.R.) ..	21	21
68	R. W. Shaw (B.L.) ..	62	20	78	W. Paulsen (B.R.) ..	6	6
67	R. W. Shaw (B.L.) ..	55	20	79	A. LePla (R.I.R.) ..	41	19
66	J. W. Short (B.L.) ..	43	22	80	A. LePla (R.I.R.) ..	2	2
69	Parisian P.Y. ..	14	14	62	Mrs. L. Maund (Cl. W.)	21	0
70	Parisian P.Y. ..	12	12	61	Mrs. L. Maund (Cl. W.)	14	14

FODDER CONSERVATION.

Referring to a Press telegram from Warwick, to the effect that in view of the state of the finances and the opposition of Local Producers' Associations, the Government had decided not to proceed with the proposed scheme for fodder conservation, the Minister for Agriculture and Stock (Hon. W. N. Gillies) said, in the course of recent Press interview, that this was incorrect as the Government had not yet given full consideration to the scheme put forward by the Council of Agriculture, which involved an expenditure of £2,500,000. The Council of Agriculture itself, however, came to a decision at its last meeting—which decision was influenced by the fact that only twenty-eight out of the 107 Local Producers' Associations favoured the larger scheme, and sixty-eight of them favoured the storage on the farm and more liberal advances under the Advances to Settlers Act for this purpose. This idea was favoured by himself, as the one for immediate consideration, continued Mr. Gillies. The Government, however, recognised that the conservation of fodder and the conservation of water were national matters that must ultimately be dealt with in a national way.

CREAM GRADING.

(Points of a Paper read by Mr. C. McGrath, Instructor in Dairying, Department of Agriculture and Stock, before Dairy Factory Managers' Conference at Brisbane, 31st May, 1923.)

In co-operation with the Dairying Industry Advisory Board the Dairy Factory Managers' Association can engage in a work of real national service, for just to the extent to which we improve quality and increase output do we enrich the State, and enable it to carry its post war burdens. It may be said, however, that dairying pays quite as well, and perhaps even better, than general agriculture. One generally finds that depression when it occurs is less felt in districts largely devoted to dairying. The dairy farmer is the pioneer of close settlement throughout this State. A sure sign of stability, and a sight that inspires confidence, is a herd of good dairy cows, on a well laid out dairy farm. The dairy cow made possible the successful settlement of many now prosperous areas in the State, extending along the coastal belt from the Tweed to the Atherton Tableland. The industry is extending northwards. Last year I saw some 200 dairy heifers intended as foundation dairy stock on the Daintree River. In the Northern Peninsula are vast areas of scrub-covered flats, and tablelands of rich soil, well watered, sound dairy country awaiting development.

A Healthy Cow Delivers the Goods.

The healthy dairy cow, properly cared for, delivers the goods of an A1 quality. Deterioration, if any, occurs as soon as the dairy farmer takes delivery. The quality of the cream is no better and no worse than the quality of the milk from which it was separated. In order to produce A1 cream, attention must be given to the production and handling of the milk, and the separation, handling, and delivery of the cream on the factory floor. The quality of the butter produced is dependent upon the quality of the cream, the care, attention, and skill of the buttermaker. The factory manager who wants to place his factory output in the highest grades must have high-grade cream to work with.

Cream Grading.

Cream grading is the all important factor in determining the quality of the output. In the grading of milk or cream, or any of its products, it is essential that the grader should have his faculties trained so as to be able to fully appreciate the natural influences of odour and flavour of a first-grade dairy product, be it milk, butter, or cheese. The full natural flavour of carefully produced and well-handled milk, and its product cream, appeals to the senses of a trained grader. The cream grader and buttermaker should keep in close touch to secure the best results of their co-operative efforts. The position of grader is one of great responsibility. He must carry out his duties expeditiously and exactingly. As the lid is removed from each can on the receiving floor, the grader brings to his assistance the senses trained specially for his work by years of practical experience. He notes the condition and general appearance of each cream supply, both can and contents—cans that are rusted, dinted, or open seamed do not appeal to him as suitable containers for cream from which A1 butter can be manufactured. The surface appearance of the cream catches his eye. The presence of flies, insects, and particles of dirt is an indication of neglect. The presence of moulds seriously affects the quality of the cream, and may give rise to "fishiness" or moulds in butter produced therefrom, and points to unsuitable conditions surrounding production and storage.

A hard tough covering on the surface points to neglect in stirring the cream. A frothy or aerated surface gives rise to a suspicion that separation has taken place into the cream can direct, or is the result of neglect of necessary stirring. An accumulation of gas bubbles on the surface is the result of the action of gas-forming bacteria yeast cells, *bacillus Coli communa*. When placing the cream samples and stirrer in the cream if a grader finds a hard, tough layer within the body of the cream, he concludes that the cream has been delivered direct from the separator into the can at each time of separation, a practice that cannot be too strongly condemned.

Hard tough portions throughout the body of the cream is an indication of want of mixing and careful stirring. Curdling is caused by separating cream with a fat-content below the standard, or allowing warm cream to flow from the separator to mix with the product of a previous separation, or by the mixing of warm and cold cream.

Partial churning of cream directs the grader's attention to the butter-fat test of the supply, and if below the standard the supplier's attention is called to it. The use of cans of suitable capacity, so that each delivery will fill a can, or cans, or the use of a tin float is serviceable where cream is conveyed long distances by road. Ropiness is generally associated with the use of insanitary water, which gives rise to the micro-organisms producing this defect. Slimy condition denotes the presence

of undesirable organisms, while in isolated cases it has been traced to the fodder consumed. The body of the cream is noted by the grader. A1 cream has an even body with the consistency of a well-mixed paint, of a bright appearance. An overripe cream is dull in colour, due to the action of putrefactive organisms breaking down the milk solids.

The Grader's Work.

The grader's sense of sight has done its work. His faculties of smell and taste have been called to his aid. The odour of a first grade cream that has taken on a clean acid flavour, but has not attained an overripe condition, appeals to the grader's sense of smell. The grader will have noted undesirable odours such as an unclean, disagreeable odour found in the produce of unhealthy cows. A stable or yard odour is detected in cream produced under insanitary conditions, such as dirty yards and bails, from which droppings have not been removed. Overripe supplies will have attained a strong acid, vinegar, rancid, and stale taste, due to the presence of undesirable organisms associated with insanitary production and handling methods. Feed odours are found in cream produced by cows fed on foods that impart strong flavours to the milk and cream, such as turnip, rape, and green lucerne. Undesirable odours are also imparted by varieties of herbs and weeds which grow in our pastures at periods of the year. Aeration benefits, but does not remove strong feed flavours. Flavour is the all important characteristic that determines the grade and value of the cream and butter. The grader must have a keen sense of taste, developed and trained by practical dairy factory work, so as to enable him to detect and appreciate the clean, full, natural flavour of an A1 cream. He will discern by flavour the following defects: unclean, overacid state, vinegar, rancid, tallowy, musty, woody butter, metallic, also food flavour defects. Cream may also absorb oil flavours from milking machines if proper care is not exercised by the operator. In factory practice the cream is graded into three classes—A1, 1, and 2.

Cream Classification.

An A1 cream must have a clean, full-matured flavour, and odour either sweet or of a pleasant acid flavour, showing no curd particles, and of a smooth, even consistency. No. 1 cream comprises cream in over-ripe condition, but possessing true lacic acid flavour, of a smooth, even consistency, and cream sour or sweet, slightly off or strong in flavour, and of a smooth, even consistency. No. 2 is the classification for all cream that, in the opinion of the grader, does not possess the qualities and character to enable it to qualify for a higher grade. Some hundreds of supplies are handled and graded in a day's work during a normal season. Let us analyse the results obtained by various factories and we find that the percentage of A1 grades varies from 68 per cent. to 98 per cent., a difference of 30 per cent. in amount of A1 cream received by butter factories operating in different areas. Is the full blame for this high percentage of low-grade cream to be placed on the shoulders of the dairy farmers? In my opinion this is not so. Any one district or locality has not a monopoly of up-to-date, painstaking dairy farmers. I have met progressive dairy farmers in all parts of this State where the dairying industry has been established. I ask practical men to call to mind butter factories that have an output of A1 butter of from 90 per cent. to 100 per cent. of its entire output. Note the location of the factory, study its environment, and it will generally be found that such a factory is located in a district devoted chiefly to dairying. Facilities for quick and frequent communications with factory are provided. Deliveries of cream are never less frequent than three or four weekly, and often daily.

Where Time Tells.

The factory with the lower percentage of A1 cream is not so satisfactorily served. Supplies are drawn from long distances by road to rail, and in consequence periods from twelve to twenty hours elapse from the time the cream leaves the farm until it reaches the factory, and the quality is much impaired in consequence. Cream of third class is generally of a very inferior quality. It is difficult for a grader to class it. The more one looks at it the worse it appears; the more one smells it the sicker one gets. If the dairy cows that produced this grade only smelt the product the herd would go on strike or dry up.

Co-operation Between Farm and Factory.

The percentage of third class cream is, happily, gradually diminishing, and we look forward to the day when it will be necessary to have two classes only for cream received by all butter factories. To reach that position managers must have the assistance of the dairy farmers, and they must support the farmers in turn. The farmers are not dairying for any other purpose than to make a profit. The majority are always ready to improve their methods and to take advantage of facilities offering, so as to deliver cream of an A1 quality. We must take a wide view of the

varied conditions associated with the production, handling, and delivery of cream at factories.

The provisions of the Dairy Produce Act safeguard the production and handling of cream, and when complied with the benefits are realised. The matter of delivery from farm to factory calls for assistance from one and all who are interested in the welfare of this great industry. We must ensure more frequent deliveries of cream. Our help must be extended to dairy farmers distantly located from rail, and to those situated along branch railways where the train service does not allow of regular and frequent deliveries. Insulated cream cars suitably iced could be made available during summer months for suppliers using the railway. Organisation of supplies to factories on zone system deserves consideration. To each factory should be allotted such dairying areas that offer facilities to the producers to reach such factory regularly, and with the least possible delay and expense. To keep before the mind of producers, and others handling dairy produce, the necessity of protecting cream from sun rays and heat, I suggest that suppliers' consignment tags, as supplied by the dairy factories, have printed on their face in red, the words "Protect against sun's rays and heat." The words to be printed in large letters, of light or dotted lines, so as not to interfere with the reading of the address. In the cleansing of cream cans I obtained excellent results from spraying or rinsing with chloride of lime solution after the cans leave the steriliser. Cans so treated smell sweet and clean, and are free from the "off odour" that one detects in cans that have been lidded down for some hours.

The full benefits of grading are attained only when the results of the work carried out on the factory grading floor are brought under the notice of the interested suppliers, and I suggest the issue of a grade card setting out defects in cream supplied and offering suggestions with a view to assisting the producer to obtain an A1 standard, to suppliers of cream below A1 quality. The following form might prove generally acceptable:—

SPECIMEN GRADE SHEET.

QUEENSLAND DEPARTMENT OF AGRICULTURE AND STOCK.

Dairy Branch, , 1923.

DEAR SIR,—

This Grade Sheet is forwarded with the desire to point out clearly to you the defects in your cream; and to offer suggestions for remedying such defects, so that the quality of the product may attain an A1 standard, to the mutual benefit of yourself and your factory.

GRADE CARD.

The cream delivered by you to factory on , 192 , was and not in a suitable condition to produce an A1 Butter. The following suggestions may assist you:—

DEFECTS AND PREVENTION.

