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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

Conference of Canegrowers—Minister's Opening Address.

THE Queensland Canegrowers' Association held its Third Annual Conference in March, commencing its sittings in Brisbane on the 19th. The Chairman, Mr. George Johnson, presided over a large and representative gathering of producers from all sugar districts of the State. It was fitting, he said, that Mr. Forgan Smith, the Minister for Agriculture, who was responsible for the Act under which their organisation was created, should declare the conference open. In the course of his inaugural address Mr. Forgan Smith said:—No doubt during the proceedings of this conference you will review the history of the past four years, take stock of your achievements, and review your future plans. However, I am satisfied that the canegrowers' section of the Queensland Producers' Association has justified its existence, and has long years of usefulness awaiting it in the years to come. The sugar industry plays a prominent part in the life of Queensland as a State. It is a most important agricultural industry, it affords a great amount of employment to a large body of our people, and in addition to that it is one of the main industries on which our White Australia policy is based. There are still in our midst unfortunately, in some parts of the Commonwealth, people who, while giving lip service to the White Australia ideal, would like to see some of our industries carried on under standards not compatible with white men's standards in any free community. I mention that to indicate that by the White Australia ideal we not only lay down as a Commonwealth policy something to ensure the purity of our race, but also to provide that the economic conditions for those engaged in those industries should be made such that the standards of comfort which white men and women have a right to expect should be maintained. I am called

upon to make these remarks on account of the agitation which arises from time to time regarding sugar prices and so forth, and also the intimation in the press within the last few days that certain interests are moving in the direction of having bananas produced by coloured people of other countries introduced into Australia. As the case for the home production of bananas is strong, so the case for the production of sugar is equally strong.

Review of the Sugar Industry.

IT is interesting to review the figures relating to the industry and realise what is involved from the point of view of Queensland in regard to sugar. The total assets are: Mills and refineries, £7,800,000; farms, £16,600,000; a total of £24,000,000 invested in the sugar industry in Queensland. The area under cane comprises approximately 300,000 acres, and the number of registered farmers engaged in the industry is 7,300. It gives employment to 28,000, and its wages bill alone is worth £6,000,000 a year. In addition to that, having regard to the interdependency of all industries, it can be calculated that the sugar industry gives employment for a very large section of the public in addition to those whom I have mentioned. It is estimated that directly and indirectly in Queensland the industry benefits 100,000 persons. The area under cultivation has increased in thirteen years from 161,195 acres to 274,838 acres. In the course of the same period the production of sugar has increased from 225,847 to 485,745 tons, and last year the total production was 515,130 tons, indicating a remarkable extension and showing to some extent the productivity of this State and the capacity for further expansion of the industry if suitable markets were available. On the question of production, I might state, as Minister for Agriculture, that the problem of surplus production is one that gives great concern each year. Your organisation and other organisations have dealt with this problem at various annual conferences, and various schemes have been put forward individually and by certain sections of the industry. Up to the present it has not been possible to secure anything like complete unanimity on any proposal, nor has any scheme been put forward that does not carry with it, as its inevitable accompaniment, certain serious economic dangers. In other words, one must review the industry from the point of view of the whole of the State and the Commonwealth, and where possible devise a scheme that will give justice to the grower, and at the same time do nothing that will affect the economic balance of the industry as it affects the national well being. As far as I am concerned, and the Government is concerned—it is not my purpose to refer to any of the proposals that you have on your agenda paper dealing with this problem—but I am authorised to say that any definite, concrete scheme that may be submitted and adopted at this conference, having for its object the control of the industry in an orderly manner and beneficial to the State as a whole and to the growers, will receive the very careful attention of the authorities in the State. In common with the other authorities, the Queensland Government has been making representations for improvement in the duty overseas with a view to helping you in the direction of a better price for your surplus product. So far as we have got to at present the preference duty given to sugar is insufficient to meet your requirements. Naturally, one cannot view with equanimity the continually growing surplus. It is a question surrounded with great difficulties. Various schemes have been tried in other countries, and some have been abandoned because they have broken down under the economic circumstances of production. However, if your conference, as representing the industry, can put forward a scheme relating to this matter which will achieve this purpose then we will be in duty bound to give every consideration to it.

A Charter of Control.

AGAIN, on the control side of the industry you have certain very important legislation. You have the Act of Parliament under which your organisation functions. In some quarters I notice that is being assailed. Certain people have put forward the idea that the Q.P.A. as an organisation statutorily established could be reviewed from a certain standpoint. I do not wish to go into any detail about the arguments that might be put forward for and against this form of organisation, but I do wish to impress this point on growers and others concerned that there must be some sound advantage to accrue to an industry that is given certain statutory authority that enables them to control their own industry. That is the point I wish to make. You are under your own Act, you are given a charter to control

your own industry to an extent that does not exist in any other State in the Commonwealth, and if that control is used with wisdom it must give the farmers definite benefits. Obviously no Government can do for an industry, or for an individual, what they should do for themselves. We can simply supply you with the machinery and the authority to do things. How you do those things depends on your own intelligence, on your own capacity, and the influence you exert on your fellow members. I would be very chary, if a member of this organisation, about supporting any activity that would reduce the authority and the powers you are able to operate under your own charter and your own statute.

The Benefit of the Cane Prices Act.

ANOTHER measure which affects your interests is the Cane Prices Act, an Act which, it is estimated, has benefited the grower considerably. Payment for cane by analysis has undoubtedly been responsible for much increased efficiency on the producing side. Under the system of computation now established, as against former methods, canegrowers benefited during the 1927 season alone to the extent of £630,000. It would be interesting to work out the figures obtained by the new method and the method adopted prior to this Act and see how much the grower has benefited directly and indirectly as a result of this legislation.

The Science Side of the Sugar Industry.

THE Sugar Experiment Stations Act is another measure with an important bearing on the efficiency of the industry. The amount of cane required to a ton of sugar is being gradually reduced. Sometimes it is claimed that it is entirely due to improved milling facilities, but I think the improvement in the efficiency extends all round. It is due to improved methods of cultivation, improved varieties of cane, and the improved standard of work in the sugar-mills. All sections have participated in the work of building up this industry to the standard it has attained. Last week, in Mackay, there was a conference of sugar technologists called by my department. Certain mills did not send delegates because, perhaps, of a suspicion that there was some nigger in the wood pile, some purpose in the mind of the Minister for Agriculture that has not been revealed. I want to say no such purpose was in my mind. Certain people may endow me with Machiavelian proclivities with regard to certain lines of policy, but my desire was to call together the trained men of the industry who would be capable of discussing technical matters affecting the mills of Queensland with a view to arriving at something to assist one another in coping with collective difficulties. All highly organised industries at the present time realise the importance of the scientific and technological side of their activities and the sugar industry would be well advised to build up a technological staff on the highest scale possible. Every aid that science and modern invention and improved methods can bring to any industry should be welcome and readily adopted. I am pleased to say that that conference was a distinct success, and a Queensland branch of the International Bureau of Sugar Technologists was subsequently launched in Mackay, and I am satisfied that in the future it will render very valuable service to the sugar industry. I hope when the next conference comes round that every mill in Queensland will be represented by one or more experts, who will persist in the work of elucidating the problems which affect the industry. It is also intended to build up the Bureau of Sugar Experimental Stations with a view to giving greater aid to the industry than has been possible in the past. Tangible evidence of its value is apparent, and it is pleasing to note the confidence that Mr. Easterby and others associated with him have been able to build up in all sections of the industry. As new problems develop you may rest assured that the bureau will be eager and willing to help in the solution of the many difficulties. That is as it should be. One of the most important functions, I consider, of the Department of Agriculture is to co-operate with the various activities in the agricultural life of the State, and help in co-ordinating the work of the various scientific organisations throughout the Commonwealth and thus throughout the world.

I wish you success in your conference, and in your industry, and if, as a result of your deliberations, some improvement can be effected to the industry in Queensland you will have achieved a very important national purpose. When you conclude your deliberations if you desire to put anything before the Government, by way of deputation, I will be pleased to arrange a meeting place where those resolutions can be discussed.

Bureau of Sugar Experiment Stations.

THE VALUE OF FERTILISERS FOR SUGAR-CANE.

REVIEW OF THE RESULTS OF SOME EXPERIMENTS AT SOUTH JOHNSTONE IN 1928.

The value of fertilisers as an aid in the reduction of production costs has always been emphasised by the Bureau. At the same time it has been pointed out that it is necessary to determine, by careful field experimentation, the exact manurial requirements of the crop, in order that the money laid out in purchase of fertiliser may be spent to the best advantage.

It is with this in mind that the farm experimental trials have been initiated this year. We hope that these tests will supply much of the information needed to enable us to make a definite recommendation as regards the fertiliser requirements of our various soil types existing under widely different climatic conditions.

Hence it must be stressed that results obtained on our Experiment Station at South Johnstone will not be applicable on all sugar lands in Queensland. Indeed, the conclusions which might be drawn, from trials made there, may have only limited application on other soil types in the Innisfail or far northern areas.

However, it will be explained how the fertiliser requirements of certain soils under a definite set of climatic conditions may differ from one another in degree only; the need for one or more plant foods may be uniformly felt, due to the dominating influence of climate. This state of affairs undoubtedly holds in the wet tropical belt north and south of Innisfail. For this reason some of the results obtained on the South Johnstone station during the past year will be emphasised.

The soils in this coastal area north of Townsville are favoured, in general, by an abundant rainfall. The excessive water which the land receives in the wet season is not held by the soil. Part is removed as surface drainage, while the remainder is drained away by percolation into the subsoil. The continued leaching to which the soil is thus subjected brings about the removal of large amounts of lime, potash, and other important plant foods, and very often results in the production of an acid soil.

Many of our northern lands are found to exist in this acid condition, even in their virgin state. That they are able to produce very good early crops is due to the available plant foods which are set free when the soil humus is decomposed. This process is stimulated by the clearing of the land, and particularly by any cultivation operations which are performed. The low supply of easily decomposed humus, which is characteristic of these soils originally, means that after a few crops have been removed the soils are very considerably reduced in their productive power. If heavy crops are to be obtained once more, it is essential that certain deficiencies must be made up, so that the cane plant may have the desirable medium in which to carry on its life processes most efficiently.

The first essential is that the lime deficiency be corrected in order to destroy the acid state of the soil. With a lack of available lime, and consequently a sour condition in the soil, the plant functions under a great handicap. Very often the addition of lime alone to the soil so improves growing conditions generally that the crop response is very marked. This is well illustrated by results obtained on the South Johnstone station this past year. The soils on the station, in common with so many more in the Innisfail area, are very decidedly sour, and it was expected that the response to lime would be very appreciable. The results obtained were as follows:—

LIMING EXPERIMENT (PLANT CANE).

	Tons cane per acre.
No treatment plots	32.9
One ton burnt lime per acre harrowed in before planting	39.1
Gain due to liming	6.2

We find, then, that a gain of 6 tons of cane per acre resulted from the treatment. There can be no question that the added return from the plant crop alone shows a

very handsome profit. Reckoned at 25s. per ton net for the extra 6 tons, the return was £7 10s. To purchase and apply 1 ton of lime should cost less than £4. The beneficial results will, moreover, be lasting in their effect, and increased returns will certainly follow right through the succeeding ratoon crops.

The extent of the improvement in yield due to a lime application on this soil would have been shown still more definitely, had fertilisers been employed uniformly over the entire field, on both limed and unlimed plots, for a goodly supply of lime is necessary at all times if the maximum returns are to be obtained from manuring.

The second important experiment was that of the application of a heavy dressing of superphosphate. It is well recognised by agricultural scientists that an acid soil is usually deficient in phosphates. The acid condition of the soil favours the leaching away of this important plant food, so that the soil tends to become depleted. The dressings in this experiment were applied at the rate of 1,000 lb. of superphosphate per acre. Now there are few farmers in Queensland who would think of applying 1,000 lb. of mixed fertiliser per acre, far less this amount of superphosphate alone. Let us study the increased yields due to the treatment, and their value to the grower:—

Superphosphate Experiment (1st Ratoons).

	Tons cane per acre.
No treatment plots	24.1
One thousand pounds superphosphate per acre, at ratooning ..	33.8
Gain due to manure	9.7

The gain due to the use of superphosphate was 9.7 tons of cane per acre; allowing a net value of 25s. per ton—a decidedly low value—the added return was 9.7 × 25s., or £12 2s. 6d. per acre. One thousand pounds of superphosphate would cost about £5 in Innisfail, and allowing as much as £1 for applying it, the net profit is still in excess of £6 per acre. Certainly an extra return of £6 per acre on a 50-acre harvest would appeal to most of our Queensland canegrowers. And, further, the benefits do not stop here. It has been shown by chemical analysis that a 40-ton crop of cane would take up about 70 lb. of phosphoric acid from the soil. Of this amount, 50 lb. are permanently removed in the cane which is sent to the mill, while the remaining 20 lb. are returned to the soil when the tops and trash are burned.

Now the 1,000 lb. of superphosphate contained 200 lb. of phosphoric acid, and only 50 lb. of this were removed in the crop. Hence, besides returning a very decided profit, the added effect of a permanent addition to the plant food supply of the soil was brought about—a process which alone makes for permanent agriculture.

These are but two examples of what might be done by treating soils with individual plant foods of the necessary type. It is not possible to calculate what would have been the result had the application of both lime and superphosphate been made on the one plot of land. Certainly the crop would have been considerably in excess of even the 39-ton crop obtained from lime alone.

The results bear out the prediction which has been stated repeatedly by the writer—that the amounts of fertiliser which might profitably be employed on both plant and ratoon crops, in many of our northern areas, is in excess of half a ton per acre per year. But let it be emphasised once more that the only sure way in which the true manurial requirements of any soil type may be fully known is to carry out a small, well-planned field trial on the particular type of soil on which the results are to be employed.