Over-ripe, Stale, Rancid.—Cool cream as low as possible immediately after separation. Keep cream in cool clean surroundings. Do not mix hot and cold cream together. Stir cream occasionally. Scald utensils. Deliver more regularly to factory.

Cowy.—Keep milking sheds clean. Remove droppings daily from shed. Remove milk to separating room as soon as milked. Store cream in clean surroundings.

Gassy or Fermented.—Wash cow's udder before milking. Keep out of milk hairs and particles of dirt. Strain milk immediately after milking. Do not allow cows to drink or wade in bad water. Do not use rusty utensils. Cool cream and stir.

Tallowy.—Do not expose milk or cream to high temperature or direct rays of the sun.

Unclean.—Keep separator and utensils clean and well scalded. Do not use milk of newly calved cows or unhealthy cows or cows suffering from inflamed udders.

Roapy.—Keep utensils thoroughly cleaned and well scalded. Do not allow dairy cows to drink or wade in bad water.

Food Flavours and Weedy.—Do not feed highly flavoured foods immediately before or at time of milking. When possible remove dairy herds from fields where pastures give rise to strong flavours.

Absorbed Odours and Flavours.—Do not allow milk or cream to come in contact with odour of paint, engine oil, oil gas disinfectants, fruit, vegetables, &c.

Curdy.—Adjust separator to deliver cream of standard test. Do not mix hot and cold creams.

Pasteurisation.

Pasteurisation of cream has brought about a marked improvement in the quality of the butter produced. The process enables the manufacturer to produce a more uniform grade, and improves storing qualities. We must, however, avoid overestimating the influence of pasteurisation in eliminating defects met with in cream. Pasteurisation expels from the cream vapours and gases, and removes volatile substances and flavours absorbed by cream. A cream grader's experience enables him to class his cream for pasteurisation, so that the best results are obtained for the producer, and the factory's reputation is safeguarded. A knowledge of dairy bacteriology is essential. The grader realises that the lactic acid bacteria are found in cream produced under sanitary conditions, and control the changes that take place in cream having a pronounced clean lactic acid flavour. A cream not having this characteristic would be considered over-ripe for the production of A1 grade butter. Unclean, fermented, stale, rancid, slimy, and curdled cream cannot, by the process of pasteurisation, be converted into an A1 butter. Experience makes a grader familiar with the chief defects met with in factory cream supplies, and also with defects due to localised conditions pertaining to soil, climate, food, &c. A sustained co-operative effort will result in an improvement of the quality of the butter produced, a matter as vital to the State as is the increase of our exports. It costs as much to manufacture, provide boxes, &c., for second grade as for first grade butter. The expenses of railage, freezing, storage, and shipping are the same for all grades. It is, therefore, evident that the higher the grade the greater the value on the overseas market, the lower will be the percentages of expenses incurred in placing the commodity on the market. If all had been as good as the best, then the dairy farmers would have received many thousands of pounds more for their product, and the distributors would have something satisfactory to handle. Let the slogan of all connected with the Queensland Dairying Industry be, "All can be made as good as the best," and with the aid of big co-operative and persistent effort may the industry progress and reach that stage when we can say of our butter production, "All is as good as the best." Then the dairy industry will take its proper place as the premier branch of agriculture.

A SUMMARY OF SOME EXPERIMENTS CARRIED OUT BY THE BUREAU OF SUGAR EXPERIMENT STATIONS.—VII.

The Director of Sugar Experiment Stations, Mr. H. T. Easterby, commenced this series in the May (1922) Journal, and in his opening article discussed deep cultivation experiments and tabulated comparative crop result from subsoiled and non-subsoiled fields. The second instalment, an account of results of irrigation experiments and the action of irrigation and manures upon the density and purity of sugar juices, appeared in the June (1922) issue. In the August number Mr. Easterby's notes covered experiments in fertilisation, and were followed in the succeeding issue by an account of distance experiments and resultant crops. In the October (1922) number the summary was continued with notes on the introduction and testing of cane varieties. In the February Journal experiments to determine if cane sets cut from arrowed canes have a prejudicial effect on the germination and subsequent yield were discussed. In his introduction to the Summary of Experiments above mentioned, the Director stated that a summary of the chemical work accomplished by the Bureau, to be prepared by Mr. George R. Patten, formerly Chief Chemist to the Bureau, would also be presented. Mr. Patten has now completed this summary, which entailed a great deal of elaborate work and occupied much time. The results will appear from time to time in the Journal until complete, when the whole summary will then be published in bulletin form.—Ed.

SOIL AND OTHER CHEMICAL ANALYSES—*continued.*

Summarised by GEORGE R. PATTEN, Analyst, Agricultural Laboratory, Brisbane, formerly Chief Chemist, Bureau of Sugar Experiment Stations.

The following summary includes the remainder of Series III.—Bundaberg Soils.

It will be noticed that the full chemical names of soil constituents are given in the first table. In the remaining tables, in order to save space and time, the chemical symbols are used, but the layman can easily make these out on reference to the first table.

The lime content in these soils is much better on the average in these series of soils than they were in Series I.—Cairns Soils.

SERIES No. III—*continued.*

SHARON, KALBAR, OAKWOOD, BONNA.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	80·40	..	..	..
Moisture	1·74	..	..	..
Combustible matter ..	5·87	..	5·97	..
Silica (SiO_2) insoluble ..	..	76·64	62·71	66·72
Silica (SiO_2) soluble	..	12·63	10·33	10·99
Phosphoric acid (P_2O_5) ..	·12	·14	·24	·26
Chlorine (Cl.)	·003	..	·003	·003
Iron oxide (Fe_2O_3)	4·23	1·19	5·26	5·59
Alumina (Al_2O_3)	6·34	5·21	10·71	11·40
Lime (CaO)	·54	·51	·97	1·03
Magnesia (MgO)	·39	·22	·58	·61
Potash (K_2O)	·19	·84	·88	·94
Soda (Na_2O)	·08	2·08	1·78	1·89
	99·90	99·46	99·43	99·43

Acidic elements in the soils .. .. 77·97 per cent.
Basic elements in the soils .. .. .. 21·46 per cent.
Total nitrogen in the soils .. .. .. ·119 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0025	75
Lime (CaO)	·1310	3,930
Potash (K_2O)	·0337	1,011

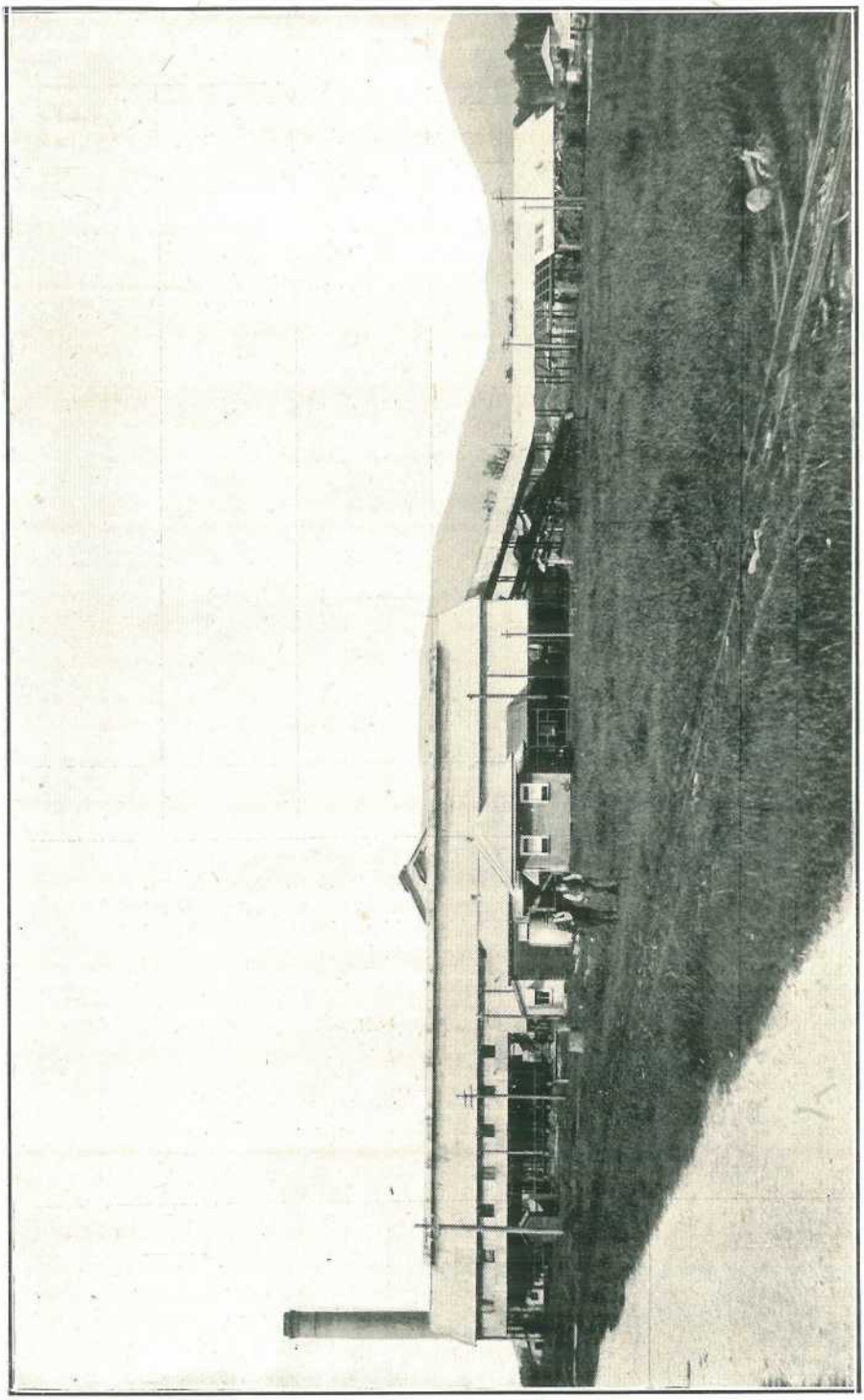


PLATE 1.—BABINDA CENTRAL SUGAR MILL.

FAIRYMEAD.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	71·60	..	..	..
Moisture	3·40	..	..	..
Combustible matter	9·10	..	9·42	..
SiO_2 (insoluble)	..	72·20	53·51	59·08
SiO_2 (soluble)	..	13·66	10·13	11·18
P_2O_5	·48	·14	·59	·65
Cl.	·003	..	·003	·003
Fe_2O_3	4·90	2·27	6·75	7·46
Al_2O_3	8·38	6·98	13·85	15·29
CaO	·51	·74	1·08	1·19
MgO	·74	·33	1·01	1·12
K_2O	·47	1·54	1·62	1·79
Na_2O	·19	2·62	2·13	2·35
	99·77	100·48	100·09	100·11

Acidic elements in the soils .. .. 70·91 per cent.
Basic elements in the soils .. .. .. 29·20 per cent.
Total nitrogen in the soils .. .. .. ·133 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0015	45
Lime (CaO)	·1086	3,258
Potash (K_2O)	·0235	705

WATERVIEW.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	72·49	..	..	..
Moisture	2·96	..	..	..
Combustible matter	8·17	..	8·41	..
SiO_2 (insoluble)	..	72·79	54·35	59·35
SiO_2 (soluble)	..	12·72	9·50	10·37
P_2O_5	·14	·13	·24	·26
Cl.	·004	..	·004	·004
Fe_2O_3	5·54	1·08	6·51	7·11
Al_2O_3	8·08	8·89	14·96	16·33
CaO	1·11	·80	1·74	1·89
MgO	·67	·30	·91	1·00
K_2O	·45	1·31	1·45	1·58
Na_2O	·19	2·32	1·92	2·10
	99·80	100·34	99·99	99·99

Acidic elements in the soils .. .. 69·98 per cent.
Basic elements in the soils .. .. .. 30·01 per cent.
Total nitrogen in the soils .. .. .. ·153 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lbs. Per Acre.
Phosphoric acid (P_2O_5)	·0106	318
Lime (CaO)	·2391	7,173
Potash (K_2O)	·0441	1,323

AVONDALE (INCLUDING MIARA).

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	73·38	..	..	..
Moisture	3·52	..	..	..
Combustible matter	9·95	..	10·31	..
SiO_2 (insoluble)	..	74·31	56·52	63·03
SiO_2 (soluble)	..	10·69	8·13	9·07
P_2O_5	·28	·09	·35	·39
Cl.	·04	..	·04	·04
Fe_2O_3	5·06	1·80	6·61	7·38
Al_2O_3	6·18	9·03	13·28	14·81
CaO	·47	·85	1·23	1·38
MgO	·50	·47	·88	·98
K_2O	·33	·79	·94	1·05
Na_2O	·30	1·53	1·47	1·64
	100·01	99·56	99·76	99·77

Acidic elements in the soils .. .. 72·53 per cent.
Basic elements in the soils .. .. .. 27·24 per cent.
Total nitrogen in the soils .. .. .. ·229 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0021	63
Lime (CaO)	·1395	4,185
Potash (K_2O)	·0327	981

INVICTA.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	75·22	..	..	..
Moisture	2·58	..	..	..
Combustible matter	8·53	..	8·76	..
SiO_2 (insoluble)	..	75·40	58·22	63·81
SiO_2 (soluble)	..	11·82	9·13	10·00
P_2O_5	·22	·11	·31	·34
Cl.	·004	..	·004	·004
Fe_2O_3	5·35	2·41	7·35	8·06
Al_2O_3	6·93	6·58	12·20	13·37
CaO	·36	·78	·97	1·06
MgO	·35	·46	·73	·80
K_2O	·23	·58	·69	·76
Na_2O	·13	2·00	1·68	1·84
	99·90	100·14	100·04	100·04

Acidic elements in the soils .. .. 74·15 per cent.
Basic elements in the soils .. .. .. 25·89 per cent.
Total nitrogen in the soils .. .. .. ·206 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0031	93
Lime (CaO)	·1028	3,084
Potash (K_2O)	·0321	963

GOOBURRUM.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	86·93	..	..	..
Moisture	·79	..	..	..
Combustible matter	4·46	..	4·49	..
SiO_2 (insoluble)	..	89·20	78·16	81·84
SiO_2 (soluble)	..	5·89	5·16	5·40
P_2O_5	·13	·07	·19	·20
Cl.	·002	..	·002	·002
Fe_2O_3	2·58	·49	3·03	3·17
Al_2O_3	4·21	2·72	6·63	6·94
CaO	·17	·41	·53	·55
MgO	·15	·34	·44	·46
K_2O	·12	·34	·42	·44
Na_2O	·06	·73	·69	·72
	99·60	100·19	99·74	99·72

Acidic elements in the soils .. .. .. 87·44 per cent.
Basic elements in the soils .. .. .. 12·28 per cent.
Total nitrogen in the soils .. .. .. ·129 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0006	18
Lime (CaO)	·0680	2,040
Potash (K_2O)	·0292	876

PIALBA.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	76·77	..	..	..
Moisture	3·49	..	..	..
Combustible matter	8·02	..	8·26	..
SiO_2 (insoluble)	..	82·50	65·67	71·55
SiO_2 (soluble)	..	9·20	7·30	7·96
P_2O_5	·15	·09	·23	·25
Cl.	·004	..	·004	·004
Fe_2O_3	3·94	1·55	5·33	5·78
Al_2O_3	6·99	4·10	10·51	11·47
CaO	·20	·37	·40	·55
MgO	·25	·54	·69	·75
K_2O	·14	·26	·35	·38
Na_2O	·12	1·63	1·40	1·52
	100·07	100·24	100·14	100·21

Acidic elements in the soils .. .. 79·76 per cent.
Basic elements in the soils .. .. .. 20·45 per cent.
Total nitrogen in the soils .. .. .. ·193 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0008	24
Lime (CaO)	·0506	1,518
Potash (K_2O)	·0187	561

NERANG.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	69·90	..	..	..
Moisture	4·36	..	..	..
Combustible matter	8·89	..	9·29	..
SiO_2 (insoluble)	..	72·62	53·07	58·53
SiO_2 (soluble)	..	8·47	6·19	6·83
P_2O_5	·29	·16	·47	·46
Cl.	·003	..	·003	·003
Fe_2O_3	5·13	3·17	7·68	8·47
Al_2O_3	9·43	10·56	17·58	19·39
CaO	·65	·75	1·23	1·35
MgO	·83	·42	1·18	1·30
K_2O	·31	1·32	1·38	1·57
Na_2O	·20	2·20	1·76	1·95
	99·99	99·67	99·83	99·75

Acidic elements in the soils .. .. 65·82 per cent.
Basic elements in the soils .. .. .. 33·93 per cent.
Total nitrogen in the soils .. .. .. ·199 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

—	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0016	40
Lime (CaO)	·1356	3,390
Potash (K_2O)	·0404	1,010

MOUNT BAUPLE (RED SOILS).

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	73·06	..	..	..
Moisture	2·45	..	..	..
Combustible matter	8·09	..	8·24	..
SiO_2 (insoluble)	..	83·54	62·57	68·22
SiO_2 (soluble)	..	8·91	6·67	7·32
P_2O_5	·17	·16	·35	·39
Cl.	·003	..	·003	·003
Fe_2O_3	4·92	·85	5·68	6·20
Al_2O_3	10·47	4·68	14·21	15·49
CaO	·32	·24	·45	·49
MgO	·26	·12	·35	·39
K_2O	·10	·29	·32	·35
Na_2O	·09	·95	·81	·88
	99·93	99·74	99·65	99·73

Acidic elements in the soils .. .. 75·93 per cent.
Basic elements in the soils .. .. .. 23·80 per cent.
Total nitrogen in the soils .. .. .. ·140 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

—	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0006	18
Lime (CaO)	·0946	2.838
Potash (K_2O)	·0233	699

MOUNT BAUPLE (GREY SOILS).

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	81·33	..	..	..
Moisture	2·28	..	..	..
Combustible matter	6·51	..	6·66	..
SiO_2 (insoluble)	..	86·27	71·81	76·92
SiO_2 (soluble)	..	6·91	5·75	6·15
P_2O_5	·18	·13	·30	·32
Cl.	·004	..	·004	·004
Fe_2O_3	2·86	·71	3·53	3·78
Al_2O_3	6·01	4·18	9·63	10·32
CaO	·26	·27	·49	·53
MgO	·24	·24	·45	·48
K_2O	·18	·41	·53	·57
Na_2O	·12	1·21	1·13	1·21
	99·97	100·33	100·28	100·28

Acidic elements in the soils .. .. 83·39 per cent.
Basic elements in the soils .. .. .. 16·89 per cent.
Total nitrogen in the soils .. .. .. ·170 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

—	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0006	15
Lime (CaO)	·0602	1,505
Potash (K_2O)	·0226	565

BEENLEIGH.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	73·08	..	..	..
Moisture	4·27	..	..	..
Combustible matter	8·05	..	8·42	..
SiO_2 (insoluble)	..	71·84	54·85	59·93
SiO_2 (soluble)	..	8·82	6·69	7·30
P_2O_5	·29	·18	·44	·49
Cl.	·004	..	·004	·004
Fe_2O_3	4·35	5·25	8·55	9·33
Al_2O_3	7·79	9·49	15·38	16·79
CaO	·84	1·10	1·74	1·89
MgO	·91	·15	1·07	1·16
K_2O	·26	·78	·87	·95
Na_2O	·20	2·16	1·86	2·03
	100·04	99·77	99·87	99·87

Acidic elements in the soils .. .. .. 67·72 per cent.
Basic elements in the soils .. .. .. 32·15 per cent.
Total nitrogen in the soils .. .. .. ·169 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre
Phosphoric acid (P_2O_5)	·0019	47
Lime (CaO)	·1179	2,947
Potash (K_2O)	·0280	700

MORETON.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	67·65	..	..	..
Moisture	3·92	..	..	..
Combustible matter	10·62	..	11·08	..
SiO_2 (insoluble)	..	75·51	53·44	59·91
SiO_2 (soluble)	..	8·10	5·61	6·33
P_2O_5	·12	·19	·28	·31
Cl.	·005	..	·005	·005
Fe_2O_3	4·37	5·84	8·45	9·57
Al_2O_3	11·78	7·86	17·74	20·02
CaO	·44	·52	·81	·92
MgO	·88	·10	·99	1·12
K_2O	·19	·46	·52	·58
Na_2O	·13	1·56	1·21	1·15
	100·10	100·14	100·13	99·96

Acidic elements in the soils .. .. 66·55 per cent.
Basic elements in the soils .. .. .. 33·41 per cent.
Total nitrogen in the soils .. .. .. ·197 per cent.

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0012	30
Lime (CaO)	·0846	2,116
Potash (K_2O)	·0099	248

GOODWOOD.

Constituent Element.	Agricultural Analysis.	Insoluble Residue.	Absolute Analysis.	
		Insoluble in Hydrochloric Acid.	Water-free Soil.	Mineral Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Insoluble matter	59·89	..	..	..
Moisture	2·25	..	..	..
Combustible matter	11·51	..	11·76	..
SiO_2 (insoluble)	..	57·47	35·21	39·87
SiO_2 (soluble)	..	27·91	17·06	19·31
P_2O_5	·19	·16	·29	·33
Cl.	·005	..	·005	·005
Fe_2O_3	5·55	6·44	9·65	10·92
Al_2O_3	19·69	6·75	24·23	27·45
CaO	·44	·28	·61	·69
MgO	·35	·08	·41	·47
K_2O	·13	·30	·32	·36
Na_2O	·11	·93	·69	·78
	100·11	100·32	100·23	100·18

Acidic elements in the soils .. .. 59·51 per cent.
Basic elements in the soils .. .. .. 40·67 per cent.
Total nitrogen in the soils .. .. .. ·168 per cent

AVAILABLE PLANT FOOD SOLUBLE IN ONE PER CENT. ASPARTIC ACID.

——	Per Cent.	Lb. Per Acre.
Phosphoric acid (P_2O_5)	·0012	42
Lime (CaO)	·1185	4,147
Potash (K_2O)	·0098	343

SOUR GRASS OR YELLOW GRASS.

A grass that is causing a good deal of worry to many farmers on the Millaa Millaa and Ravenshoe country is the Sour Grass or Yellow Grass (*Paspalum conjugatum*). Several inquiries as to the best means of eradicating this grass have been sent to the Department of Agriculture and Stock, and the Government Botanist (Mr. C. T. White) has made the following report on the matter:—

"The grass is one widely spread over the tropics, and though animals will feed on it they do not take to it when other and better grasses are available. In Hawaii it is known as Hilo Grass, and the problem of its eradication there is quite a big one, principally because its spread affects reafforestation work, as it spreads over the ground as a complete mat, growing up to 2 ft. high, preventing seeds germinating and choking seedling trees out. The Forestry Department of the territory is trying sowing *Leucaena glauca* seeds over burnt areas as a cover crop, hoping it will cast a shade and kill the grass out by cutting out the sunlight. *Leucaena glauca* is a small tree widely spread over the Pacific Islands and not uncommon in North Queensland. As this method means that the land has got to be locked away from stock for some time, however, it is one quite unsuited for agricultural areas.