In conclusion, it might be not altogether unnecessary to attempt to dispel an erroneous idea which seems to linger in the minds of many growers regarding the results obtained from experiments on our stations. The defence often set up, to justify their not following the results we have shown, is that the care which our lands receive could not possibly be given under average farm conditions; and the extra cultivation is in a large measure responsible for the good results. The fallacy of this argument is very apparent; for in all experiments, such as those described, the difference in yields is due to the fertiliser treatment exclusively, as the same careful cultivation is received alike by both treated and untreated plots.

It is true, however, that clean fields are necessary in order that maximum returns may be obtained from the use of fertilisers; for weeds are only too ready to use the manure intended for the cane, and it is not profitable to fertilise both crops.

THE POSITION OF THE SUGAR INDUSTRY.

By H. W. KERR, M.Sc., Ph.D., Acting Director, Bureau of Sugar Experiment Stations.*

We are all well aware of the difficulties which are confronting the sugar industry the world over, and we in Queensland have not escaped the touch of deflated sugar values, which are causing the greatest uneasiness amongst all the sugar-growing countries of the world. There is probably no country to-day except Java which can produce sugar profitably at the present market price, and many and varied efforts are being put forth in an attempt to curb the increasing production which proceeds at a rate faster than that of increased consumption.

The present indications are that no hope can be entertained for improved sugar prices in the near future, as a large surplus continues to flood the world's markets.

Several schemes have been put forward from time to time, but growers have not yet succeeded in becoming unanimous on a method by which curtailment of plantings could be achieved successfully and justly.

Another alternative has been to attempt to obtain increased preference on sugar imported into Britain from Australia, and we hear much agitation for greater trade reciprocity within the Empire. But setting aside for the time being those matters which involve the invocation of outside aid, growers might seriously consider the question, "Have we done all in our power, by the adoption of the best methods of cultivation, by the use of adequate fertilisers applied in the right way and at the right time, and by growing those varieties which are best suited to our lands—have we done all we can to reduce production costs to a minimum?" In a country such as Queensland, where the standard of living is high, we must maintain a proportionately high degree of efficiency in order that we may continue to enjoy these privileges.

The Efficiency of the Queensland Sugar Industry.

We have heard considerable controversy in the past few months regarding certain statements contained in the annual report of the Director of the Bureau of Sugar Experiment Stations. It is true that some of the facts which it disclosed do not reflect the utmost credit on the efficieney of our methods. But I would take this opportunity of saying, in answer to outside criticisms, that our Queensland sugar industry is no less efficient than many other industries, both primary and secondary, which also enjoy privileges comparable with those bestowed upon the canegrower.

At the same time we must not lose sight of the fact that it is incumbent on us to continue our forward march, and demonstrate that a protective tariff does aid in development and the search after efficieney, and is not an obstacle in the path of progress.

Efficiency must be measured in terms of a comparison between our present results and the results which we might achieve, with the facilities we possess, and under the difficulties which confront us. It was never suggested that Queensland growers could achieve anything like what has been accomplished in Java, for instance, but I feel sure that there is, in certain of our areas at least, quite considerable scope for improvement.

Intensive Cultivation.

The principle of intensive cultivation in our sugar industry is so ardently advocated by us, because it means the maximum net return for labour and money expended in producing the crop, and I feel sure that you have in this Bureau an organisation which can afford you considerable assistance in achieving this end. The activities of the Bureau have been handicapped in the past, due to its having to function with a staff scarcely adequate for the work in hand. The return of the three Government research scholars from abroad has added very considerably to the strength of the personnel, and, if I may say, as one of them, the opportunities which they have had in their travels have afforded them a very intimate acquaintanceship with the experiences of the leading canegrowing countries of the world, the problems which have confronted them, and the manner in which they have been solved.

Reduction of Production Costs.

The ultimate aim and object of the Bureau must necessarily be to aid growers in reducing production costs. And, so far as agricultural methods are concerned, it has been proven in Java, Hawaii, and elsewhere that the most successful method of

* In an address delivered at a Conference of the Queensland Canegrowers, Brisbane, 21st March, 1929.

solving the difficulties is by means of field experimentation on a wide scale. We feel that this phase of the work is of such importance that it will constitute the major project of our agricultural division for many years to come. With this object in view a scheme has already been launched in Queensland, and I am pleased to say our early experiences have convinced us of the practicability of the method.

The First Objective.

Our first objective is a determination of the fertiliser requirements of our various soil types. We know that much can be achieved by the judicious use of the correct fertilisers, but we do not at present possess the desired knowledge which would enable us to declare just what are the fertilisers which will yield the maximum returns under our varied conditions of soil and climate. Hence we have planned for the setting out of about sixty fertiliser trials, to be distributed throughout all our mill districts, as an initial effort. Preparations for this work are well in hand, and we have already set out four of these trials in the Bundaberg and Childers districts. Our plan is to select a field which is about to be planted, and which carries a soil type of major importance in that particular area. The grower whose land has been chosen is one who is keen and appreciative of the value of this type of work, and who will give the trial the care which its importance demands. Further, we have attempted to select men who command the confidence of their neighbours whose lands possess soil of a similar type. The planning of a trial which should yield the maximum of useful data is made by ourselves, and we also carry out the work of laying out the plots, applying the fertiliser, and making observations on growth and growing conditions. Later, the supervision of harvesting operations will also be carried out by our officers, and the co-operation of the various mills has been assured with regard to the weighing and analysing of the produce from the individual plots. It has been our plan to ask the grower to provide the fertiliser necessary for the trial, and the ready response to this requirement has convinced us of the interest which growers are prepared to take in this experimental work. This is very gratifying to us, and should go far towards ensuring the success of the project.

However, I am very pleased to announce at this time that the fertiliser companies are also very appreciative of the value of our efforts, and altogether about £300 worth of the required materials have been placed at our disposal, which will provide for all our trials for this year. This fertiliser will be passed on to the growers who are co-operating with us, as a contribution from the fertiliser suppliers, in return for any added labour which the experimental trial may impose upon them.

Farm Experiments.

Naturally, the extent of the work which can be successfully initiated in one year is limited, and it is appreciated that many growers who would willingly take up the work with us must be disappointed for the time being. However, as the number of trials will be added to from year to year, it is hoped that before long all interested will have an opportunity of securing a trial on their farms. In about three years' time we expect to have about 200 farm experiments under way, and the value of the results secured on such a wide scale will be very evident.

The Future Work of the Bureau.

Our future work will not be confined to fertility trials alone, but we will extend the scheme so as to embrace all phases of experimental work—variety trials, cultivation tests, &c., which will aid growers in their pursuit after increased efficiency.

I hope it will be fully appreciated that the Bureau is making a determined effort to assist growers with their difficulties, but we can of ourselves do nothing without the full co-operation of the growers. I give you a full assurance of our readiness to serve; will you in turn pledge your support of this very important field of investigation.

CANE PEST COMBAT AND CONTROL.

Mr. E. Jarvis, Entomologist to the Bureau of Sugar Experiment Stations, has submitted the following report for the period February to March, to the Acting Director of the Bureau:—

Insects Having a Good Time.

During this period of the year, when wet conditions combined with high temperatures are being experienced in the district of Cairns, insect life of all sorts is unusually abundant.

In addition to the large variety of insects damaging sugar cane, bananas, fruit trees, and many kinds of vegetables, the residents of this portion of Queensland are also exposed to personal attack from the various blood-sucking and other objectionable species commonly occurring in the tropics.

Although the chief object, of course, of the Sugar Bureau in issuing reports of this nature is to forewarn growers of the probable appearance of those insects thought likely (by the Entomologist) to cause trouble each month, it is also proposed to deal very briefly from time to time with the control of the principal noxious species which indirectly affect the health and activities of our cane farmers.

Just at present, grubs of the "greyback" cockchafer are enjoying the congenial climatic conditions brought about by alternate heat and generous showers; which bid fair, if continued during April, to ultimately favour their transformation into the pupal or chrysalis state.

Convincing evidence of the work of this formidable cane-beetle will gradually become apparent through April and May on many areas which during the last two or three years have either been slightly infested by or practically free from grubs.

Cane Pests Causing Trouble During the of Month of April.

1. Grubs of "greyback" cockchafers (eating the roots).
2. "Beetle borer" (tunnelling in the sticks).

All grubs of the "greyback" will now be in their third or last stage of growth, and feeding vigorously on the main roots or basal portion of the cane sticks.

To make sure that this final development has been reached, the grower has only to measure the width across the hard brown head of one of these grubs, which will be found to be exactly ⅝ of an inch. In fields where they happen to be very numerous one cannot go wrong in collecting them during ploughing operations; since the value of this commonsense control method is recognised and practised whenever possible by farmers in other countries.

What About the Weevil Borer?

This beetle, although of secondary importance as a cane pest, must not have its activities overlooked. Its mere presence here and there in the butts of canes need not, however, cause alarm, unless such crops be destined to stand over to the next season before being cut.

Much good can be achieved by the owner himself, if he would take the trouble to find out the degree of an infestation by laying down bait-traps in the manner described in my hints for last month (March). In cases where few beetles are found in the traps, and the cane is about fully grown, it only remains for the grower when harvesting same to insist on low cutting; and the subsequent milling operations will do the rest by crushing all the living beetles with their grubs and pupæ contained in the canes.

Farmers' Interest in Pest Control.

It is often wondered when the interest of the farmer will be fully awakened in our insect pests of cane and their control, and he will ask himself the question—"Why should these grubs or caterpillars be allowed to work their destructiveness unmolested by *me*, and spoil the ultimate result of the trouble and expense I have gone to, in thorough preparation of the ground, manuring, and clean cultivation of same?"

Why, indeed, when the grower holds the solution of the difficulty in his own hand, and can, if he chooses, prevent such depredations. Any farmer wishing to know how to successfully fight his insect enemies of cane should apply at once to the Entomologist at Meringa Experiment Station for assistance.

CANE PESTS AND DISEASES.

Mr. A. N. Burns, Assistant Entomologist, stationed at Mackay, has submitted the following report for the month ended 12th March, 1929, to the Bureau of Sugar Experiment Stations:—

Greyback Grubs now in the Third Stage.

Field observations made during the last day or two show that most of the grubs of this destructive insect have entered the third and final grub stage. It is from the present time, and until about the end of next June, that the most serious injury of cane roots will take place. Actual leaf indications, such as yellowing or wilting, may not show for some weeks yet, although the grubs are active all the time.

These are the resultant grubs from the eggs that were laid by the beetles during last December, the intermediate time having been occupied in the egg, and first and second grub stages. During these two stages very little actual injury is done to cane roots, the grubs subsisting principally on humus obtained from the continual ingestion of soil. Laboratory experiments have shown that this season practically all the beetles had ceased laying eggs by the first week of January. From fourteen to seventeen days are normally occupied during the incubation of the eggs, so that by the main bulk being deposited between the 14th and 25th December, many young first-stage grubs were in evidence about the first week in January. Periods varying in duration from four to five weeks were required by these grubs before changing into the second stage, which this season was reached in the majority of individuals by the first week of February. A slightly longer time elapses before the next moult into the third stage takes place, thus making the time spent in the second stage between five and six weeks.

It is an interesting fact that during the whole of any particular grub stage, the size of the grub's head does not alter, although the body increases considerably in size. Whilst in the first two stages the grubs are usually to be found about a couple of inches below the surface of the soil, unless the weather is unusually dry. As before stated, until they arrive at the third stage, their food consists mostly of humus obtained from the soil; certainly in the first stage this is so, and may be supplemented in the second stage with fine grass roots or the smaller and more tender cane roots.

As is unfortunately too well known, during the third stage the tables are turned, the grubs' diet consisting almost wholly of roots, &c. It is at the present time, before grub damage is apparent through the wilting of the cane, that growers should attempt fumigation.

Fumigation of Cane with Carbon Bisulphide.

For obtaining the best results possible from the use of this fumigant, two main things are necessary:—(1) Suitable weather conditions; (2) intelligent application of the bisulphide. This fumigant is extremely volatile, and the fumes being heavier than air, have a tendency to penetrate downwards into the soil. It is therefore essential that during the time of fumigating the soil be fairly free so as to allow the maximum penetration of the poison fumes. It can, therefore, be clearly seen that it would be utterly useless to attempt fumigation immediately following heavy or soaking rains. Several days should be allowed to elapse until such time as the ground is less consolidated and water-logged.

When handling bisulphide, great care should be exercised that it does not come into contact with fire, as it is not only highly inflammable but also explosive.

As already pointed out, the fumes of this material have a tendency to work downwards, therefore it is in this connection that the intelligent application of the bisulphide exists. Before treating a block of cane, a good general "depth survey" should be carried out. This means digging at a few stools throughout the affected area in order to ascertain the depth at which the grubs are situated. This discovered, the doses of poison should be applied to a depth slightly less than that at which the grubs were located. With ordinary sized stools two doses of fumigant are usually sufficient; one on each side of the stool. If, however, any very large stools are encountered, three doses placed equidistantly round the stool should be enough.

Method of Injection with (A) Dank's Injector, and (B) Vermorel Injector.

(A) The Dank's Liquid Soil Injector consists of a brass container, above which are two wooden hand-grips, one on either side; a plunger with a dose regulator around it in the form of a graduated collar. Below the container is a long spear with an adjustable footplate, below which again is a small aperture through which

the doses are ejected. Each dose is measured mechanically inside the Injector, and with each downward stroke of the plunger one dose is delivered.

The usual dose given is ½ ounce, or ¼ ounce per stool (i.e., two ½ ounce doses, one on each side of the stool). To obtain this, set the little pin in the graduated collar which is round the plunger stem, to "6." When applying the doses, do not insert the spear into the middle of the stool. Insert it into the ground some 2 or 3 inches from the stool, taking care to have the dose aperture directed towards the plant. Press the plunger down sharply. The depth adjustment for the doses is obtained by setting the distances between the lower side of the footplate and the dose aperture, to whatever is required, i.e., 2, 3, or as many inches as are necessary.

(B) The Vermorel Liquid Injector is very similar in appearance and construction with the Danks; the principal points of difference, however, are in the regulation of doses, and the fact that the expulsion chamber (not aperture) is attached just below the container tank, and independently from the upper portion of the spear.

Regulation of doses is effected by removing the split pin in the plunger cap, taking off the cap, and then slipping on to the stem or piston the brass rings which are supplied with the machine. The effect of this regulating is as follows:—Without any rings added, one downward stroke of the plunger delivers .36 or just over one-third of an ounce of liquid.

With one ring added	.32 oz.	approximate.
With two rings added	.29 oz.	
With three rings added	.25 oz.	
With four rings added	.22 oz.	
With five rings added	.18 oz.	

This latter dose is approximately one-sixth ounce.

As five is the total number of rings that are supplied with this injector, therefore ½ ounce is the minimum dose that can be obtained. This is slightly in excess of the minimum dose that can be obtained from the Dank's Injector, but the difference, although it takes slightly more material to treat an acre, is really hardly worth considering. Should, however, still smaller doses be required, no doubt a couple of extra rings could easily be made or procured.

It has been occasionally reported that immediately following fumigation, an excellent percentage of "killed" grubs has been obtained, but some weeks later some grubs have again been observed attacking the same cane roots, naturally leading to the belief that some of the grubs had recovered from the effects of the poison. In isolated instances where a grub has been just outside the range of the dose of poison at the time of fumigating, it would certainly survive, but the explanation given is that the "new invasion" is caused by the grubs that were feeding at the weed and grass roots between the cane rows, having travelled to the cane stools.

The actual period during which the bisulphide is able to kill the grubs is within the first twenty-four hours after application; therefore if these grubs reached the cane roots some days after fumigation, they would not be affected. Such a recurrence of grubs is preventable by having the spaces between the cane rows free from weeds, &c., for some little time before fumigation is actually carried out. This could be done say a week beforehand, then by that time the grubs would probably all be concentrated at the cane roots, and would therefore come under the influence of the poison.

Supplies of carbon bisulphide for fumigation are available to growers in the Mackay district, at a reduced rate of cost, on application to the Secretary of the Pest Destruction Board. Injectors, too, are also available through application to the same institution.

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

INSECTICIDES*

By ROBERT VEITCH, B.Sc., Chief Entomologist.

The preceding chapter might be regarded by some readers as being of interest rather than of practical importance to growers. Such, however, is not really the case, for many points dealt with therein have an important bearing on the measures that may be adopted in combating insect pests, e.g. the varying structure of the mouth parts. The present chapter is, however, severely practical for it deals with the all-important subject of insecticides.

Insecticides are chemicals used in the control of insect pests. Their function is to kill the insect to be controlled without, at the same time, causing any appreciable degree of injury to the plant or animal host on which it is feeding or without injurious effect on the medium in which it may be feeding or breeding. Further important considerations in the choice of a chemical as suitable for insecticidal purposes are—firstly, its cost and method of application, which must be such that its use is economically sound and practicable; and secondly, its safety, in that it must be capable of being employed without danger to the operator when reasonable precautions are observed in its application.

The chemicals used as insecticides may be classified in three groups —firstly, stomach poisons; secondly, contact insecticides; and thirdly, fumigants. The choice of the particular class of insecticide to be employed in combating an insect epidemic will be determined partly by the conditions under which the pest is operating and partly by the feeding habits of the insect to be controlled.

Stomach Poisons.

As has already been pointed out in an earlier chapter many insects injure their host plants by actually biting off and swallowing portions of the foliage, fruit, or stalk of the plants on which they are feeding. Typical insects in that category are the army worm, the codling moth, the corn-ear worm, the cutworm, the fig beetle, the leaf-eating ladybird, and the pumpkin beetle.

The first four insects just mentioned pass through larval stages possessing chewing mouth parts which enable them to nibble off portions of the foliage, fruit, or stem of the attacked plants. The other three insects referred to possess chewing mouth parts, both as larvæ and beetles, and hence are destructive in two of their four life cycle stages, whereas the others are destructive in one only, the moths being incapable of injuring any part of the plant.

Spraying or dusting their food plants with poison is the control measure generally employed in combating the type of insect now under discussion. Some of the species, however, are more effectively controlled by the use of baits containing suitable poisons. On swallowing a certain amount of the poisoned food or bait, death rapidly ensues. For obvious reasons the materials used in this manner are referred to very appropriately as stomach poisons.

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

The insecticides belonging to this class are nearly all some form of arsenic which must conform to two conditions—firstly, it must be practically insoluble when made up into a spraying mixture, otherwise serious burning of the sprayed foliage will ensue; and secondly, it must be soluble in the digestive juices of the stomach so that it may be absorbed with fatal results to the insect that has fed on the poisoned plants or baits. When the insecticide is employed in the preparation of a poison bait only the second condition need be taken into consideration.

Arsenate of lead, Paris green and poison baits containing Paris green are later discussed in detail as being the most effective and most commonly employed representatives of this type of insecticide.

Contact Insecticides.

The earlier discussion of insect-feeding habits also showed that although many insects injured their host plants by chewing the foliage, fruit, or stem, another very important group was responsible for damage by piercing the epidermis or skin of the attacked plants and by extracting the plant sap through the punctures which they had made by means of their piercing mouth parts. In this class of insect the mouth parts are so developed that they are quite incapable of chewing, and their feeding is restricted to sucking plant sap just as a mosquito sucks the blood of humans. When the feeding habits of these sucking insects are considered, it is evident that it would be useless to attempt their control by arsenical sprays spread over the surface of their food plants. The surface tissue is never eaten by this type of insect and hence the poison would not be swallowed.

Stomach sprays of the arsenical type being impracticable for sucking insects assistance must be obtained from another class of insecticide, and it has been found that what are known as contact insecticides are very effective for the control of these sucking insects.

Contact insecticides owe their killing properties to a number of factors. The mortality produced by their application may be due to their corroding influence on the bodies of the insects covered by the contact sprays. They may suffocate the insect by the closure of the pores through which it breathes or, on the other hand, death may ensue as a result of the more volatile portions of the insecticide passing in through the breathing pores of the body.

Insects against which contact insecticides may be employed are well represented by the scale insects and aphids.

Kerosene emulsion, resin wash, miscible oils, nicotine sulphate, and lime sulphur are later dealt with in some detail as typical representatives of contact insecticides.

Fumigants.

Reference must now be made to the third class of insecticide—namely, fumigants. Fumigants may be employed against both the chewing and sucking type of insect, but difficulties are frequently encountered in their use and generally, but not invariably, they are employed only in enclosed spaces. Fumigants produce gases which kill by entering the breathing pores of the insect body and destroying the tissues or by suffocation following on the removal of oxygen.

The fumigants most commonly employed in Queensland are hydrocyanic acid gas and carbon bisulphide; detailed discussion of fumigants will be confined to these two insecticides.

Arsenate of Lead.

Arsenate of lead is without doubt the most suitable and the most popular form in which to use arsenic as a stomach poison on insect infested foliage. When mixed for spraying it settles slowly in the mixture and it adheres longer to the foliage than other stomach poisons such as Paris green. Further points in its favour are the fact that it does not at all readily burn the foliage, and its presence can easily be detected on the leaves, thus enabling the operator to make sure that the spraying has been complete and effective. It does not kill so quickly as Paris green, but is much safer to use on foliage.

Arsenate of lead may be bought either in powder or paste form. When the powder is used in the preparation of a spray it is essential that every particle should be well moistened before the arsenate of lead is added to the water. A thin paste, free from lumps, is therefore prepared by gradually adding small quantities of water to the powder until it is thoroughly wet. The paste prepared in the manner just described is then poured into the vessel holding the rest of the water to be used in the preparation of the spray.

Various formulæ are in use for arsenate of lead sprays, but one that has given satisfaction as a standard spray is—

Arsenate of lead powder	1½ lb.
Water	50 gallons.

If the paste form of arsenate of lead is used the formula must be modified as follows:—

Arsenate of lead paste	3 lb.
Water	50 gallons.

Arsenate of lead is also frequently used as a dust instead of a spray, hydrated lime being generally employed as the carrier. Formulæ for the arsenate of lead dust vary from one part of arsenate of lead to ten parts of hydrated lime to as high a strength as one part of arsenate of lead to three parts of hydrated lime. Mention may be made of the fact that quite a number of proprietary dusts containing arsenate of lead are at present on the market.

Paris Green.

Paris green is much less popular as a spray than arsenate of lead, its lack of popularity being due to a number of factors. Firstly, it settles much more quickly in the spraying mixture than is the case with arsenate of lead, and hence it is difficult to maintain anything like a uniform strength of spray throughout the operation. Secondly, it does not adhere so well to treated foliage and consequently must be applied at more frequent intervals to ensure protection. Thirdly, it is not so safe to use owing to the fact that Paris green may contain an appreciable percentage of water soluble arsenic and such soluble arsenic will burn foliage. That difficulty, however, may usually be overcome by the addition of lime. The added lime combines with the soluble arsenic and reduces the danger of burning the sprayed foliage. Paris green possesses the advantage over arsenate of lead in the rapidity of its effect on insect life.

Paris green used as a spray should be prepared in accordance with the following formula:—

Paris green	⅓ lb.
Quicklime	1 lb.
Water	50 gallons.

The Paris green should be worked up into a paste by the addition of a small quantity of water; then the lime should be slacked in a little water and added to the rest of the water. Finally the Paris green paste, which should be free from lumps, is added.

As in the case of arsenate of lead, Paris green may be applied as a dust, hydrated lime again being the ordinary carrier. Various formulæ show Paris green being used in the proportion of one part of the poison to from six to ten parts of the hydrated lime.

Poison Bran Baits.

Paris green has been referred to as presenting several unsatisfactory features when used as a spray, but in the preparation of poison bran baits employed in the control of such pests as cutworms it gives very good results. The danger of burning foliage no longer operates, and its relatively quick-killing powers render it more effective than arsenate of lead. A further attractive feature of Paris green is the greenish tinge imparted to the bait, thus enabling the operator to determine whether or not the poison has been thoroughly and uniformly incorporated in the bran.

Poison baits may be prepared in accordance with the following formula:—

Bran	25 lb.
Paris green	1 lb.
Molasses	1 quart.
Oranges	2 fruits.
Water	2 gallons (about).

The Paris green and bran should first of all be mixed together in a thorough manner and while still dry. The molasses and the finely chopped fruit and its juice should then be added to some of the water. The water containing the molasses should next be mixed with the bran and Paris green and the whole should then be well stirred up, enough water being added to produce the right consistency.

It is highly desirable that the poison bait should be of the right consistency, and only sufficient water should be added to permit of it being in a crumbly state and thus capable of being easily scattered broadcast on the ground. It should, at the same time, be sufficiently moist to permit of each flake of bran taking up its quota of Paris green and molasses.

Neither the fruit juice nor the molasses is essential in this bait, although they are usually considered desirable. Horsedung and sawdust have been substituted for the bran in certain formulæ, and smaller percentages of Paris green have also been used, but it is desirable to adhere to the formula given until such time as experiments have demonstrated the equal efficiency of cheaper formulæ when used in this State.

It should hardly be necessary to add that poultry and other domestic animals should not have access to areas that have been treated with poison bran baits.

Kerosene Emulsion.

Kerosene emulsion is one of the oldest insecticides employed against aphids and scale insects, but its use is now less general than was formerly the case. It possesses, however, one considerable advantage in the fact that all the ingredients required for its preparation can be readily obtained in any centre.

A common formula for the stock solution is as follows:—

Hard soap	½ lb.
Water	1 gallon
Kerosene	2 gallons

The soap should first be dissolved in the water by boiling and, while the water is still hot, the kerosene should be added to it, but not in proximity to the fire. This mixture should be churned up violently by means of a small spray pump for about five or ten minutes. A good emulsion without trace of free oil should then be available. It is essential that the oil should be thoroughly emulsified because, if free oil is present, burning of the foliage may ensue. Soft water or rain water should be used in the preparation of kerosene emulsion, but if only very hard water is available it can be broken with lye. The stock solution prepared in the manner just described will keep for some considerable time, but some authorities maintain that it is preferable to prepare fresh quantities as required.

When required for use, the stock solution should be diluted by the addition of water. The proportion of water added will depend on the nature of the insect to be controlled, and also on the sensitiveness of the plant to be sprayed. Some authorities maintain that one part of the stock solution to fifteen parts of water is the highest strength at which foliage should be sprayed, while other investigators recommend a strength of one part of stock solution to ten parts of water and even less.

Mention has been made of the necessity of having the oil thoroughly emulsified to avoid the danger of burning the foliage. Attention has also to be directed to the fact that if much emulsion runs down the trunk of sprayed trees serious injury may be caused at or below the ground level. This danger may be avoided to some extent by building up a cone of loose earth at the base of the tree to be sprayed. Such a cone, 9 to 12 inches high and about 12 inches wide, will absorb an appreciable proportion of the surplus kerosene emulsion that runs down the trunk of the tree. After the tree has been sprayed the earth cone should be scraped away and, if necessary, the unsprayed portion of the trunk should be given a light spraying.

Resin Wash.

Resin wash is a spray that has enjoyed a considerable amount of popularity when employed against scale insects attacking citrus trees.