"Experiments should be made with a view to its eradication. The only method I can think of is to try and smother the grass with another rank-growing species that is at the same time a good dairy grass, and for this purpose I would suggest Kikuyu Grass, *Panicum muticum*, and, perhaps, Elephant Grass.

"Kikuyu Grass has been found of great value in the eradication of bracken from pastures in New South Wales, and there is a possibility of it proving of value in combating Sour Grass on the Atherton Tableland.

"Where possible the ground should be ploughed and worked, and later drills opened about 3 ft. apart and Kikuyu Grass roots dropped in about every 3 ft. Where the ground is too rough for this the roots should be hoed in about 3 ft. apart each way. The same remarks apply to *Panicum muticum*—this work might be done anytime from September to March, but preferably I should say during the first summer rains.

"Elephant Grass might be tried along with Kikuyu, planting the latter between the rows of Elephant Grass. While these grasses are getting a good hold stock should be kept from them, and for this purpose it will probably be found necessary to subdivide properties more than at present is usually done.

"In addition to the above method smothering the grass with a growth of the Florida Velvet Bean (*Stizolobium deeringianum*), or other rampant recognised leguminous fodder, might also be tried."

QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS, Assistant Botanist.

No. 22.

The Bolly Gum (*Litsea reticulata*) is one of the largest of scrub trees. Its timber has been used for many years for staves, lining, and cabinet work. The barrel is often flanged at the base in the heavier scrubs of the North Coast line, but in the scrubs of the Macpherson Range the flanges are often suppressed. In appearance the timber is somewhat like Queensland maple, but is lighter in colour and plainer in figure. The trees attain a height of 150 feet and a barrel diameter of 5 feet. The bark is brown and fairly scaly, showing roundish depressions from which small rounded flakes of bark have been shed. The trees abound in the coastal scrubs of New South Wales and Southern Queensland, and extend from the Hawkesbury River, New South Wales, to Cairns, North Queensland.

Photo. by the Authors.]

PLATE 2.—THE BOLLY GUM (*Litsea reticulata*).

A specimen in the rain forest of Roberts Plateau, National Park.

Photo. by Dept. of Agriculture and Stock.]

PLATE 3.—THE BOLLY GUM (*Litsea reticulata*).

(A) Flowering Twig. (B) Fruiting Twig.

WEEDS OF QUEENSLAND.

BY C. T. WHITE, Government Botanist of Queensland.

No. 33.

TREE GROUNDSEL (*BACCHARIS HALIMIFOLIA*).

Description.—A tall shrub, dioecious (*i.e.*, the sexes on different plants), glabrous or the young shoots somewhat viscid—scurfy. Leaves 1-2 inches long, obovate, prominently toothed with a few large teeth in the upper portion, the lower portion gradually narrowing into a petiole or leaf-stalk. Flower heads on the male plant, sub-globose, small, solitary or a few clustered together. Flower heads on the female plant solitary in the axils of the upper leaves and clustered at the ends of the branches, forming large terminal loosely-branched panicles. Achenes (seeds) ribbed, straw-coloured, scarcely one line long, capped with a white pappus about ½ inch long.

Distribution.—A native of Tropical North America; a naturalised weed in Queensland. Has increased a good deal of late years and capable of becoming a considerable pest if not checked.

Botanical Name.—*Baccharis*, a name given by the Greeks to some aromatic plant dedicated to Bacchus; *halimifolia*, Latin relating to the plant having leaves like a *Halimus*, plants now placed under the genus *Atriplex*.

Supposed Poisonous Properties.—*Baccharis* is a large genus of plants principally South American, and one species there *B. cordifolia*, the Romerillo or Mio Mio of the Argentine, is well known as a stock poison. An exhaustive account of this plant and its effect on stock will be found in the following paper by Dr. R. Bidart, "Toxicidad del Romerillo, Contribucion a su Estudio" contained in "Memoria de la Direccion General de Ganaderia 1910, 11, pp. 122-127, Buenos Ayres."*

As *B. halmifolia has* quite commonly been suspected of poisoning stock in Southern Queensland, particularly about Caboolture, Bald Hills, and other localities on the North Coast Line, feeding experiments were made with the plant at the Stock Experiment Station, Yeerongpilly, and a report published in the Annual Report of the Chief Inspector of Stock, 1919-1920 (Annual Report Department of Agriculture and Stock, Brisbane, p. 677). Two heifers were fed continuously for a period of a fortnight, on a ration of mixed leaves and chaff in almost equal proportions. Three guinea-pigs were fed for almost twelve days on the leaves and ate them with avidity. One died and post mortem examination proved that the internal viscera were normal and full of partially-digested food. This animal was greatly emaciated, and although apparently the food was bulky, it lacked the necessary nutrient material to support life, and death had resulted from malnutrition. The two remaining animals looked healthy, but greatly emaciated and anaemic. These were started again on their normal ration and did well. Constipation was a marked feature in the stock fed on Baccharis. From this it would appear that the plant is not definitely poisonous to stock, but is quite valueless as a fodder.

Eradication.—The plant forms a large bush or shrub, and hoeing the young plants and grubbing out the larger clumps is likely to be the only satisfactory way of dealing with it. It is a robust grower and I rather doubt the efficiency of poisonous sprays.

Botanical Reference.—*Baccharis halimifolia* Linnaeus Species Plantarum 860.

* I am indebted to Mr. H. Tryon for this reference.

PLATE 4.—TREE GROUNDSEL (*Baccharis halimifolia*).

SCIENCE AND THE FARMER.

A SURVEY OF QUEENSLAND AGRICULTURE.

RURAL PROBLEMS—SUGGESTED EDUCATIONAL SCHEME—THE IMMIGRATION QUESTION—THE QUEENSLAND UNIVERSITY AND THE STATE'S GREAT BASIC INDUSTRY.

In the course of a recent public lecture, under the ægis of the Queensland University, Professor Goddard expressed some views of intense interest to all connected with the future of agriculture in this State, and the main points of his address, relating more particularly to the problems facing the farming industry, are set out hereunder.—Ed.

Professor E. J. Goddard, B.A., D.Sc., in the course of a recent public lecture in Brisbane on "Biological Activities in Relation to the State, surveyed many of Queensland's rural problems and made some noteworthy remarks on this State's agricultural future. The Senate and Staff of the Queensland University were fully represented and the chair was occupied by the Premier (Hon. E. G. Theodore).

After dealing with more abstruse scientific matters, Professor Goddard declared that one day this State would have to tackle the question of attracting people to its land from other lands for national and economic reasons, but the time was not opportune until some more constructive scheme than that of overcrowding the cities was available. Undoubtedly the greatest economic question confronting the Commonwealth was that concerned with agriculture.

Agriculture as a National Concern.

In Australia, and particularly in Queensland, agriculture, as a national problem, appeared to him to call for consideration of the following:—

(1) Agricultural settlement;
(2) Agricultural survey, with a view to maximum production;
(3) Control of distribution of agricultural products;
(4) Agricultural education;
(5) Agricultural research;
(6) General scientific research;
(7) Meteorological research;
(8) Hydrographical and topographical survey with a view to immigration.

All these problems were intricately bound together, necessitating the exercise of much constructive and educated thought. When one viewed the small population of Australia, and the enormous proportion which was concentrated in the cities, there was occasioned much wonderment. He thought that the real reason for the marked disproportion of the people in our cities to those on the land lay in the fact that thousands of young Australians in the cities were desirous of going on the land, but owing to force of circumstances were unable to secure a sound agricultural education, or who, if such were available, could not secure the necessary land. Again, there had never been any serious attempt to attract people from the city to the land.

The Education of the Future Farmer.

The following Press report of the lecture covers the general scheme advanced by Professor Goddard for the education of the future agriculturist. After dealing fully with the migration, to the great problem of agriculture, he said:—"On the economic side, biology is most intimately linked up with agriculture. Undoubtedly, the greatest economic question confronting the Commonwealth of Australia is that concerned with agriculture. This is equally the case in all countries in the Southern Hemisphere, and I have enjoyed the opportunities offered by a life spent in two of these countries of studying this problem from the academic and, I hope, practical standpoint. There is no problem of deeper concern for statesmen, universities, and all true patriots. In Australia the agricultural question touches the very vitals of the country in many insidious ways, and the correct handling of the problem demands, above all things, clear-headedness, perspective, courage, and honesty of thought, and the overthrowing of many old ideas conserved by self interest in antagonism.

The Scientist and the Economics and National Life of the State.

"Many agricultural schemes have been tried in various parts of the world, but few, if any, have ever given full satisfaction, simply because they stop just where they might impinge on the field of vested interests, a policy which in these days there is a gradually increasing national desire to break down. As a biologist, my interests in agriculture will be patent on the grounds that many aspects of biological science look towards agriculture, but any interest which I may form in that respect will be strengthened by the fact that I have the privilege of occupying a university chair in a country demanding agricultural development, and, more important still, the settlement of a large white population on the land. Consequently, in treating the subject of agriculture, I propose to view the subject from the academic standpoint, that is to say, as a biologist who recognises that he must orientate himself towards the question by viewing it from, and not dispensing with, the purely biological aspect.

"It may be that some may think that the field I propose to traverse lies beyond the province of my concerns, and exceeds the limits of my theme, but may I point out that this idea of water-tight compartments of knowledge and thought has been the devastating agent responsible for destroying the vitals of much work of the greatest national value. It is here that theory and practice have been severed and forced apart, and to a very large extent the functions of our universities have been prostituted. At the present day it is the bounden duty of the university professor, and particularly one engaged in work which is directly or indirectly linked with matters concerning the economic and national life of the State, to take the comprehensive and practical point of view.

Agricultural Education.

"The more one views the question the more patent does it become that agricultural education must begin at the bottom and not at the top. Any sound scheme of such education must have in view, not the mere training of experts so badly and urgently required, but also as its major purpose the idea of attracting and training young agriculturists, so as to get the maximum efficiency from the maximum number. I fully recognise that the Agricultural College, as we know it in Australia, has done much good work of an experimental and educational nature, but I cannot concede that it has been successful in increasing the popoulation on the land nor has it increased production to the extent that modern national needs demand, in the absence of a complete scheme of education. The same criticism may be levelled more vigorously against the replacement of a national scheme of agricultural education by a University Faculty of Agriculture. There is room for both these types of institutions in a general scheme.

An Agricultural Survey.

"It seems to me that it is essential that Queensland should institute at once an agricultural survey. Such survey would have as its object an investigation of the various districts under the control of the District Councils and their subsidiary Local Producers' Association, for the purpose of deciding, even in a preliminary manner, the best types of agriculture to be encouraged in each district. This investigation would include research into the chemical character of the soils, rainfall, and general climatic conditions, and the determination of a list of products arranged in order of importance and keeping in view the scheme of rotation. In each district should be instituted Rural Schools—a scheme which I note is being extended by the Queensland Government—where, after education in a State School, continuation classes could be continued giving instruction in certain liberal lines as well as in agricultural topics and economics, and also in domestic science.

Land for Agricultural Students.

"Such schools will serve not merely to enlighten children whose birth dooms them to the land, but will help to attract many from the towns, and will hasten the raising of the status of the ordinary farmer to that dignity of which until comparatively recent times he has been dispossessed. Such pupils should have the opportunity of serving an apprenticeship, and of concentrating on a knowledge of those particular products for which the area is specially suited. It is here that a land settlement scheme should be evolved. Land should be made available on the easiest terms for such students, who should thus be encouraged to become independent farmers, if not immediately after graduation, at least at some definite period succeeding graduation. In the interim they might well complete their period of apprenticeship as farm labourers within that district, the labour supply of which could thus be controlled by the District Council in its contact with the Rural Schools of their districts.

"For purposes of more advanced agricultural education there should be instituted agricultural schools, where teachers for the Rural Schools could be trained, and where

those who are ambitious to proceed further than the curriculum of the Rural Schools might be attracted from the Rural Schools or from the schools of higher status in the towns. The number of colleges should be based on the ability to cope with practical teaching in all the outstanding products of the districts falling within the scope of such colleges.

"There should be a system of scholarships, and again there should be a land settlement scheme which will enable any student who completes the course to acquire land on a reasonable basis. There can be little doubt that such institutions will in a very effective way serve as a lure to attract many of our city youth to the farming profession. Proficiency in the practice of farming and consequent eligibility for land grants might be made dependent on some term of employment in the district in which the education has been completed.

"Such institutions, in conjunction with the Rural Schools, will assure that co-operative spirit and mutual interest in the district which is essential to the welfare of agricultural effort. This co-operative spirit is to-day manifesting itself in South Africa, where, I think, the agriculturist has been victimised and isolated by the speculator and non-agriculturist to a probably greater extent than in any part of the world. Agricultural commerce should be controlled by agriculturists, and for the purpose of producing greater efficiency in this respect there should be available courses of instruction in commerce.

Agriculture and the University.

"Agricultural education could be carried a stage further at the university, where courses in special agricultural subjects could be followed in conjunction with those pure science subjects with which they are cognate or with which it is desirable that any prospective agricultural research student should be familiar. In this way there could be equipped an army of investigators who should have an excellent agricultural equipment and could serve the agricultural colleges as well as fill posts as Government experts. There should be available for such students overseas scholarships which would enable them to spend at least one, but preferably two, years abroad.

"In this way the university could discharge its national duty in respect to agriculture and do an enormous amount towards relieving the present sad state of affairs in respect of the paucity of Australian-trained agricultural specialists. In this way there would be a linking of a series of educational institutions seriously and intimately bound up with the agriculturists of the State, and working in co-operative and scientific spirit for the welfare and progress of the agricultural industry. It is in this way that the university can exercise its influence as a national centre for the training of men destined to guide the future of the agricultural industry, and can help to break down the present tendency to regard the university man as one concerned merely with the theoretical in life."

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS FOR JUNE, 1923.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Prim	Friesian ...	4 April, 1923	1,140	3·3	43·80	
Miss Security ...	Ayrshire ..	8 June, ,,	667	5·3	41·40	
College Cold Iron	Jersey ..	23 April, ,,	570	5·4	34·30	
Snowflake	Shorthorn	17 April, ,,	600	3·7	25·80	
College Prima Donna	Friesian ...	19 Mar., ,,	630	3·3	25·50	
Charming Damsel	Ayrshire ...	27 April, ,,	540	4·0	25·20	
Rosefall of Marinya	,, ...	29 Mar., ,,	570	3·7	24 60	
Lady Loch II. ...	,, ...	20 April, ,,	540	3·7	23·40	
College Evening Glow	Jersey ...	5 April, ,,	450	4·4	23·10	
Lute	Ayrshire ...	26 April, ,,	480	4.0	22·20	
College Mignon ..	Jersey ...	22 Nov., 1922	360	5·0	21·00	
Little Buttercup ...	Friesian ...	3 Mar., 1923	540	3·3	20 70	
College Nita ..	,, ...	5 April ,,	510	3·5	20·70	
Lady Mitchell ...	,, ...	1 May, ,,	510	3·5	20 70	
Yarraview Village Belle	Guernsey ...	19 Feb., ,,	330	5·3	20·40	
College Ma Petite	Jersey ...	12 June, ,,	361	4·8	20·33	

PLATE 5.—SUGAR CANE AND PINEAPPLES ON "BROOKLANDS," MR. J. DENNETT'S PROPERTY AT CHOWEY, BURNETT DISTRICT.

PLATE 6.—COFFEE FROM TREE TO TIN IN ALL STAGES.
MR. BOARD'S EXHIBIT AT THE BUDERIM SHOW.

PLATE 7.—QUEENSLAND FRUIT, AN EAST BUDERIM DISPLAY.

General Notes.

The British Empire Exhibition.

The last day for receiving applications for space in the agricultural section of the Queensland display in the forthcoming Empire Exhibition at London is 31st July. The Department would be glad to be informed of any non-perishable produce which, in the opinion of growers, has sufficient exhibition merit. The products covered by the agricultural schedule include those from orchard and garden (non-refrigerated), vineyard and field (cereals and products, fodders and plants, cotton and other fibres, sugar).

Prickly-pear as Fodder—New Machines Tested.

Two new machines for treating prickly-pear as a stock food have been brought under the notice of Departmental officers recently. Mr. A. E. Gibson (Instructor in Agriculture) inspected one of the machines in operation, the patent of Mr. Page, of Warra, and observed that it was capable of treating 3 or 4 tons of pear daily, shredding it and improving its palatability for stock. The construction of the machine is very simple. A second machine, manufactured at Ipswich for W. Sinclair, of Westbrook, was observed to be different, its action being more slicing than shredding in character. Both machines proved effective for the purpose for which they were designed.

Tick Investigation.

The Director of the Institute of Science and Industry (Sir George Knibbs), accompanied by Mr. R. Short, of the Stock Department, recently visited the Stock Diseases Experimental Station at Yeerongpilly, and were received by the Government Bacteriologist (Mr. C. J. Pound). After explaining and demonstrating the course of the investigations, Mr. Pound indicated the results which had now been obtained and showed the Director the material under review. The result of this work will be the subject of a bulletin now being prepared by the committee specially appointed to deal with cattle-tick control. This bulletin will be published by the Institute of Science and Industry. The Director, deeply interested in what he saw, in answer to a question as to the significance of the results, stated that he regarded them as of very great economic value. It had been demonstrated in America that experimental work on the cattle-tick pest was exceedingly valuable, and by appropriate action would be made really effective. "Indeed," said the Director, "if the views of the special committee be given effect, there is very little doubt that the tick pest will be as effectively dealt with here as it has been in the United States of America."

Motor Fuel from Molasses.

A plant is to be established in Cuba capable of producing 900,000 gallons of motor fuel alcohol annually.

The decision to convert the molasses production of the plant into alcohol for internal combustion engines, says "Facts About Sugar," is in line with expectations in the sugar trade that other than the previously existing means will gradually be found for the disposal of blackstrap, the price of which last year went as low as 2 cents a gallon, delivered in New York, at which level the producer lost money by selling.

As far as can be learned the product of the still will be virtually ready for consumption in engines as it leaves the apparatus. The fermentation of the molasses will produce a mash varying in alcoholic content from 5 to 10 per cent., and this will be fed continuously to the still. Provision, it is understood, has been made for carrying off the water and eliminating the fusel oil, while part of the alcoholic vapours will be treated with heated sulphuric acid, so as to produce ether. The ether gases and the remainder of the alcohol gases will be condensed together so as to give as the product of the still a mixture of ether and alcohol suitable for consumption in internal combustion engines.

With the exception of some aniline colouring matter used to prevent the alcohol from being sold for human consumption, and the addition of a small quantity of chemical to prevent rusting in the engines, the fuel will be complete as it leaves the still.

The plant is expected to consume in the neighbourhood of 5,000,000 gallons of molasses annually.—"South African Sugar Journal."

Departmental Appointments.

Cane Testers—Season 1923.

A. L. Levy	L. H. Fuller	R. B. May
D. Marles	I. McGill	J. S. Pollard
F. W. Trulson	J. Howard	J. C. D. Casey
C. Rowe	H. Lambert	H. Jorgensen
K. Dunton	A. A. McCullagh	F. Jorss
K. Fauth	L. C. Home	S. C. Bracey
H. G. W. Barton	I. V. Palmer	R. J. Rollston

at Bingera, Fairymead, Farleigh, Kalamia, Maryborough, Millaquin, Moreton, Mourilyan, North Eton, Pioneer, Plane Creek, Pleystowe, Qunaba Racecourse, Gin Gin, Inkerman, Proserpine, Doolbi, Cattle Creek, Mount Bauple, and Marian mills respectively as from the 1st July, 1923, until the 31st December, 1923.

Assistant Cane Testers.

E. Christsen	P. H. Compton	L. Chadwick
J. E. O'Reilly	T. D. Cullen	J. McFie
A. G. Kelly	P. J. Phelan	

at Millaquin, Farleigh, Plane Creek, Babinda, Pleystowe, Inkerman, Marian, and Proserpine mills respectively, as from the 25th July, 12th July, 25th July, 29th June, 26th July, 13th July, and 17th August, 1923, respectively.

C. J. Boast and M. T. Smith have been appointed as Cane Testers as from the 22nd May and the 22nd June, 1923, respectively, at South Johnstone and Babinda mills respectively.

The Officer in Charge of Police, at Collinsville, has been appointed an Acting Inspector of Stock under "*The Diseases in Stock Act of* 1915."

Police Constable J. Lane, of Tolga, has been appointed an Inspector under the Slaughtering Act.

N.U.P.B.A. Activities—A Lecture on Wyandottes—Points of a Favoured Breed.

Dr. A. J. McDonald delivered an informative address on the Wyandotte at the last monthly assembly of members of the National Utility Poultry Breeders' Association. Mr. M. H. Campbell, senr., vice-president, was in the chair. The lecturer, who has bred Wyandottes for a considerable number of years, being a persistent winner in the show pen, recently crowned his long list of successes by capturing first and champion with a White Wyandotte in Sydney Royal Show. The cockerel was on exhibition during the evening for demonstrative purposes. In his opening remarks the lecturer stated that it was not his desire to give a formal lecture, but to furnish material for a discussion or debate. The Wyandotte, he said, in general conformation was a bird of curves, being neither so low set or short backed as an Orpington, nor so high on the legs or long-backed as the Plymouth Rock or Rhode Island Red. The ideal Wyandotte type was the happy medium between the two, being broad, deep, nuggety, and thick set. The depth from the back to the keel should be about equal to the length from the front of the breast to the pelvic bones. The rose comb should be very neatly set on the head like a little cap and should be free from coarseness. The head should be broad, short, and well rounded, the eye (this is most important) being a red bay colour neither grey nor green. Neck short and thick, and back sloping gradually up to the tail, which should also be short and broad. The body should be well set up on the legs so that the shank can be plainly seen. The bird should be well balanced. The lecturer was very anxious that his audience should fully grasp what he meant by type, and passed around numerous photographs to illustrate his meanings. Mr. Frank Stansfield exhibited a Barred Rock cockerel for comparison in type, and Mr. Kidd of the Social Sub-committee of the Association, took the opportunity of obtaining a promise from Mr. Stanfield to lecture on Plymouth Rocks in the near future. As the N.U.P.B.A. is primarily a utility club, the utility qualities of the Wyandotte were productive of considerable discussion. It appears that the White Wyandotte has never been thoroughly exploited in Australia for utility purposes. They have, it was claimed, proved wonderful winter layers, but were not nearly so good in the hot weather, as they have not yet become thoroughly acclimatised. Figures were quoted from competition results by Messrs. Kidd and A. E. Walters, which bore out the foregoing facts; although in America they have reached a very high state of perfection from a utility standpoint, having reached over the 300-egg mark. The results of the recent egg-pool ballot have proved conclusively what a high position the N.U.P.B.A. holds, and what a large influencing factor the Association is in the minds of the utility section of Queensland poultry men. No fewer than four of the five successful candidates for the Egg Pool Board are N.U.P.B.A. members, and the Association has implicit confidence in the ultimate success of the Pool. As a result of energetic efforts the price of mill offals has recently been reduced by 30s. per ton.