A formula recommended in New South Wales is as follows:—

Caustic soda, 98 per cent. quality	5 lb.
Resin	16 lb.
Soft soap	6 lb.
Water	100 gallons

The wash is prepared by boiling 10 gallons of water and adding to it the finely powdered resin, caustic soda, and soft soap. The mixture

should then be boiled for two or three hours. It should be frequently stirred and small quantities of hot water added from time to time until there is 20 gallons of the mixture. Hot water is used in diluting the mixture, 1 gallon of the mixture being used to 4 gallons of hot water.

Resin wash has its maximum efficiency as a spray when the young scales are hatching out. It should not be used when the trees are suffering from the effects of a dry spell.

Like kerosene emulsion, resin wash is now less used than formerly, and it has largely been supplanted by other sprays and by cyaniding.

Miscible Oils.

Miscible oils are mineral oils that have been treated in such a manner that they will mix quite freely with water. They have been extensively used during recent years as sprays for the control of scale insects.

Quite a number of proprietary brands of miscible oils are on the market and, as a rule, full instructions as to the mode of mixing and application are issued by the manufacturers. It is essential that these oils should emulsify properly, and that they should not be used at too great a strength, otherwise injury may result to the treated plants.

Nicotine Sulphate.

Nicotine sulphate is a spray that is enjoying a very considerable degree of popularity as a suitable insecticide against aphis, thrips, and other small and delicate insects. It is marketed as a highly concentrated tobacco extract, in which 40 per cent. of nicotine occurs in the form of nicotine sulphate.

This insecticide is generally used at a strength of one part of nicotine sulphate to eight hundred parts of water, a common formula being—

Nicotine sulphate, 40 per cent.	.. .. ½ pint
Soap	.. 2 lb.
Water	.. 50 gallons

The soap is added to produce a better spread and adherence of the spray.

Nicotine sulphate is also often applied as a dust, hydrated lime being in many cases employed as the carrier. The proportions in this dust are generally 5 lb. of the nicotine sulphate to 95 lb. of the hydrated lime. Various proprietary dusts containing nicotine sulphate are now on the market.

Lime Sulphur.

Lime sulphur is one of the most important sprays used as an insecticide, and it possesses the further merit that it is also a valuable fungicide. It was formerly made on the orchard by boiling a mixture consisting of sulphur, lime, and water. The concentrated lime sulphur solution, however, is now manufactured commercially, and is largely used in place of the home-made article, the preparation of which is a decidedly unpleasant task. Home-made lime sulphur is further referred to in Chapter VI.

The concentrated solution must be diluted before being used as a spray, and in order to determine the exact amount of dilution necessary a Baumé hydrometer is used. This is necessitated by the fact that the strength of the concentrated solution varies quite considerably. The hydrometer is placed in the solution, and the number of degrees registered by it is noted. The reading on the hydrometer indicates the specific gravity of the solution, and by comparison with a table the necessary amount of dilution will be shown.

Carbon Bisulphide.

Carbon bisulphide is a liquid that evaporates very rapidly on exposure to the air, forming a heavy, highly explosive and inflammable gas. It should, therefore, not be brought into contact with a flame or highly heated pipes, and it is just as well not to smoke when using this fumigant. Although it does not possess the extremely dangerous properties of hydrocyanic acid gas, carbon bisulphide should, nevertheless, be treated with great respect, and the operator should, as far as is practicable to do so, avoid inhaling the vapour.

Carbon bisulphide is used principally for the fumigation of stored seeds that may be insect-infested, and it is also frequently employed in the destruction of ants' nests. It is a highly efficient fumigant for the purposes to which it is usually put.

It is generally considered that at least moderate temperatures are required to permit of satisfactory results being obtained in carbon bisulphide fumigation. Less than 60 deg. Fahr. has frequently been productive of very disappointing results, and a temperature of 70 deg. Fahr. or more is desirable.

When carbon bisulphide is used for the fumigation of seed a suitable container must be selected, and care should be taken to ensure that it is quite as airtight as is practicable. The seed to be treated is placed in the container and the fumigant is then added. As the gas produced by the evaporation of the liquid is much heavier than air, it is usual to place the carbon bisulphide in saucers or other vessels on the top of the material to be fumigated, so that the heavy vapour will be diffused through the whole of the enclosed space. As soon as the carbon bisulphide has been placed in the saucers, the container, whether it be a small box or a large iron tank, should be immediately tightly closed.

It has been demonstrated that under average conditions 4 to 5 lb. of carbon bisulphide per 1,000 cubic feet of container will produce satisfactory results in a reasonably airtight container if the insect-infested seeds are exposed to that concentration of fumigant for a period of about thirty-six hours. At the conclusion of the fumigation period the treated seeds or grain should be ventilated or aired.

It is well to remember that this fumigation will kill only the insects that are actually living in the seeds at the time of treatment. To ensure continued freedom from attack the fumigated seed should be subsequently stored in containers that are free from insect infestation, and are so constructed that they can be satisfactorily sealed up.

Hydrocyanic Acid Gas.

Hydrocyanic acid gas is quite the deadliest chemical in general use as a fumigant in insecticidal work. It has been largely employed in the fumigation of buildings, imported raw materials such as cotton, dormant nursery stock, and last but not least in the treatment of scale insect-infested citrus trees. The following detailed consideration of hydrocyanic acid gas as a fumigant will be confined entirely to its use for the last-mentioned purpose.

The citrus trees to be fumigated are covered by sheets or tents in order to confine the gas for a sufficiently long period to permit of the insects being killed. The sheets used should obviously be made from a reasonably gas-tight material, and for this purpose an 8-oz. special army duck is employed as being most suitable. It is a common practice to dip the new material in a tannin bath in order to minimise the chance of mildew and rotting. The size of sheets or tents employed will, of course, depend on the size of the trees to be treated.

The hydrocyanic acid gas required for the fumigation may be generated in any one of several different ways. Originally potassium cyanide, sulphuric acid, and water were used for its production, but in recent years sodium cyanide has largely replaced potassium cyanide in the pot method of generating the gas. A more recent development in California has been the use of liquid hydrocyanic acid gas. Other developments have been the use of a dust known as calcium cyanide, while a fumigant called Zyklon has also appeared on the market as a source of hydrocyanic acid gas.

The procedure adopted when the pot system of fumigation is employed is briefly as follows:—The tree to be fumigated is covered by a sheet or tent of appropriate size and the number of cubic feet represented by the space enclosed by the sheet is ascertained by reference to a table. This figure on the table indicates in other columns the quantities of sodium cyanide or potassium cyanide, sulphuric acid and water required to produce the correct amount of gas to fumigate such a space. The necessary quantities of these materials are then accurately weighed out or measured, and the requisite amount of water is first poured into an earthenware pot or dish. The measured quantity of sulphuric acid is then added slowly and carefully to the water. Great care must be exercised in adding the sulphuric acid, because if it splashes on the body of the operator it will inflict severe burns. The earthenware pot is placed under the sheet or tent at such a distance from the side of the sheet as to reduce to a minimum the danger of injury thereto by the splashing of the acid. As soon as the earthenware pot is in position the cyanide is dropped into it and a piece of sacking is placed over the pot.

It is essential that the cyanide should be added as soon as possible after the addition of the sulphuric acid to the water in order to obtain the best reaction. As soon as the cyanide has been dropped into the mixture of water and sulphuric acid that portion of the base of the sheet that has been raised to permit of the charging must be closed. It must be clearly understood that the hydrocyanic acid gas is generated very rapidly and is extremely dangerous, and hence the operator should on no account inhale it, and he should withdraw immediately the cyanide has been dropped into the pot containing the mixture of sulphuric acid and water.

In citrus fumigation the time of exposure of each tree to the gas is generally forty-five minutes, which is considered a sufficiently long period to permit of satisfactory results being obtained.

Fumigation with the pot system of cyaniding should be carried out at night, because then the danger of injury to the treated trees is materially reduced. It should never be done during the heat of the day nor in strong windy weather, and it is always well to exercise special precautions in fumigating weak trees. It is further desirable to make sure that the foliage and fruit on the trees to be treated are dry, and it is also generally advisable to avoid fumigating when a heavy dew is experienced. Fumigation of trees bearing an excessively large quantity of tender young growth may be attended with injurious results. A further precaution to be observed in connection with fumigation is that trees that have been sprayed with Bordeaux mixture should not be fumigated with hydrocyanic acid gas for at least six months after spraying.

A great deal of time has been devoted to the study of citrus fumigation in the United States, particularly in the State of California, and investigators in that country have expressed the opinion that fumigation should not be carried out when the temperature rises above 70 deg. Fahr. They also hold the opinion that there is some appreciable danger in fumigating trees carrying small fruit—i.e., at the period between the setting of the fruit and the time at which it reaches an inch in diameter. There is still a field for investigation on many aspects of citrus fumigation in the State of Queensland.

Fumigation, especially for the armoured scales such as red scale, is a very effective means of control. The gas generated penetrates to every part of the tree, and if it is of proper concentration employed under conditions that are both suitable and safe a very high percentage of kill will be obtained. One decided hindrance, however, to the extensive employment of citrus fumigation in Queensland lies in the cost of equipment, which is undeniably heavy if it has to be incurred by each individual orchardist. Where the gas is generated by the pot system, operations have largely to be confined to night work, and a further disadvantage arises from the fact that the sulphuric acid must be handled with great care. On the other hand, if spraying is adopted, the spraying of a heavy foliage tree such as citrus is no easy task, because no matter how painstaking the operator may be it is difficult to reach every portion of the tree.

The remarks on fumigation have so far been confined entirely to the pot system of generating the hydrocyanic acid gas. Attention, however, must now be directed to the recent extensive use in Australia of calcium cyanide dust for citrus fumigation. The procedure in using calcium cyanide is briefly as follows:—Firstly, observations are made to determine whether or not the conditions are favourable for fumigation, then, if the conditions are satisfactory, the trees to be treated are covered with sheets, the trees are measured, and the appropriate doses of calcium cyanide dust are poured out and blown in under the sheets. After the expiry of the necessary fumigation period the sheets are then moved on to the next set of trees to be treated.

The Department of Agriculture and Stock carried out a number of preliminary trials with this dust on citrus trees in several districts,

and in these preliminary trials, under the conditions then prevailing, good kills of red scale and white louse were obtained.

Where to Obtain Insecticides and Fungicides.

Many orchardists doubtless have their own agents or local dealers through whom they either do or can obtain their supplies of insecticides and fungicides, but, nevertheless, it frequently happens that the Department is asked where these may be obtained. For this reason it has been thought desirable to give the names of some of the dealers in or near the metropolitan area. The Australian Co-operative Fertilisers Limited, Roma street, Brisbane; Buzacott (Queensland) Limited, 371 Adelaide street, Brisbane; Southern Queensland Fruitgrowers' Association Limited, Cleveland; and Taylors and Elliotts Limited, Charlotte street, Brisbane, all handle various lines of insecticides and fungicides.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of Years' Records.	Feb., 1929.	Feb., 1928.		Feb.	No. of Years' Records.	Feb., 1929.	Feb., 1928.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	9·44	27	21·07	18·11	Nambour	8·48	32	12·07	42·58
Cairns	15·24	46	28·02	16·12	Nanango	4·06	46	4·13	10·10
Cardwell	17·04	56	15·24	22·36	Rockhampton ...	7·06	41	36·37	18·01
Cooktown	13·04	52	26·68	23·42	Woodford ...	8·15	41	6·14	24·03
Herberton	7·36	41	14·63	13·60					
Ingham	16·05	36	18·48	31·45	*Darling Downs.*				
Innisfail	22·17	47	39·52	26·25					
Mossman	15·18	15	31·60	36·73	Dalby	2·77	58	2·80	8·47
Townsville	11·60	57	5·25	9·66	Emu Vale ...	2·24	32	7·75	10·33
					Jimbour	2·65	40	1·91	3·65
Central Coast.					Miles	2·68	43	3·59	7·32
					Stanthorpe ...	3·17	55	5·85	8·36
Ayr	9·07	41	4·15	20·64	Toowoomba ...	4·22	56	10·37	15·17
Bowen	8·87	57	4·74	13·07	Warwick	3·01	63	6·72	8·65
Charters Towers ...	4·49	46	4·86	5·14					
Mackay	11·31	57	12·41	25·51					
Proserpine	11·61	25	19·58	24·13					
St. Lawrence ...	7·67	57	11·08	26·53	*Maranoa.*				
					Roma	3·03	54	4·68	4·09
South Coast.									
Biggenden	3·71	29	7·72	19 88					
Bundaberg	5·96	45	10·73	13·18	*State Farms, &c.*				
Brisbane	6·31	78	6·24	16·12					
Caboolture	7·06	41	6·72	23·35	Bungeworgorai ...	2·49	14	3·94	1·70
Childers	5·75	33	12·51	29·57	Gatton College ...	3·05	29	...	12·09
Crohamhurst ...	12·50	35	6·45	38·01	Gindie	2·90	29	5·98	3·28
Esk	5·14	41	7·91	13·99	Hermitage ...	2·20	22	5·47	9·57
Gayndah	4·11	57	8·39	12·14	Kairi	9·16	14	...	16·61
Gympie	6·39	58	10·78	18·20	Sugar Experiment Station, Mackay	10·02	31	12·77	28·49
Kilkivan	4·80	49	5·37	14·86	Warren	3·76	14	...	10·62
Maryborough ...	6·30	56	3·21	17·37					

21st March, 1929.

GEORGE G. BOND,
Divisional Meteorologist.

THE DAIRYING INDUSTRY IN QUEENSLAND.

ITS PROSPECTS IN THE CENTRAL DIVISION.

ADDRESS BY MR. W. FORGAN SMITH TO MACKAY ROTARIANS.

Queensland is the only country in the world in which dairying is being carried on successfully and on a large scale within the tropics. There are 52 butter and 73 cheese factories and 22,500 dairying establishments in Queensland, and it is estimated that 90,000 persons, or 10 per cent. of the population of the State, are dependent on dairying for a livelihood.