Extension of Cotton Proclamation.

Proclamations have been issued under the Sugar Acquisition Act further extending, until the 31st July, 1923, the existing Proclamations by which all cotton grown in Queensland is acquired by the Government under that Act.

Canada Interested in Queensland Agricultural Organisation.

The Minister for Agriculture (Hon. W. N. Gillies) has received a letter from the Commissioner of the Department of Agriculture, Ottawa, Canada, asking especially for a copy of the Bulletin "Scheme for the Organisation of the Agricultural Industry of Queensland." The Commissioner mentioned that he had seen this pamphlet in Ottawa, and it had so stimulated his interest that he was thus writing for a copy for his own use. The incident is noteworthy, as it indicates the interest that is being taken in other parts of the world in the agricultural policy of the Queensland Government.

The Cactus Curse—A Quest for Natural Enemies.

The Commonwealth Prickly-pear Board, which consists of Sir George Knibbs (chairman), representing the Institute of Science and Industry; Mr. G. Valder, representing New South Wales; and Mr. A. G. Melville, representing Queensland, held meetings in Brisbane recently. They inspected the laboratories of the board at Sherwood to see the present state of development of the experiments, and to inspect the growth of the various insects now acclimatised and being bred to attack the pear. During the meeting the board had under review the whole of the past work, and all suggestions made for attacking pear, and material for that purpose. Special attention was given to the means of insuring against the liberation of any of these which might themselves prove a danger to plants of economic importance, and generally. It is pointed out that up to the present time no sanction has been given by the board to the liberation of any material under its control or handled in its laboratories. The conditions under which the liberation of the enemies of the pear is likely to be effective were also considered. Mr. W. B. Alexander, who is in charge of the whole of the work during the absence of Mr. J. C. Hamlin in the United States, accompanied the board on its inspection.

Sheep as Weed Exterminators.

Mr. Hugh McMartin advises that his sheep are proving very efficient weeders in his cotton patch at Indooropilly. They have gone through the whole of the field and have left the rows perfectly clean, thus obviating the necessity of chipping. The cotton shrub as a fodder evidently has no appeal for sheep, and though the weeds, especially pig-weed, were cleaned up thoroughly the cotton plants were left severely alone.

Answer to Correspondent.

Peanut Cultivation.

T.S. (Purga)—

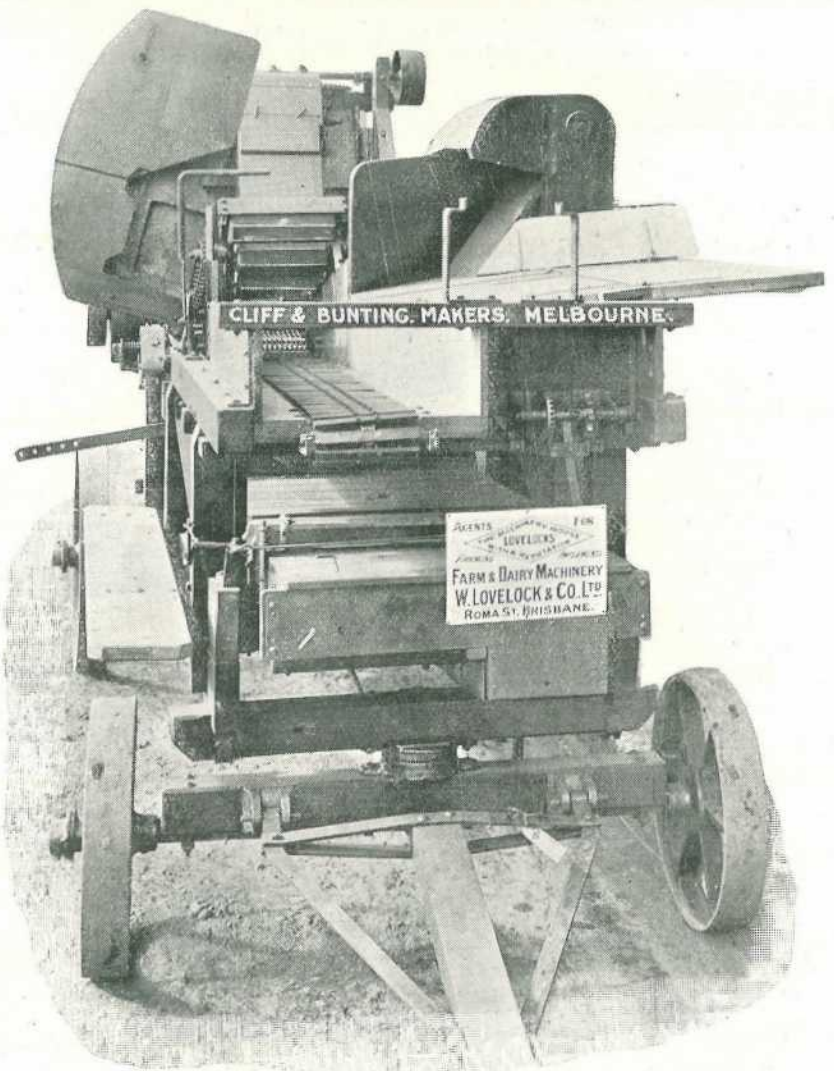
The time for peanut planting varies according to climate. In the cooler districts, sowings may be made when all danger of frosts is over and the soil may be expected to be reasonably warm, September, October, November, and December being suitable months. In the tropics the crop can be grown practically throughout the year, but consideration must be given to climate and rainfall—*i.e.*, sufficient rainfall to give the crop a start, and reasonable expectation of fine weather for harvesting; other information on peanuts is contained in a "Journal" extract sent direct.

A NANANGO BIRD SANCTUARY.

The Broadwater Camping and Water Reserve, in the neighbourhood of Nanango, has been made a sanctuary under "*The Animals and Birds Act of* 1921," and Messrs. J. A. Lee, C. S. Stewart, J. T. Mulcahy, and A. Smith have been appointed officers under the Act.

GIANT CHAFF CUTTER.

A Giant Chaff Cutter made in Australia, with Australian materials and by highly-skilled Australian workmen, for service on the Downs, from the floor of W. Lovelock and Co., Ltd., Roma street. Back view, showing web feed.



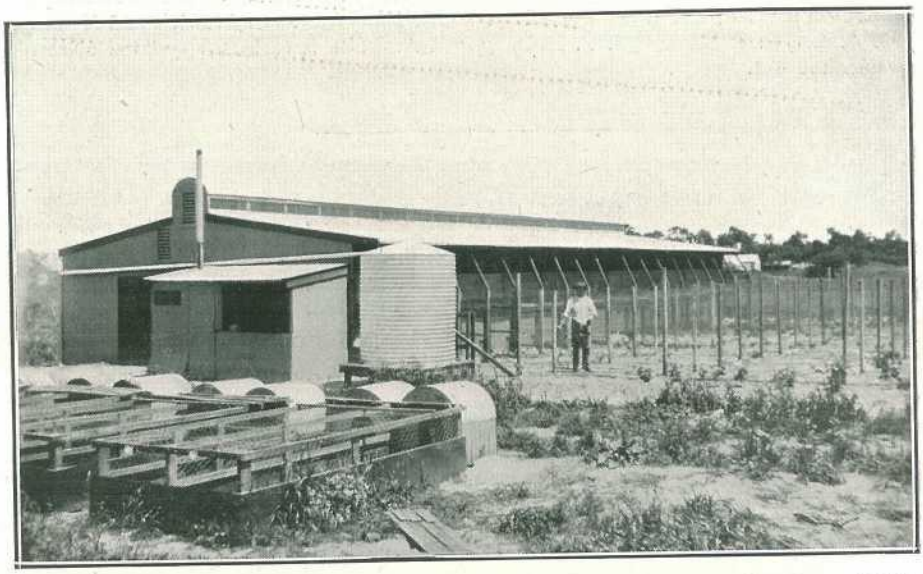


PLATE 8.—"ALL VARIETIES" (VICTORIA), MAMMOTH BROODER SHED CAPACITY, 3,500.

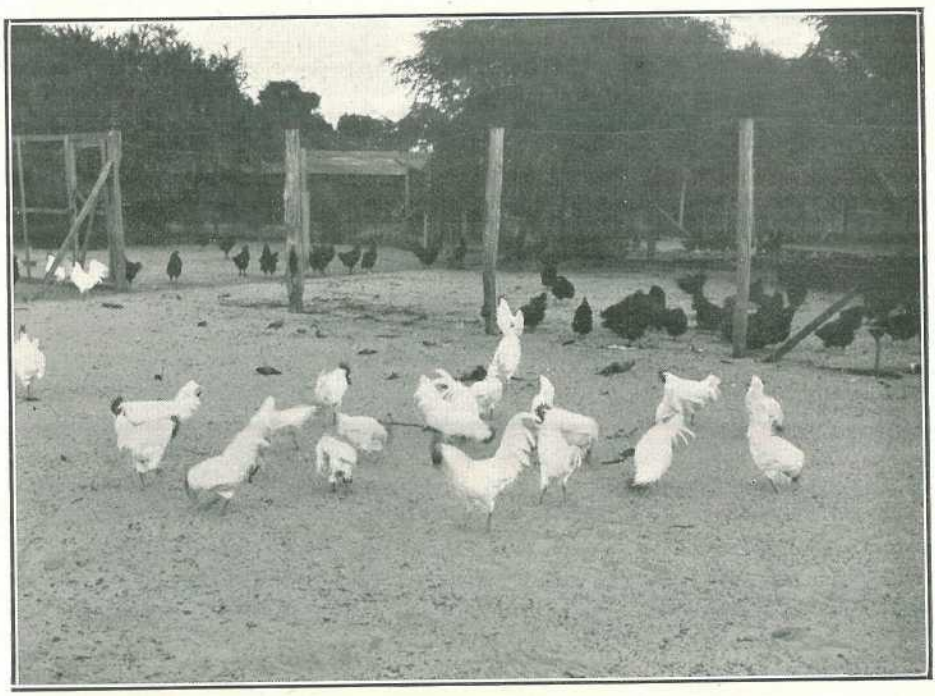


PLATE 9.—A PEN OF COCKERELS, "ALL VARIETIES" STUD (VICTORIA).

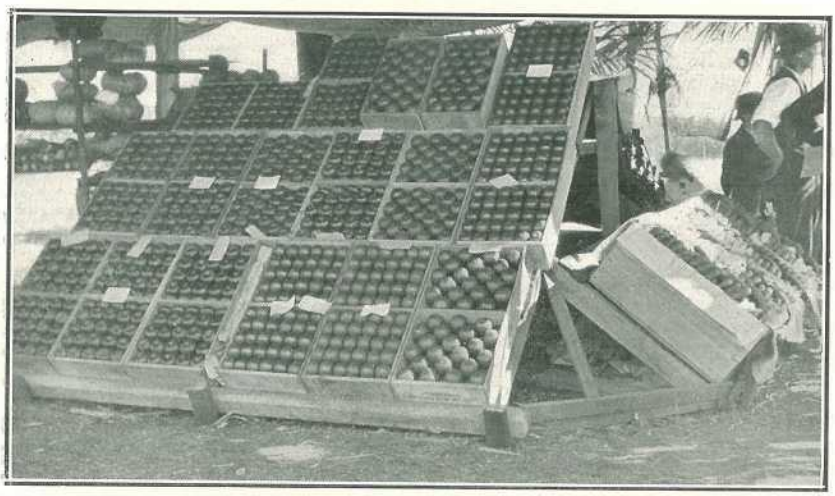


PLATE 10.—CITRUS EXHIBIT, BUDERIM SHOW.