The amount of capital invested in the industry in Queensland alone is, approximately, £35,000,000—*Mr. Forgan Smith.*

"The dairying industry is a distinct advantage to Queensland. It affords an opportunity for settlement that is not available in other directions, and I believe its capacity for extension, not only in this State, but throughout the Commonwealth, is great indeed."

These words were used by Mr. Forgan Smith, Deputy Premier and Minister for Agriculture and Stock, to emphasise the importance of dairying, in an address to Rotarians at Mackay on 12th March. The dairying industry, he said, appeared to be a good business proposition for the Mackay district. It was of extreme importance and growing rapidly, every two out of three farmers in Queensland being engaged in it. This was the only country in the world where it was being carried on in the tropical area, which meant they had more problems to deal with than those countries engaged in the industry in the more temperate zones. There were 52 butter and 73 cheese factories, and 22,500 dairying establishments in Queensland, and it was estimated that 90,000 persons, or 10 per cent. of the population of the State, were dependent on it for a livelihood. The amount of capital invested in the industry in Queensland alone was approximately £35,000,000. Last year had been the biggest year in production since the industry was established here, and the Commonwealth statistician made the following statement in the Year Book so far as it was concerned. **"The marked development of dairying in Queensland, where the butter production nearly doubled since 1913, was responsible for the largest share of the increased output in Australia, whilst Victoria and New South Wales also made important contributions to the general progress."** The value of the industry in this State in 1914 was £2,393,402, and in 1927 it had increased to £7,250,000. That increase was represented in butter, cheese, and other dairy products.

Cream more Valuable than Gold.

It was also worthy of note that the value of the dairying industry in the Gympie district was far greater than had been the value of gold in the mining days. The quality of the product had also been improved, as a result of the Commonwealth and State Governments acting in conjunction, the idea being to place upon the markets of the world an article equal to that of any other country. **In Queensland there had been distinct progress in this particular direction during the last few years, and since he had been Minister for Agriculture and Stock—a little over four years—eight entirely new butter factories had been opened, and additions had been made to quite a number of other factories.** During his visit to New Zealand, which was an important dairying country, he had been given the opportunity of visiting some of the factories, and he found they were not ahead of the best equipped factories in Queensland. On the stock side, of course, the yield per cow was higher than in Queensland, due to some extent to better breeding and better feeding, as a more uniform rainfall enabled a more uniformly balanced ration to be supplied. In 1925-26 the Queensland percentage of first-grade butter and cheese was 68.3 of the total output, but in 1927-28 it had increased to 82.1. The higher grade butter represented a distinct advantage to the dairyman, as it provided him with a bigger cream cheque.

Science in the Dairy.

A considerable amount of work yet remained to be done in connection with scientific research. The production of butter and cheese in a tropical climate presented many problems that were not met with in countries such as New Zealand and Denmark, which were two big competitors on overseas markets. The figures he had indicated in regard to quality went to show that they were working along the right lines, and the technologists in charge of the industry were doing good work; progress would be so continued as the years went by.

Improvement in Production.

An important thing with regard to the future of dairying in Queensland was to continue not only the improvement of the factory side of the industry, to which those engaged in it were fully alive, but also to carry out improvements on the production side. **No matter how well equipped a factory might be, unless they kept the cream delivery in a first-class condition it was impossible to turn out a high quality product. In that connection the Agricultural Department was doing a great deal in instructional work, with a view to stressing on dairymen the importance of good breeding and feeding.** When one looked at the average return of butter-fat per cow in Queensland, it was not too much to expect that with proper breeding and feeding it could be increased from 150 lb. to 250 lb. a year. Proof of his statement could be established from the returns of those herds which were subject to departmental grade tests. The department tested herds free of cost with a view to ascertaining for the dairymen the cows which paid, and those which did not. Of those herds subjected to tests, some ranked as high as the average highest yield in other countries of the world.

The Better Bull Scheme.

With a view to encouraging the breeding of good herds the Government advances a subsidy of half the cost of a purebred bull to a dairyman with twenty head of dairy cattle or more. Arrangements had also been made with the shipping companies and the Commonwealth Government to give further inducements for the importation of stock from other countries. In Argentine the herds had been improved by the introduction of bulls from Great Britain, and that country would later be a competitor on overseas markets. The future depended not only on the valume of production, but on its excellence, which, when thoroughly established, would provide a good living in dairying.

The Industry in the Mackay District.

Continuing, Mr. Smith said he had followed with considerable interest the discussions that had taken place from time to time regarding the establishment of the industry in Mackay. Before starting a factory it was necessary to have an assured cream supply to commence with, as the security for any loan that might be required was not the building and equipment of the factory, but a continuous supply of cream to keep it going at its minimum capacity. There could be no doubt about the advantage of the industry being established here provided they proceeded along sound lines, and dairymen with experience in other parts of the State and Commonwealth would be a big advantage. There were lands in the district suitable for dairying, some of which were privately owned, and some of which was Crown land. It was proposed to open those areas for settlement. There was a considerable amount of land in the Bolingbroke resumption, behind Sarina, suitable for dairying as well as agriculture, and he intended to have an agricultural survey made of it when the weather was more favourable, to establish what those lands were suited for. From investigations made by his officers, some of the land there was suitable for dairying, and some for tobacco and banana-growing, both of which industries would be of advantage in the developmental work of Mackay.

The Call for Co-operation.

With regard to the proposed amalgamation, said Mr. Smith, one could readily recognise that to belong to an established organisation was a distinct advantage, as these were days when the best success was achieved in any industry by co-operation. One had to realise that no matter how good a business man might be, if he endeavoured to establish a new business there were certain losses inseparable from the initial stages. To have the experience gained by an established body was an obvious advantage. The control of the technical side of a factory was of extreme importance, and technicians

could be employed by large organisations that a small organisation could not afford to employ. He had noticed that Mr. Wilson had been here to discuss the matter of amalgamation, and the company he represented manufactured a large quantity of high-grade butter. It was not part of his duty as Minister for Agriculture to recommend an amalgamation of companies, as that was a matter the shareholders themselves would have to decide, but he would like to point out the advantages of belonging to an organisation that was in existence.

The Department of Agriculture advanced two-thirds of the cost of building a co-operative butter factory, provided the proposition was a sound one, and having regard to the principles he had previously mentioned. There should be no difficulty in finding portion of the money from that source.

The Industry yet in its Infancy.

A good deal remained to be done in connection with research in the dairying industry, and it had been proposed that a laboratory should be established by the Commonwealth Government to be worked under the auspices of the Bureau of Science and Industry. Certain preliminary investigations had been made, but one of the difficuties met with was to obtain the services of a man with the necessary qualifications, and so far very little had been done in connection with it. If the Commonwealth did not soon do something, it would be necessary for the State of Queensland to take action on its own behalf, and he proposed calling a conference in June or July of leaders of the industry and technicians to deal with the matter. **Speaking at Murgon on the previous Saturday Mr. T. Flood Plunkett stated that the dairying industry in Queensland was only in its infancy, and in the next few years its expansion was bound to be greater than ever it had been.**

A vote of thanks was accorded Mr. Smith for his address, at the instigation of the President (Mr. A. M. M. Calletly).

FLAVOUR DEFECTS IN MILK.

C. McGRATH, Supervisor of Dairying.

Flavour is so important that every attention should be given to aroma in dairy products. A high-grade food product must be free from "off flavours" and odours. Milk is subject to undesirable flavours and odours which if not eliminated detracts from its favourable appeal to the appetite fo consumers, who assume that an "off flavoured" product is intrinsically bad. The products of "off flavoured" milk are usually wanting in the first essential in high-grade food products, that is, an appealing flavour and odour.

The causes of "off flavour" and odour defects in milk have been classified by research workers under these four headings:—(1) Abnormal physical condition of the cow; (2) absorption of odours at the time of milking and after; (3) odours arising from highly-flavoured feed consumed by the cow; and (4) flavours and odours due to biological changes in milk.

1. The Health of the Animal.

Milk secretion is a physiological function and is highly complex in its nature. Variation in the composition of milk is liable therefore to happen should the cow's system be not normal. An abnormal condition of an animal's health disturbs the chemical, physical, and physiological properties of milk, and detrimentally affects the flavour, the food, and market value of the milk and its products.

This is an important matter and calls for the special attention of the dairyman. Close contact with the dairy herd enables him to detect unhealthy animals, and the remedy is culling affected cows from the herd.

2. Flavours and Odours.

"Off flavours" and odours are absorbed during the process of milking, and subsequently, and include odours from tainted air arising from dirty sheds, yards, and unsanitary surroundings generally; also from fumes and oil odours where milking plants are in use.

All milking plants should be so located and erected as to protect the milk and its products from contamination.

3. Food Flavours.

The absorption of air-borne food odours such as silage and green lucerne has little influence on the flavour of the milk, while green maize, oats, wheat, barley, and hay could be fed during milking without imparting undesirable flavours and odours to the milk.

"Off flavours" and odours are imparted to milk through feeding highly-flavoured feeds, also from rank pasturage. From the results of research workers it is known that for the most part the food taint comes through the body of the cow, and not through absorption of taint from the surrounding air.

The food flavours and odours are transmitted through the stomach and lung walls direct to the blood, then through the mammary glands to the milk. In investigating the garlic flavour in milk it was found that its transmission was a matter of minutes only.

Green lucerne, silage, turnips, and rape, when fed to dairy cows, will give rise to undesirable flavours and odours in the milk.

Some foods, even when fed in large quantities, do not impart an objectionable flavour to milk and these include native grasses and many varieties of introduced grasses, also green maize, wheat, oats, barley, &c., well-cured hay, and many of the concentrates.

Investigation has proved that milk drawn from a cow within one hour after having eaten high-flavoured foods will carry a strong flavour of the food consumed. If longer than one hour elapses from the time the cows have eaten certain strong-flavoured food until they are milked the product is comparatively free from the "off flavour" and odour. Such foods should be fed to cows in profit one hour or upwards before milking time.

Many varieties of weeds (herbage) which thrive on cultivated areas and on scrub soils are among the worst offenders in imparting undesirable and, in some instances, intensely disagreeable flavours and odours, to milk, which are carried into the products manufactured therefrom, and depreciate their market value.

From careful investigations it has been found that a number of food taints are perceptible in milk produced three hours and upwards subsequent to the animal eating such foods.

Garlic flavour, for instance, is very pronounced and objectionable in milk. If a milch cow inhales the odour of garlic, its milk will absorb the garlic taint which will remain perceptible in the milk drawn up to seven hours after. When some foods possessing pronounced undesirable flavours and odours are consumed by cows in profit their milk has a pronounced "off flavour" and odour which is most difficult to remove by modern methods of pasteurisation and deodorisation.

Rank pasturage when grazed on, also produces a milk possessing an undesirable flavour.

4. Biological Changes in Milk.

The activity of micro-organisms bring about changes in milk and its product which give rise to a variety of flavours and odours some of which are desirable and others injurious and objectionable.

The means by which bacteria gain access to milk may be grouped thusly:—

(1) Intra mammary.
(2) Introduction in the course of milking operations.
(3) Milk utensils.
(4) Milking plants, coolers, and pasteurisers.
(5) Contamination by dust, dirt, and maturing micro-organisms.
(6) Contamination by absorption of impure air and surroundings.

The essential conditions for bacteria control in milk are healthy stock, sound nutritious fodder, the observance of sanitary principles pertaining to the production and handling of the milk and control of temperatures.

LOSS OF BUTTER FAT IN SEPARATING.

By F. J. WATSON, Dairy Instructor.

From results of tests of separated milk received from dairymen in different districts the fact is evident that loss of butter fat in separating causes very considerable monetary loss to many producers of cream.

Apart from losses through separators being out of order, or through wear and tear, one particular cause of loss of fat is very frequently met with, even when separators are otherwise in perfect condition. In many instances where hand-driven or small belt-driven separators are used the original cistern is discarded and a larger cistern or vat is substituted and fitted to a stand separate to the frame of the separator. It is frequently the case that this vat is fitted with a tap of different proportions to that on the original cistern, and when in operation this tap is usually in a position entirely different from that on the original container, thereby causing faulty separation. It may be observed that the tap of the cistern supplied by the makers of the separator is so fitted that when opened wide to admit milk into the separator bowl it permits the float to rise only to a certain height, and the float, in turn, prevents the milk from rising beyond a certain height in the funnel. The height at which the milk should be kept in the funnel is, in some makes of separator, marked on the inside of the funnel. When a substitute vat is used it is necessary that the height of the vat stand should be so adjusted that when the tap is wide open the milk will not rise in the funnel any higher than it would if the original vat were in use.

Using a Separator—Important Points.

In using the separator the following points are of importance:—

The separator should be run at the speed indicated by the maker throughout the time of separation. The separator bowl should not be over-fed by admitting milk into it too fast, as will be done when the tap and float are in the wrong positions as described.

Regulation of the milk flow should not be done by hand.

The correct speed of the bowl and the flow of milk should first be assured and then, and not before, should the cream screw be adjusted to obtain the desired percentage of fat in the cream.

The temperature of the milk is an important factor. If the milk is cold, separation is likely to be incomplete. The temperature should be about 90 deg. Fahr., and the separation should preferably be done while the milk is still warm immediately after milking.

It should be remembered that the separator has been made and adjusted by its maker to cleanly separate a certain quantity of milk at a certain speed and in a certain time, and that any variation in speed, feed, time or adjustment will result in faulty separation.

If the separator is run only a few turns per minute below its proper speed, or if it is fed with only a few gallons per hour beyond its intended capacity, there will be a loss of fat with which the adjustment of the cream screw has nothing to do.

The following table, compiled from actual experiments, shows loss of fat that may occur when the separator is not run at proper speed.

Cream.	Loss when Separator was Run at Correct Speed.	Loss when Separator was Run 10 to 15 Turns Too Slow.
Per cent.	Per cent. Fat.	Per Cent. Fat.
30	0·020	0·08
32	0·025	0·085
35	0·030	0·095
36	0·020	0·110
38	0·030	0·140

Running the separator over speed does not give any appreciable advantage in separating.

QUEENSLAND RAIN FOREST TREES.

By W. D. FRANCIS, Assistant Government Botanist.

The Pigeon-Berry Ash or Southern Maple is a large tree of the rain forests of the ranges of Southern Queensland and Northern New South Wales. In botanical nomenclature it is known as *Cryptocarya erythroxylon*. The trees have no prominent buttresses. The bark is pale and somewhat scaly; when cut it has a peculiar fragrance. The wood is also slightly aromatic, and is slightly pink when freshly cut. In appearance the wood is somewhat like Queensland maple, but is scarcely so ornamental. Nevertheless, the wood is a useful one for cabinet work and indoor building purposes.

Photo.: W. D. Francis.]

PLATE 85.—PIGEON-BERRY ASH (*Cryptocarya erythroxylon*).

A tree in the ranges to the east of Killarney.

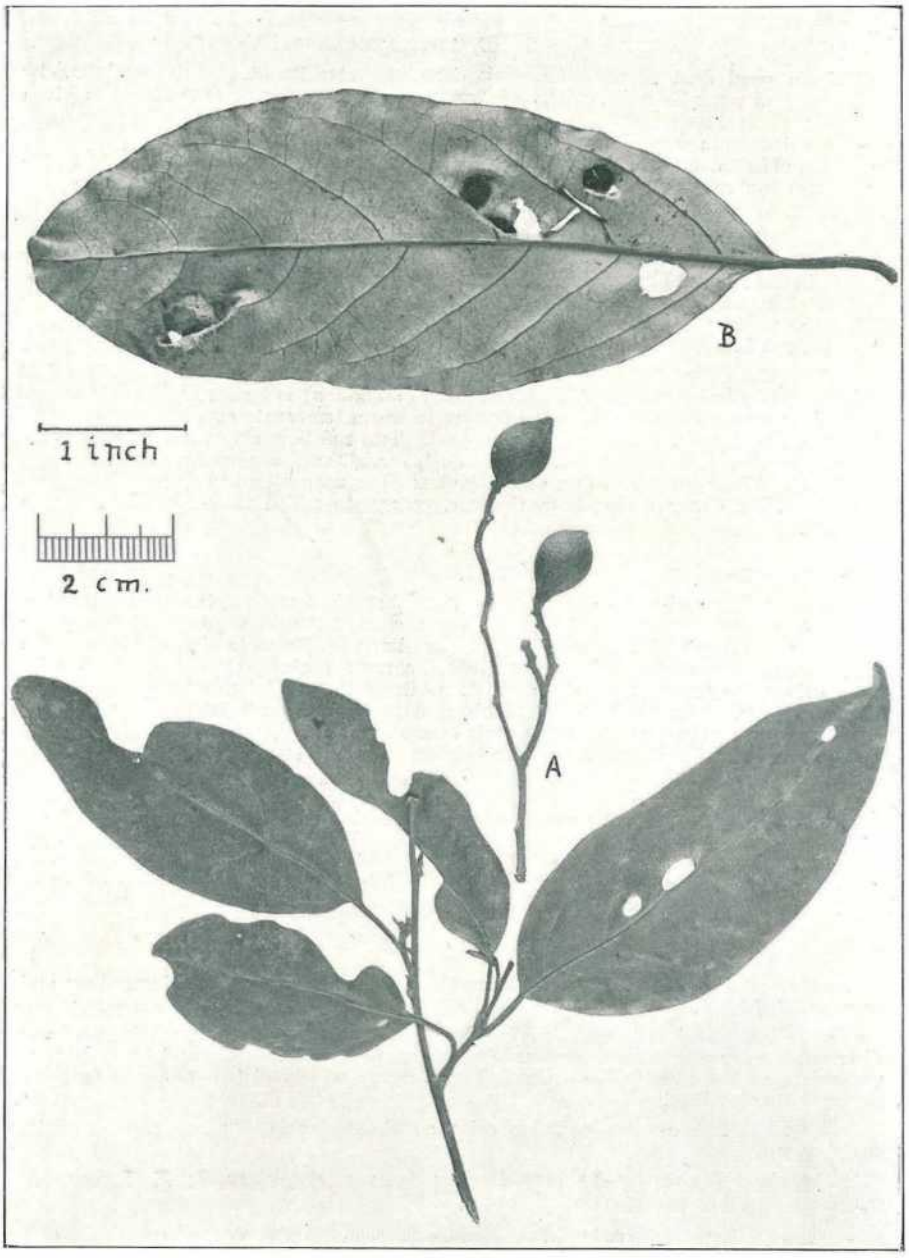

Photo.: Department of Agriculture and Stock.]

PLATE 86.—PIGEON-BERRY ASH (*Cryptocarya erythroxylon*).

A, Dry Fruits; B, Leaf showing underside.

WEEDS OF QUEENSLAND.

THE CORRECT BOTANICAL IDENTITY OF THE LANTANAS NATURALISED IN QUEENSLAND.

By C. T. WHITE, Government Botanist.

As a good deal of work is being done in Australia at the present time by veterinarians regarding the effects of Lantana on stock, the present notice is given defining those Lantanas naturalised in Queensland. As is well known, Lantana causes a disease in cattle known colloquially as "pink-nose."

In published reports of feeding tests with Lantana the species have been confused, for, unfortunately, the material experimented with not having been submitted to a botanist for correct determination.

The first record of the disease is by Tucker in the Annual Report, Department of Agriculture and Stock, Brisbane, 1910-11, p. 25. A further report was made by Pound in the Annual Report, Department of Agriculture and Stock, Brisbane, 1913-14, p. 109. There is undoubtedly confusion here, the red flowering Lantana referred to being the variety *Sanguinea*, and the pink flowering Lantana being the common *L. Camara*, not *L. Sellowiana*.

From the records so far published it would seem that both species are harmful, but the red flowering variety (*L. Camara*, var. *Sanguinea*) is by far the more virulent.

Lantanas are common in garden culture in warm temperate countries, and several forms of the common Lantana are recognised. Two red flowering varieties have been described—viz., var. *crocea* (*L. crocea* Jacq.) and var. *sanguinea* (*L. sanguinea* Medikus). These are very close, but I think the one naturalised in Queensland comes under var. *sanguinea* rather than the var. *crocea*, to which it has previously been referred.

1. *Lantana Camara* (Common Lantana).

Botanical Description.—A rambling shrub, stems 4-angled, the angles bearing short, somewhat recurved prickles. Leaves opposite, bright green above, paler beneath, averaging 2½ in. long and 1½ in. wide, but variable as to size, on short stalks about ½ in., subcordate, rather pointed at the apex, scabrid (rough to the touch) above, the veins and veinlets clothed with white, rather soft hairs beneath, margins serrate-crenate. Flowers in heads of about 3 flowers, about 1 in. across, on stalks about as long as the leaves, opening pale cream with a dark yellow centre, dying off lilac or purplish. Fruit fleshy, purplish black when ripe, ovoid, about ⅓ in. long, borne on the floral receptacle which becomes elongated, thickened and somewhat fleshy.

Distribution.—A native of tropical America, now widely distributed as a weed over the tropical and subtropical portions of the world.

Botanical Name.—Lantana, an ancient name of the Viburnum, which this resembles a little in foliage (Loudon); Camara, an old generic name of the Lantana.

Botanical Reference.—*Lantana Camara* L., sp. pl. 874.

2. *Lantana Camara* var. *sanguinea*.

Botanical Description.—Differs from the type in the flowers opening yellow and turning bright red.

Distribution.—A native of the West Indies, but now, like the normal form, widely distributed over the tropics and subtropics of the world. The variety is not so abundant as the type in Queensland, but is fairly widely distributed, and in some places is the dominating form.

Botanical Name.—Genus and species as above; varietal name *croceo*, Latin, meaning saffron-coloured.

Botanical Reference.—*Lantana Camara* L., var. *sanguinea*, L. H. Bailey (*L. sanguinea* Medikus in Act. Acad. Theod. III. Phys. 229).

3. *Lantana Sellowiana* (Small or Creeping Lantana).

Botanical Description.— A shrub, climbing in the absence of support, trailing along the ground, or weeping over rocks, &c.; branches slender, quadrangular in the young state, but soon becoming more or less rounded; unarmed. Leaves bright green above, paler beneath, rather small, averaging 1 to 1½ in. long and about ¾ in. broad, but variable as regards size, on a stalk of about ¼ in., margins serrate-crenate, soft to the touch, covered above and below (particularly on the veins below) with scattered white hairs. Flowers in heads of about 20 flowers and about 1 in. across,

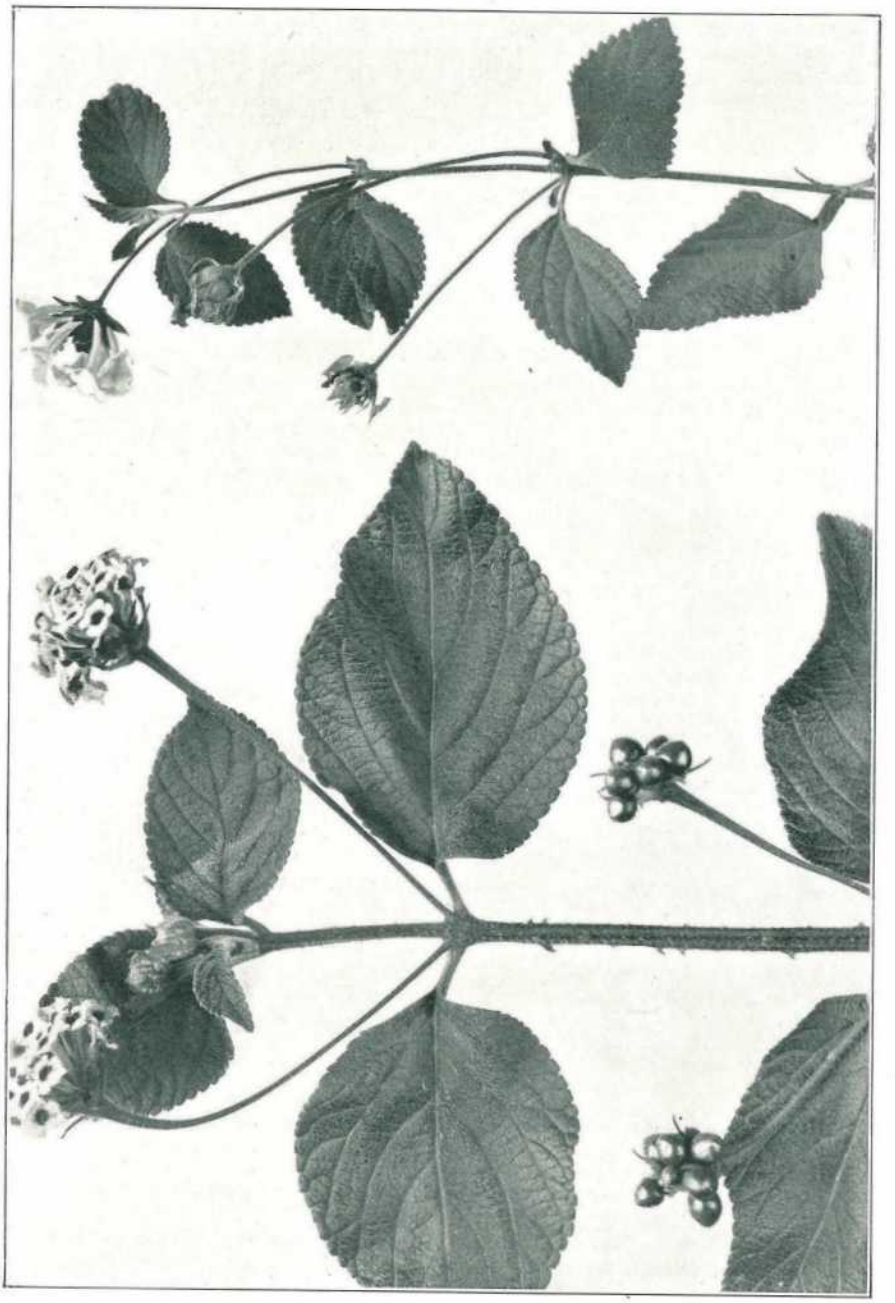

PLATE 87.

Left.—Common Lantana (*Lantana Camara*). Right.—Small or Creeping Lantana (*Lantana Sellowiana*).

in the leaf axils on slender stalks about twice as long as the leaves, mauve or light purple with a yellow throat, becoming darker and losing the yellow throat with age; outer bracts (subtending the flowers) broadly ovate forming a sort of involucre, inner ones successively narrower. Fruit a small reddish-brown drupe ("berry"), borne on the enlarged receptacle, bracts persistent.

Distribution.—A native of South America widely cultivated in tropical and sub-tropical countries as an ornamental trailer.

Common Names.—Small Lantana, Trailing or Weeping Lantana, Wild Verbena are names applied to it in Queensland.

Botanical Name.—Lantana (see under *L. Camara*); *Sellowiana* in honour of Friedrich Sellow, a German botanist who travelled extensively in South America during the early part of the nineteenth century.

Botanical Reference.—Lantana Sellowiana Link and Otto, pl. sel. hort. Berol., p. 107, t. 50.

QUEENSLAND SHOW DATES, 1929.