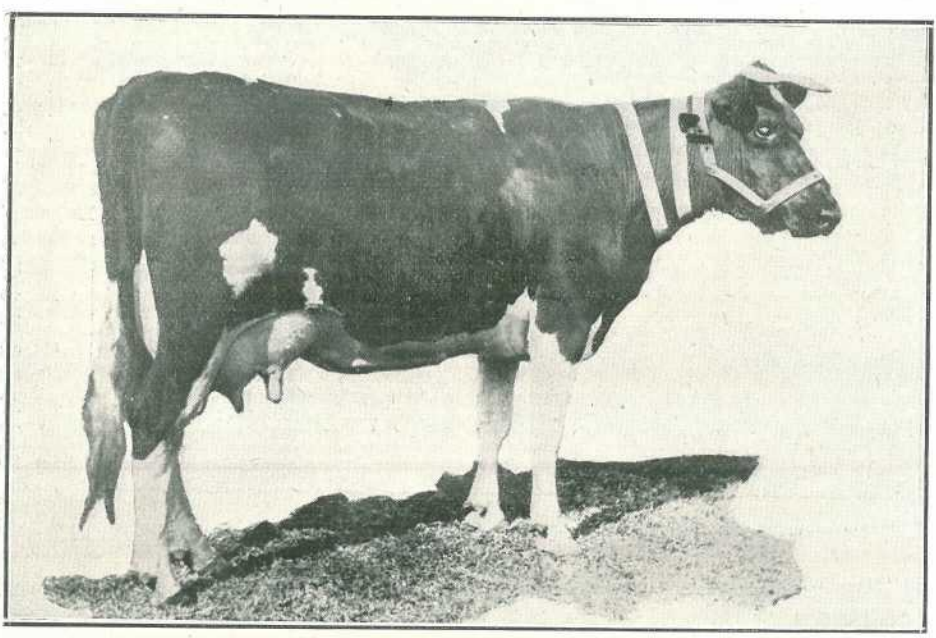


PLATE 11.—A NEW FRIESIAN RECORD BREAKER.
"Dairymaid," the property of P. P. Falt, Tingoora. In nine months she produced 15,792 lb. of milk and 696·58 lb. b. f. = 819½ lb. c. b.

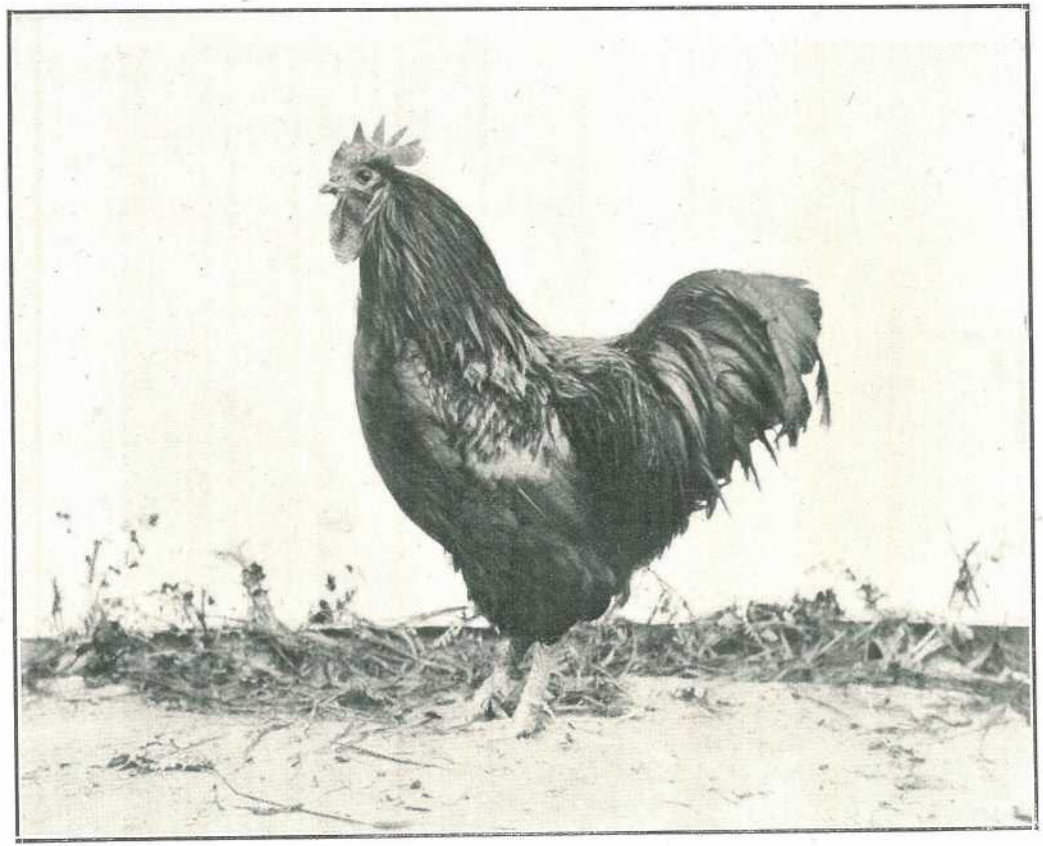


PLATE 12.—"CHAMPION KING."

Bred by J. C. Mickelburough, "All Varieties" Stud Poultry Farm, Victoria, and adopted by South Australia for their Standard.

ON A SOUTHERN POULTRY FARM.

A QUEENSLAND BREEDER'S IMPRESSIONS.

Lecturing recently before the Brisbane branch of the National Utility Poultry Breeders' Association, Mr. Stanley Lloyd, a member of the council of that body, had something to say on the methods employed successfully on a Victorian stud poultry farm. A recent Southern tour by Mr. Lloyd embraced a visit to Mr. J. C. Mickelburough's "All Varieties" farm, at Cheltenham, near Melbourne, and the following points have been taken from a very interesting and informative paper:—

A Novel Cool Brooder.—On the Victorian farm, which is regarded as one of the show poultry places in the Southern State, was seen a novel cool brooder, the owner's own idea, in the form of a frame 3 in. by 3 in. and 18 in. high, with a bag so arranged on top that it can be adjusted according to the age of the chickens. On this is placed a large feather pillow; then strips of flannel are dropped in front of the brooder, which completes a brooder capable of holding 100 chicks. Rarely does a loss occur when once the chickens are placed in these. Cold brooders for chickens under three weeks are not advisable, as they mean too much labour.

A Modern Egg Room.—The layout includes a brick egg room neatly fitted with divisions and trays to hold eggs from forty-seven breeding pens, neatly labelled with full particulars of breeding and number of pens. The system is good, as each egg is also numbered; this gives a double check. No client need ever worry about the eggs received, as every tray carries the date when last emptied. Should any pen not be sold within five days, the eggs are removed from same and placed in the incubator. A very interesting display was made of four trays of eggs carefully graded, two of browns, each a different shade, packed between white and purple paper, and two of white of different shades packed between blue and brown paper. This is really the American style, and one can hardly realise the effect without seeing it. The walls of the egg room are covered with awards; in fact, one might say the ceiling also. This shows that "All Varieties" stock is not only bred to lay, which has been proved by the egg-laying competitions, but are carefully bred on standard lines.

A New Idea.—A small show of fifty of the nest stud birds, all in single pens, with a card over same, showing breeding and record of eggs laid and any other awards was, to the lecturer, a new idea, enabling anyone to study the type of bird that had made a name for itself.

A Great Bird.—Among the pick of the pens was "Champion King," a cockerel of thirteen months, and with a great future before him. He is bred from 326 over 307, and shows that the full scale of points can be obtained, and at the same time carry the best line of blood for heavy egg production, and is without doubt one of the best type Orpingtons that has ever been shown in utility classes, carrying a very neat head, large bold dark eye, with a neat comb, showing good texture and no coarseness, with great length, depth, and width of body and excellent plumage, soft silky, with a beautiful green sheen.

Other Feathered Aristocrats.—While among the Black Orpingtons, "Lady Queeny," winner of last Burnley test, and "Queen Bess," first individual trap-nest, Burnley, 1921, were fresh blood, showing great type and size, with neat heads, good in texture and eyes. "Lady Victory," who had just made such a name for herself at the Royal Show, by winning first and blue ribbon in a class of thirty-five pullets, showed wonderful stamina, and is a bird that will weigh well over the 5 lb., with a great length, depth, and width of body, nice, finely modelled head, bright, clean face, and a large, bright, expressive eye. "Lady Perfection" is one of the best White Leghorn pullets for type and quality that has ever been owned by any utility poultry breeder. She made her first appearance at the last Royal Show, where she won first in a very big class. The judges can be complimented upon selecting such a bird, with a breeding, as she has 335 over 307, which proves that "All Varieties" is not satisfied with eggs alone. "All Varieties Queen" is a White Leghorn hen that anyone would be proud to own, not because she has won first and blue ribbon at the last Royal Show, but for her type and quality, which is just what our Leghorn breeders want. Her line of blood stands alone as a laying strain.

Modern Methods.—Breeding pens are carefully arranged to save labour in feeding and cleaning. The use of single test pens ensures the attainment of a high standard of stock. Birds are carefully culled for size and type. Only the very best standard birds are selected, and from these, after twelve months' testing, the heaviest layers are picked for single mating, from whence "All Varieties" high-class males have sprung. Runs are continually sown with oats, which not only keeps them fresh but provides feed and work for the birds. Mammoth brooder sheds have a 3,500 capacity, and are water heated. Temperature has a range of 20 degrees. The Russell watering system is installed, ensuring a regular supply of cool and clean water.

Generally, the farm provides a striking object lesson in modern poultry farming, its system and methods are quite suitable for conditions in this State, and a visit should be included in any touring Queenslander's itinerary.

Farm and Garden Notes for August.

Land which has been lying fallow in readiness for early spring sowing should now be receiving its final cultivation prior to seeding operations. Potato-planting will be in full swing this month, and in connection with this crop the prevention of fungoid diseases calls for special attention. Seed potatoes, if possible, should be selected from localities which are free from disease; they should be well sprouted, and, if possible, should not exceed 2 oz. in weight. Seed potatoes of this size are more economical to use than those large enough to necessitate cutting. If, however, none but large-sized seed are procurable, the tubers should be cut so that at least two well-developed eyes are left. The cut surfaces require to be well dusted with slacked lime, or wood ashes, as soon as possible after cutting. Where it is necessary to take action to prevent possible infection by fungoid disease, the dipping of potatoes in a solution of 1 pint of 40 per cent. formalin to 15 gallons of water, and immersing for one hour, will be found effective. Bags intended for the subsequent conveyance of tubers to the paddock should also be treated and thoroughly dried. After dipping, spread out the potatoes and thoroughly dry them before re-bagging. Where the tubers are cut, the dipping is, of course, carried out prior to cutting.

Arrowroot, yams, ginger, and sugar-cane may be planted this month in localities where all danger from frosts is over.

Maize may be sown as a catch crop, providing, of course, that sufficient soil moisture is available.

Sweet-potato cuttings may also be planted out towards the end of the month.