The following is the official list of Queensland Show Dates for 1929, as issued by the Queensland Chamber of Agricultural Societies:—

Miles: 3rd April.
Pittsworth: 4th April.
Chinchilla: 10th and 11th April.
Clifton: 10th and 11th April.
Toowoomba: 15th to 18th April.
Dalby: 22nd to 24th April.
Goondiwindi: 23rd and 24th April.
Nanango: 23rd and 24th April.
Kalbar: 27th April.
Allora: 30th April and 1st May.
Charleville: 1st and 2nd May.
Taroom: 6th and 7th May.
Kingaroy: 2nd to 4th May.
Beaudesert: 1st to 4th May.
Mitchell: 8th and 9th May.
Boonah: 8th and 9th May.
Wondai: 9th to 11th May.
Mundubbera: 8th and 9th May.
Blackall: 7th to 9th May.
Ipswich: 14th to 18th May.
Roma: 14th and 15th May.
Springsure: 15th and 16th May.
Murgon: 16th to 18th May.
Gayndah: 15th and 16th May.
Goomeri: 21st and 22nd May.
Wallumbilla: 21st and 22nd May.
Biggenden: 23rd and 24th May.
Emerald: 23rd and 24th May.
Toogoolawah: 24th and 25th May.
Maryborough: 28th to 30th May.
Marburg: 3rd June.
Childers: 4th and 5th June.
Lowood: 7th and 8th June.
Gin Gin: 6th to 8th June.
Bundaberg: 13th to 15th June.
Bororen: 17th and 18th June.
Gatton: 19th and 20th June.
Gladstone: 19th and 20th June.
Mount Larcom: 21st and 22nd June.
Rockhampton: 26th to 29th June.
Esk: 28th and 29th June.
Kilcoy: 4th and 5th July.
Townsville: 9th to 11th July.
Home Hill: 12th and 13th July.
Samford: 12th and 13th July.
Caboolture: 18th and 19th July.
Rosewood: 19th and 20th July.
Laidley: 24th and 25th July.
Nambour: 24th and 25th July.
Maleny: 31st July and 1st August.
Bowen: 31st July and 1st August.
Maleny: 31st July and 1st August.
Nundah: 3rd August.
Royal National: 12th to 17th August.
Goombungee: 30th August.
Malanda: 18th to 19th September.
Beenleigh: 27th and 28th September.

CARE OF CHURN AND WORKER.

The importance of keeping the combined churn and worker in a satisfactory condition must not be overlooked. As the period of service increases extra care is required in order to keep the wood surface that comes in contact with the cream and butter in a clean and sanitary condition.

The liming of the churn once a week will be found beneficial. This operation is carried out by placing in the churn, which has previously been thoroughly cleansed and scalded, approximately 50 gallons of warm water (120 deg. Fahr.), to which is added about 10 lb. of slacked lime. The churn is then revolved for ten to fifteen minutes at intervals of one hour. The lime solution should be held in the churn overnight, the churn being made airtight to prevent the lime from drying out on the wood surface. The following morning revolve the churn for five or ten minutes, run off the lime solution, and thoroughly rinse the churn with clean cold water to remove all particles of grit or foreign matter.

Before use the churn should be scalded and cooled in the usual way.

HINTS FOR TRACTOR OWNERS.

THE "FIERCE" CLUTCH AND THE LEATHER-FACED CONTACT SURFACE.

By E. T. BROWN.*

The clutch mechanism calls for very little attention apart from keeping it lubricated. It is necessary, however, to adjust it from time to time, but this is a simple matter, and only takes a few minutes. As a general rule, the spring that forces the contacting surfaces together can be regulated, and in this way any slight alteration that is needed can be brought about. When one of the contacting surfaces is leather-faced, as is frequently the case, it may be necessary to dress the leather with some suitable oil to make it "bite" more firmly. When this is necessary the fact is known since the clutch is fierce—that is, it fails to slip slightly when the clutch is being engaged. A fierce clutch causes the engine and transmission mechanism to engage too suddenly, with the result that a severe strain is imposed on the parts concerned. If this fierceness be noticed, the clutch should be disengaged and held in that position by means of blocks of wood, or any other material suitable for the purpose, while the leather is being dressed. The leather should be thoroughly cleaned—with petrol if oil-smeared—and then dressed with colan oil. It is sometimes suggested that castor oil should be employed for this purpose, but although it may be used when colan oil is not available it is not nearly so good. The oil should be allowed a few hours, with the clutch disengaged, to soak well into the leather.

The Driving Chains.

The driving chains, when these are employed as part of the transmission system, play a very important part in the efficiency of the outfit. For this reason they should be looked after in a proper manner. It is not enough to oil them occasionally. Owing to the nature of the work done they very quickly become clogged with dirt of one kind and another. The need for attention to this part of the outfit does not only arise from the question of damage to the parts concerned, but unless the chains work freely more power is absorbed for propelling the machine and less is available at the draw-bar. If the chains be kept clean and well greased there will not be much chance of the dirt penetrating the working parts of the rollers, but even that on the outside will make the whole work less easily. All mud should be scraped off every time the tractor is used and a liberal supply of grease should be applied. Before running the machine again oil should be added to the grease so that the two together will permeate the bearings. Occasionally it is a wise plan to take off the chains, brush them with kerosene, and soak them afterwards in melted tallow. In addition to keeping the chains clean and lubricated it is essential to see that they are adjusted correctly. The best results are obtained when there is a certain degree of play. The upper part of each chain, between the two sprocket wheels, should give 2 to 2½ in. when forced upwards. This, generally speaking, is the best setting for the majority of tractors. Adjustment is simple. All that is required is to shorten or lengthen the radius rods by means of their screwed ends. It is important to see that both chains are working with the same degree of play, otherwise a severe strain is put on the transmission.

Starting up the Engine.

No tractor engine is particularly easy to start-up. But by priming and making use of the impulse-starter or the decompressor, if either be fitted, and knowing how to swing the engine, it becomes more easy. Most tractors are fitted with dual tanks. One—the smaller—contains petrol for starting-up; the other kerosene, the fuel used when the machine is at work. The reason petrol is employed in the first instance is that it is more volatile, and therefore gives a better firing mixture when cold. Before attempting to swing the engine the spark should be retarded. If advanced the engine backfires, and may cause serious injury to the operator. The spark is always timed to occur before the end of the compression stroke when the engine is "revving" normally; if set in the same position when the engine is being rotated slowly by hand it occurs long before the end of the compression stroke. The firing of the mixture thus early naturally results in the piston being forced in a backward direction. Incidentally it may be mentioned that one make of tractor is fitted with a patent device that renders a backfire impossible. To save turning the engine too much by hand the cylinders should always be primed. The compression taps should be opened

*In the "Farmer and Settler."

and a little petrol injected into each cylinder; if no such taps be fitted the sparking plugs must be taken out and the petrol injected through these openings. The engine should then be given two complete turns, so that the fuel vapour in one cylinder is fully compressed and on the point of firing. If the engine be well tuned, with every part properly adjusted, it should start up at this stage with one strong pull up of the starting handle. A little bother beforehand saves a vast amount of swinging—always a laborious job on any except the smallest machines.

BORDER STOCK RESTRICTIONS.

The relaxation of restrictions on the introduction into New South Wales of stock from Queensland has been the subject of repeated representations made by the Minister for Agriculture and Stock, Queensland (Mr. W. Forgan Smith), to the Minister for Agriculture, New South Wales (Mr. H. V. Thorby).

It has been contended by Queensland stockowners, supported by the Stock Department in this State, that these restrictions are harassing, and in some instances unjustified. It is maintained that there is no necessity for the drastic provisions in New South Wales regulations dealing with the introduction into that State of Queensland stock which have been depastured in areas free of the tick and maintained tick free for years.

As a result of these representations Mr. Forgan Smith has now been officially advised that a proclamation has been issued under the New South Wales Stock Act, which provides that the country between the Western Railway and the Great Dividing Range, from Toowoomba on the east to the Miles-Wandoan Railway on the west, has been included in the area known as Schedule "T."

As a result of the inclusion of this country in Schedule "T," all cattle which have been in the area referred to for the preceding three months prior to removal to New South Wales are now eligible for entry into that State after receiving one dipping under official supervision in an approved dip, and another dipping on arrival at the border within a period of from five to fourteen days. This is a considerable concession, in that from three to four dippings were hitherto required to permit of the introduction of cattle into the adjoining State, and cattle by road from the new portion included in Schedule "T," the area north of the railway, were not eligible for entry into New South Wales until they had been south of the Western Railway for a period of three months.

In addition to the proclamation referred to, a previous proclamation was issued modifying the restrictions on the movement of cattle into New South Wales from that part of Queensland described in their regulations as Schedule "Z" to permit of entry into New South Wales at the border on one dipping, provided the cattle have been in Schedule "Z" or Schedule "W" for a period of three months.

It is understood that the New South Wales authorities have under consideration the removal of the line described as "K" from a point between Tallwood and Miles to a point east of Goondiwindi, and an inspection has been arranged by the New South Wales Stock Department of the area in order to locate a suitable position for the line.

UNSEEN FRIENDS AND FOES.

What makes milk and cream sour and causes the ripening of cheese? What causes scour in calves, tuberculosis in cattle, and diphtheria in children? The answer is bacteria, which are also called germs and microbes.

These micro-organisms are so small that they cannot be seen with the naked eye, but can be seen and distinguished through a microscope. Large numbers of them can find accommodation on the point of a needle. All are not harmful, and many species of micro-organisms are necessary for furthering the work of man in his varied industrial and scientific activities. Some, however, are harmful, and scientists are constantly seeking means to destroy them. The means used to fight germs are called disinfectants. Fire, heat, boiling water, and live steam are in common use as disinfectants or germ destroyers. The cheapest disinfectant and one that is available on every farm is direct sunlight. Sunlight is an effective germ destroyer, and we should make more use of it. Limewash is a good disinfentant for wood work of sheds and dairy premises. Sunlight and limewash are aids in the maintenance of sanitary conditions on the farm.—C. McGRATH, Supervisor of Dairying.

THE BUFFALO FLY PEST.

STATEMENT BY THE PREMIER.

The Premier, Hon. W. McCormack, informed the Press recently that he had read the reply made by the Prime Minister (Mr. Bruce) to the question asked by Mr. Grosvenor Francis relative to the Buffalo Fly pest. The Prime Minister is reported to have said that "the work now being carried out to combat the Buffalo Fly pest is being done by the Council for Scientific and Industrial Research. He did not recollect whether any assistance had been rendered by the Queensland Government, but would investigate the matter."

The Buffalo Fly has been known to exist in the Northern Territory for more than a quarter of a century, and has been a pest to cattle in the northern part of Western Australia for many years. Its presence is known in a part of north-western Queensland as a pest which spread from the Northern Territory, and is affecting the herds of cattle-owners in two of the States of the Commonwealth. The Queensland Government is of opinion that the control of the pest should be treated as a national matter, and advised the Commonwealth Government to this effect.

Activity of the Queensland Government.

In 1925 the Council for Scientific and Industrial Research arranged with Mr. Murnane, Bachelor of Veterinary Science, to visit the northern parts of Western Australia and the Territory with a view of submitting a report upon the incidence of the Buffalo Fly in those areas. In December, 1926, Mr. Murnane submitted a report upon his findings and, inter alia, stated that the Buffalo Fly was, at that time, within 70 miles of the Queensland border. In January, 1927, the Prime Minister was communicated with and requested that every effort should be made to bring the pest under control within the Territory and obviate the danger of its spreading into Queensland. The Queensland Government offered to co-operate, through its officers, with the Commonwealth Government. It was further suggested that urgent investigations should be carried out by the Commonwealth Authorities with a view of restricting the spread of the fly. The Federal Government failed to take any action that would be efficacious in restricting the spread of the pest, and in March, 1928, the Prime Minister was then advised of its seriousness to the pastoral interests of this State, and a suggestion was made that a buffer area should be declared in that part of the Northern Territory adjoining the north-western boundary of Queensland. This suggestion was not acted upon, nor was any other action taken that was likely to be efficacious in the removing of the danger of the introduction of the fly into Queensland.

State Departmental Action.

Although the available reports indicated that the fly was some distance from the Queensland border, the State Government did not relish the inactivity of the Federal Authorities in attempting to cope with the position, and in July, 1928, arrangements were made for an officer of the Department of Agriculture and Stock, in the person of Dr. John Legg, D.V. Sc., to make an inspection of the north-western part of Queensland and the border of the Territory and report. Dr. Legg advised that he had not been able to detect the presence of the fly at the time of his visit, but was informed that the stock on portion of a Queensland holding bordering on the Territory were infested with the fly during the wet season. A copy of this report was made available to the Commonwealth Government and in August, 1928, the Prime Minister was advised as to the position and the seriousness of the introduction of the fly into Queensland from the Territory, and the request was again made that a national view should be taken of the possible spread of the Buffalo Fly, and a recommendation was made that certain properties be resumed by the Federal Authorities and an effective buffer area established. To effectively remove the possibility of the fly being carried by travelling stock from the Territory into Queensland through the stock crossing at Wollongorang, this crossing was closed in October, 1928, and the Commonwealth Authorities were notified accordingly.

In order to determine definitely whether or not the pest had extended from the Northern Territory to the holdings on the Queensland border, arrangements were made for Messrs. Smith, Entomologist, and Clegg, Stock Inspector, to visit that part of Queensland and report. The report of these officers indicated that the Buffalo Fly was present on stock on these holdings. A copy of the report was made available to the Federal Authorities and the Council for Scientific and Industrial Research. Upon the discovery of the fly on the holdings referred to these areas were placed under quarantine and incidentally the movement of stock from such holdings prevented.

Queensland Authorities Fully Alive.