Weeds will now begin to assert themselves with the advent of warmer weather; consequently cultivators and harrows should be kept going to keep down weed growths in growing crops and on land lying fallow, as well as on that in course of preparation for such crops as sorghums, millets, or panicums, maize, and summer-growing crops generally.

Tobacco seed may be sown on previously burnt and well prepared seed-beds.

Kitchen Garden.—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown which will keep the market gardeners busy for some time: Carrots, parsnips, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohl-rabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

Flower Garden.—All the roses should have been pruned some time ago, but do not forget to look over them occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm, moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall 2.63 in., and for September 2.07 in., increasing gradually to a rainfall of 7.69 in., in February.

Orchard Notes for August.

THE COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of citrus fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the Spring growth. All heavy pruning should be completed previous to the rise in the sap; and where Winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with lime and sulphur wash.

Where citrus trees are showing signs of failing, such as large quantities of dead or badly diseased wood in the head of the tree, they can (provided the root system is healthy) be renovated by cutting back the entire top of the tree till nothing but sound healthy wood is left. This should be thinned out, only sufficient main limbs being left from which to form a well-balanced tree, and the trunk and limbs so left should receive a dressing of lime sulphur, or Bordeaux paste.

Healthy trees that are only producing inferior fruit should be treated in a similar manner, and be either grafted with an approved variety direct or be allowed to throw out new growth, which can be budded in due course. The latter method is to be preferred, and an inferior and unprofitable tree can thus be converted in the course of a couple of years into a profitable tree, producing good fruit.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the tree's use during Spring. This is a very important matter, as Spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop, to a greater or lesser extent.

Do not be afraid if you cut a number of surface roots when ploughing the orchard, but see that you do cut them, not tear them. Use a disc plough and keep the discs sharp, and the root-pruning the trees will thus receive will do more good than harm, as it will tend to get rid of purely surface roots.

Planting of all kinds of fruit trees can be continued, though the earlier in the month it is completed the better, as it is somewhat late in the season for this work. The preparation of land intended to be planted with pineapples or bananas should be attended to, and I can only reiterate the advice given on many occasions—viz., to spare no expense in preparing the land properly for these crops—as the returns that will be obtained when they come into bearing will handsomely repay the extra initial expense. Growers of pineapples and bananas who send their fruit to the Southern markets should take more care in the grading and packing of such fruit, as their neglect to place it on the market properly means a big difference in price, and entails a loss that could be avoided had the necessary care and attention been given. The same remarks apply to the marketing of citrus fruits, papaws, custard apples, strawberries, cucumbers, and tomatoes, all of which are in season during the month.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and

plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is often done. You want only one strong shoot from your cutting, and from this one shoot you can make any shaped vine required. Just as the buds of the vine begin to swell, but before they burst, all varieties should be dressed with sulphuric acid solution, composed of three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid. This is the winter treatment for the prevention of anthracnose or black spot, and for downy mildew, and should on no account be neglected.

Fruit-fly will make its appearance during the month, and citrus and other fruits are likely to be attacked. Every grower should, therefore, do his best to destroy as many flies as possible, both mature insects and larvæ, the former by trapping or otherwise, and the latter by gathering and destroying all infested fruit. If this work is carried out properly, a large number of flies that would otherwise breed out will be destroyed, and the rapid increase of the pest be materially lessened. The destruction of fruit-flies early in the season is the surest way of checking this serious pest.

Keep a careful lookout for orange-sucking bugs, and destroy every mature or immature insect or egg that is seen. If this work is done thoroughly by all citrus growers there will be far fewer bugs to deal with later on, and the damage caused by this pest will be materially reduced. Destroy all elephant beetles seen on young citrus trees, and see that the stems and main forks of the trees are painted with a strong solution of lime sulphur.

GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all deciduous trees should be finished during the month, and all such trees should be given their annual winter spraying with lime sulphur. The planting of new orchards should, if possible, be completed, as it is not advisable to delay. Later planting can be done in the Granite Belt, but even there earlier planting is to be preferred.

Peach trees, the tops of which have outlived their usefulness and of which the roots are still sound, should be cut hard back so as to produce a new top which will yield a good crop of good fruit the following season in from fifteen to eighteen months, according to the variety.

Apple, pear, or plum trees that it is desirable to work over with more suitable varieties should also be cut hard back and grafted. All almond, peach, nectarine, and Japanese plum trees should be carefully examined for black peach aphis, as, if the insects which have survived the Winter are systematically destroyed, the damage that usually takes place from the ravages of this pest later on will be materially lessened.

Woolly aphis should also be systematically fought wherever present. The best all-round remedy for these two pests is spraying with black leaf 40.

In the warmer parts of these districts the pruning of grape vines should be completed, and they should receive their Winter dressing for black spot and downy mildew, as recommended for the Coast. In the Granite Belt the pruning of vines should, however, be delayed to as late in the season as possible, so as to keep the growth back and thus endeavour to escape late Spring pests.

Where orchards and vineyards have been pruned and sprayed, the land should be ploughed and brought into a state of as nearly perfect tilth as possible, so as to retain the moisture necessary for the proper development of the trees or vines and the setting of their fruit.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1923 AND 1922, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	May.	No. of Years' Records.	May, 1923.	May, 1922.		May.	No. of Years' Records.	May, 1923.	May, 1922.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	2·19	22	0·10	1·29					
Cairns	4·73	41	1·14	3·94	Nambour	5·11	27	2·02	5·33
Cardwell	3·78	51	1·15	1·34	Nanango	1·64	41	0·10	0·16
Cooktown	3·14	47	0·30	1·46	Rockhampton ...	1·73	52	0·01	0·15
Herberton	1·78	36	0·49	1·16	Woodford	3·00	36	2·45	1·47
Ingham	3·70	31	3·72	1·79					
Innisfail	13·00	42	3·71	9·65					
Mossman	3·54	15	0·42	4·25					
Townsville	1·41	52	0·69	0·23	*Darling Downs.*				
					Dalby	1·36	53	0·31	0·20
Central Coast.					Emu Vale	1·22	27	0·18	0·12
					Jimbour	1·23	35	1·03	...
Ayr	1·26	36	...	0·53	Miles	1·57	38	0·03	...
Bowen	1·38	52	0·77	0·07	Stanthorpe ...	1·97	50	0·25	0·06
Charters Towers ...	0·84	41	0·07	0·10	Toowoomba ...	2·31	51	0·42	0·18
Mackay	3·96	52	...	2·03	Warwick	1·63	58	0·08	0·03
Proserpine	5·26	20	...	1·66					
St. Lawrence ...	1·91	52	...	0·92	*Maranoa.*				
South Coast.					Roma	1·47	39	0·12	0·02
Biggenden	1·89	24	0·06	0·27					
Bundaberg	2·76	40	...	0·51	*State Farms, &c.*				
Brisbane	2·85	72	0·39	2·04					
Childers	2·35	28	.	0·50	Bungeworgorai ...	0·67	9	0·05	0·05
Crohamhurst ...	5·14	30	0·89	3·50	Gatton College ...	1·84	24	0·12	0·02
Esk	2·11	36	0·44	0·31	Gindie	1·09	24	...	...
Gayndah	1·60	52	...	...	Hermitage ...	1·34	17	0·12	...
Gympie	3·05	53	0.67	1·69	Kairi	2·34	9	*	1·10
Glasshouse Mts. ...	3·78	15	1.24	4·63	Sugar Experiment Station, Mackay	3·64	26	...	1·42
Kilkivan	1·96	44	0·25	0·17	Warren	1·24	9	...	...
Maryborough ...	3·13	52	0·75	1·60					

* Not received.

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May, 1923, and for the same period of 1922, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
State Meteorologist.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1923.	JULY.		AUGUST.		SEPTEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·46	5·6	6·36	5·20	6·9	5·36
2	6·46	5·6	6·35	5·21	6·8	5·36
3	6·46	5·6	6·34	5·22	6·7	5·37
4	6·46	5·6	6·33	5·23	6·6	5·37
5	6·46	5·6	6·32	5·24	6·4	5·38
6	6·46	5·7	6·31	5·24	6·3	5·38
7	6·46	5·7	6·31	5·24	6·2	5·39
8	6·46	5·7	6·31	5·24	6·0	5·39
9	6·46	5·8	6·30	5·24	5·59	5·40
10	6·45	5·8	6·29	5·25	5·58	5·40
11	6·45	5·9	6·29	5·25	5·57	5·41
12	6·45	5·10	6·28	5·26	5·56	5·42
13	6·44	5·11	6·27	5·27	5·54	5·43
14	6·44	5·12	6·26	5·28	5·53	5·44
15	6·43	5·12	6·25	5·29	5·52	5·44
16	6·43	5·12	6·25	5·29	5·51	5·44
17	6·43	5·12	6·24	5·29	5·50	5·44
18	6·43	5·13	6·23	5·30	5·49	5·45
19	6·43	5·13	6·22	5·30	5·48	5·45
20	6·43	5·13	6·21	5·30	5·47	5·45
21	6·42	5·14	6·20	5·31	5·46	5·45
22	6·42	5·14	6·19	5·31	5·45	5·46
23	6·42	5·14	6·18	5·31	5·44	5·46
24	6·42	5·15	6·17	5·32	5·43	5·46
25	6·41	5·15	6·16	5·32	5·42	5·46
26	6·41	5·16	6·15	5·33	5·41	5·47
27	6·40	5·17	6·14	5·33	5·39	5·47
28	6·40	5·17	6·13	5·34	5·38	5·48
29	6·39	5·18	6·12	5·35	5·36	5·48
30	6·38	5·18	6·11	5·35	5·35	5·49
31	6·37	5·19	6·10	5·36	...	...

PHASES OF THE MOON, OCCULTATIONS, &c.

6 July ☽ Last Quarter 11 56 a.m.
14 ,, ● New Moon 10 45 a.m.
21 ,, ☾ First Quarter 11 32 a.m.
28 ,, ○ Full Moon 8 33 a.m.

7th July, Apogee, 9·48 p.m.
22nd ,, Perigee 11·54 a.m.

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5 Aug. ☽ Last Quarter 5 22 a.m.
12 ,, ● New Moon 9 17 p.m.
19 ,, ☾ First Quarter 4 7 p.m.
26 ,, ○ Full Moon 8 29 p.m.

4th Aug. Apogee, 4·24 p.m.
16th ,, Perigee, 8·0 p.m.

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3 Sept. ☽ Last Quarter 10 47 p.m.
11 ,, ● New Moon 6 53 a.m.
17 ,, ☾ First Quarter 10 4 p.m.
25 ,, ○ Full Moon 11 16 a.m.

1st Sept. Apogee, 10·54 a.m.
13th ,, Perigee, 8·24 a.m.
29th ,, Apogee, 3·24 a.m.

During July the planet Mercury will pass eastwards, apparently from the constellation Taurus, through Gemini and Cancer into Leo. Venus will also appa ently pass from Taurus through Gemini into Cancer, Mars from Gemini into Cancer. Jupiter will seem to move only about one degree eastward in Libra, while Saturn will apparently move about a degree and a half further east amongst the stars of Virgo.

From 1st August to 30th September Mercury and Venus will apparently move on through Leo into Virgo, and Mars from the eastern part of Cancer to that of Leo. Jupiter will apparently move only about eight degrees further east in Libra, and Saturn about five and a half degrees in Virgo.

A partial eclipse of the moon, visible in Queensland, will take place about 9 o'clock in the evening of 26th August.

A total eclipse of the sun will take place a fortnight later, visible only in the North Pacific, Central America and Gulf of Mexico.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.