From the foregoing it will be noted that the Federal Government has been fully apprised of the position from time to time. A definite proposal was made to that Government in January, 1927, and in subsequent communications this proposal was reiterated, but to date this Government has not received any definite advice as to whether or not the Federal Authorities are prepared to treat this matter as one of national importance nor have they suggested any alternative to the proposals made by this Government.

The Department of Agriculture and Stock, through its officers, has been closely co-operating with the Council for Scientific and Industrial Research, and a clear understanding has been arranged with that body as to the manner in which the entomological investigations are to be carried out. The matter of bringing this pest under biological control has suggested itself and it is in this sphere that the science workers, associated with the Council, at present are engaged. Unfortunately, the position is that if success is achieved along these lines, it will be some considerable time before the spread of the fly will be checked, and in the interim there is the grave possibility that the fly will spread further eastward. This Government informed the Commonwealth Government of its willingness to co-operate in any proposal that may be considered effective in controlling the spread of the fly, but while the Commonwealth Authorities maintain an attitude of "do nothing" it becomes rather a difficult matter to furnish particulars of any good that has been achieved. On the other hand the particulars herein supplied clearly indicate that this Government has done all that has been humanly possible under the circumstances, and in the event of the Commonwealth Government advising that they are not prepared to deal with this matter as it should rightly be dealt with—that is, on a national basis—this Government will take such further action as may be necessary to keep the fly within restricted limitations.

THE CULT OF THE COLT.

By "U 9 L."*

VIII.

TAMING THE OUTLAW.

The colt we tackle this time is a sour brute of a thing, one with no more breeding than a Hun, and verily its ideals of honour and sportsmanship are unspeakable. All our blandishments are contemptuously hit to leg, as it were, and try as we will we can't get in touch with the thing at all. By that latter I mean in a mental sense. Physically we can put out hands on it, but mentally and morally we're outside the yard. I'm not going to weary you with the tedium of handling a colt of this sort—there's enough real trouble in the world without looking for it on a sheet of paper—and just in the process of running through there may be an odd point which is worth consideration.

We throw the ropes on the colt. Immediately in a squealing fit of rage it bucks round and round the yard, kicking and striking at anything and nothing, and it ends by entangling itself like unto a fly in a spider's web. Now, that's a nice mess, isn't it? The thing has shown by its actions that it's not fit company for a white man, and yet we have to untangle it. It's hazardous work; but it's got to be done. There's one point we've overlooked, though. With that last flying lash of its hind feet the colt nicked a bit of vein on it's other hind leg, and from that cut the blood is squirting. There's no danger of him bleeding to death—such rubbish as this doesn't ever meet an untimely end—and we've got to staunch that flow after we have the ropes off.

The trouble, though, is to get them off. It's no trouble at all! As sure as ever a snorter pricks its own bubble by letting a bit of blood from itself, that cools its fiery temper and quells its unruly spirit. In its own imagination perhaps it thinks

* In the "Pastoral Review for December, 1928. Previous notes on this subject by the same interesting and well-informed writer were reprinted in the March, August, October (1928, January, February, and March (1929) "Journals" from the February, April, May, July, September, and October (1928) numbers of the "Pastoral Review."

itself bleeding to death, and its feeble ounce of pluck is gone. When a thing of that sort has bled a bit—not more than about an egg cup—it's as tame as Mary's little lamb. It hasn't the guts to resist, it hasn't the desire to fight, and it stands helpless and harmless while you do with it what you wish. There may be exceptions to this; but I've never met 'em, and I've had it happen with more than a few. In fact, let me whisper, on real bad 'uns I've taken an ounce of blood on purpose and found it act as I desired every time. Mind you, I don't say it was good for the colt. But the sort of thing to which I refer had no good in it, so it didn't matter anyway.

If the blood is flowing freely and won't stop when you reckon it should, the easiest, if not the best way to stop it is with a pin and horsehair. Pin the lips of the wound together—just slip the pin through any old way and don't worry about making a neat job of it. Then get a long hair from the horse's tail and wind that figure of 8 backwards and forwards over and round the points of the pin. In next to no time at all the blood will clot on that hair and caulk the wound, stopping the bleeding.

Now, before going further, let me have a word or two to say about temper. Temper, like charity, covers a multitude of sins, and there are tempers and tempers. For the surly, stubborn, broody, and sluggish tempered horse I wouldn't give you threepence a dozen or accept them as discount thrown in on a pound of tea. And for the thing without any temper at all I wouldn't return anything but curses. You know the latter type of horse. It's the sort which is always falling over itself in an effort to please you, which never does anything wrong when you're looking, and which is an abomination on the face of the earth.

The Colt with a Bit o' Devil.

But when a man gets a colt with whips of devil, with a snap and sparkle in its moods, then he's got something for which he should return thanks. Above everything else give me a horse that's a contrary little cuss, that fights clean and wholesome, and one with individuality and a spirit and soul of its own. Give me something that's so darned contrary it won't admit it's beat, and when the dry sweat's caking its body, and when its breath comes in choking sobs, when it's so weary it can't lift its feet clean from the ground, then will that contrariness and devil rise superior to circumstances and its spirit will see you in blazes before it'll admit it's beat. Yes, give me devil without spitefulness, snap and sparkle without sullenness, and fight without vice and I'll show you what a horse is and what it can do.

Unfortunately, we're not handling a thing of that sort now. This that we've got is a negative proposition. Kicks! Why, my dear old sir, the thing kicks just for the fun of it. Can we cure it? I'm afraid not. Some people advocate hanging a bag of earth in a stable and letting the horse kick to its heart's content. Every time that horse kicks the bag it comes back and knocks him harder. The horse may get tired; the bag keeps coming all the time. In theory that may be right. In practice it's a blank. It's only teaching a horse to kick. Try it if you wish; but don't blame me if you get hurt.

Curing Kicking with Confidence.

The only thing which will stop kicking is confidence. Kicking, nine times out of ten, is prompted by fear and is used as a means of protection. You've got to overcome that fear, and in overcoming it you've got to show the horse that you're not afraid. Mind you, this is a fool's game, but it can be done, and there are lots of fools in the world. Move about the horse, walk behind him, lay yourself open to a knock or two, and keep your eyes peeled and your legs under you that you don't get it. If by any chance you happen to be standing in the corner of a yard or stall and a horse, any horse, swings round on you and brushes your face with the butt of his tail, that's the time your heart skips a beat or two and jumps to your mouth. There's only one thing to do; stand perfectly and absolutely still. It takes doing, let me tell you, but it's best done unless you're as slippy as greased lightning in your actions. Usually the horse doesn't know you're there. If you move you frighten him. If he's frightened he takes the only means he knows to protect himself from behind. Keep still, pray if you wish, and look for a chance to slip out of harm's way as easily and as soon as possible. Another way you may nullify a kick is by dropping your hand on the hamstring—the Achilles tendon, to air the only bit of anatomical knowledge I possess. That has a paralysing effect on that hind leg.

The Striking Habit.

When we go to slip the halter over the ears of the thing we're handling now it shows touchy about the ears, swings its head away in a wild sweep, and perhaps both fore feet whizz through the air and smack the ground beside us. Such things do happen, you know. Mobs and mobs of horses are touchy about the ears. More often than not that touchiness is expressed when the bridle is being taken off, and they submit without trouble to the thing going on. In fact, with some of 'em, it's a dickens of a job to get that bridle off their ears.

There's no cure for this—none that I've found, anyway. It's merely a case of custom, over and over again, and soothing words all the time. I've seen them so bad that they had to be roped to a post, or one front leg tied up, before the bridle could be taken off them. But with care they come to it in time. They'll always be a bit ticklish about the ears; but so long as a man doesn't infringe too greatly they aren't more than a little bit of a nuisance. That striking habit is something the same as kicking—it has to be overcome by moral suasion. It's no use taking a stick to a thing of that sort when the horse is young. In very rare cases, in later years, a stick may have a beneficial effect. And, again, it may only provoke an added outburst. Moral suasion's a winner every time when handling colts. Its effect bites deeper and the results are more lasting.

After an infinity of trouble we teach this slug which we have in hand all the other rules of the curriculum, and now we try and induce it to lead. Needless to say, and as we expected, it won't! It takes a couple of steps stubbornly, its head held forward and its tail jammed, and all the soft words and lollied blandishments we toss the thing don't penetrate skin deep.

When it is You or the Colt for it.

We try again. This time it comes with a run—it comes on its hind legs, with its mouth open, and with sudden death attached to the pedal extremities of its two fore legs! Now you're up against it, sir. This is distinctly a breach of good manners that can't be tolerated in any decent school. You've nothing in your hand but a bit of a harmless strap that wouldn't inconvenience a mosquito; you've got a raging devil in front of you, and I can tell you from the bottom of my heart that at no other time during this journey through life does a man feel so altogether helpless and alone. You've nothing in the yard with which you may defend yourself, and it's you and the colt for it. Which is going to win?

That depends entirely on the stuff of which you're made. You know there's a bit of a spreader outside the yard—a lovely bit of a stick about 3 ft. long and an inch through, and you'd give sixpence out of your own pocket to have it in your hand. But you daren't leave that yard till you've asserted yourself and proved to that dumb brute beast of the field before you that you're a better man than he is. You're up against it, and you've got to assert yourself. There's only one thing to do; you've got to go on with what you were doing—the same that induced the charge but a minute ago—and by will power alone must you subdue any insubordination. It takes doing, let me tell you, and though your voice may take a domineering note, your mind is quailing—and I don't blame you.

Stopping a Charge.

When you've proved to that colt that you're a better man than he is—be the proof ever so little—then go and get the stick. Now your spirit rises in strength, now your voice rings true, and now you tell that colt to do his darnedest. In fact, he has to be made to charge. If he won't do it of his own accord he's got to be goaded into it—he did it once, and he's got to learn it can't be done again. The first time you proved to him that he couldn't frighten you, and the second time it has to be proven that you can frighten him.

He comes! No he doesn't! He started to come; but you used that spreader with judgment. Smash! It got him along the forehead, and that colt stands in the corner of the yard and shakes his sulky head. He's had enough, and you're boss. But if a lesson has to be made drastic it must be driven home with emphasis. Again and again that colt is goaded to charge, and every time it so much as lops its ears or rolls the whites of its eyes it feels the might of man in his power. It's cruel; but it's got to be done.

By the way, a charging horse may often be stopped by hitting it solid with the heel of the palm of the hand on the point of the nostrils. It may not be as efficient as a stick, and it can't be followed up and driven home as with a stick; but I know it stops them more often than not. Why, bless you, I've been stopped myself in that way, so why shouldn't a horse do the same?

THE COTTON INDUSTRY AND THE TARIFF.

STATEMENT BY THE MINISTER FOR AGRICULTURE.

The Minister for Agriculture (Mr. W. Forgan Smith) informed the Press recently that he was much concerned about the decision of the Federal Government to defer for some months at least the matter of consideration of the Tariff Board's report upon the cotton industry. The inexcusable procrastination of the Federal Government in relation to the industry was lamentable, and both the growers and the spinners of cotton would be adversely affected as a result of the delay that has occurred.

The specious special pleading indulged in by the Minister for Trade and Customs (Mr. H. S. Gullett), in making the announcement in the Federal Parliament, was a clear indication that in its report the Tariff Board—a body established by the Commonwealth Government itself—favoured the requests of the cotton growers and manufacturers. The decision of the Commonwealth Government also is a direct repudiation of its undertaking that immediately the Tariff Board reported on this question, the necessary action would be taken. Briefly stated, the position is that three years ago the Commonwealth Government embarked on a policy of protecting this industry. On that occasion the Tariff Board took exhaustive evidence and presented a lengthy report of the economic ramifications of the industry and made certain recommendations, some of which were given effect to by the then Government. It has since been found that the action of the Commonwealth has not been adequate to achieve the policy enunciated by the late Mr. H. E. Pratten, who intimated at the time that millions of pounds of capital would be available for the establishment of the cotton manufacturing industry in Australia. "We have to-day the startling anomaly that whilst cotton in unlimited quantities can be produced in Queensland, cotton goods to the equivalent of from £12,000,000 to £15,000,000 sterling are imported annually into the Commonwealth, a very large proportion of which, quite reasonably, could be produced and manufactured here and provide employment for large numbers of Australian citizens," added Mr. Smith.

Tariff Anomalies.

Continuing, the Minister said that it had been shown beyond question that the weakness in the existing position lay in the inadequacy of the protection against imported cotton yarn. Imported cotton yarn equivalent to 20,000 bales of lint was being imported annually into Australia from Britain, U.S.A., and Japan. It was a lamentable reflection upon the inefficiency of the existing tariff arrangements to realise that during the past financial year close upon 8,000 bales of cotton had to be exported, whilst yarn to the equivalent of 20,000 bales had been imported. A complete case for the correction of these anomalies was submitted by the Cotton Board and the cotton spinners combined to the late Minister for Trade and Customs, and the Tariff Board and Mr. Guilett and his colleagues in the Federal Government have this information at their disposal.

Cotton Growing needs Protection.

Cotton growing in Australia was a comparatively young industry, and as such requires encouragement and protection at least equal to that given to other industries. A large proportion of the cotton products that are now imported could be produced in the Commonwealth. The soil, climatic and environmental conditions prevailing in many parts of Queensland are suitable for the growing of cotton, and if this industry is fostered to the degree that it is deserving of, an additional primary and secondary industry can be readily established.

Stability is the life blood of any industry and no industry can progress unless it is established on a sound foundation. Both the growers and spinners of cotton have been left suspended in mid-air without any definite knowledge concerning the future prospects of the industry. Under such conditions progress is impossible.

A Detrimental Delay.

The Federal Government has failed to appreciate the fact that the cotton growers must have a knowledge of the position, and be able to estimate with some degree of accuracy the figure their cotton will realise before the cultivation of the land and planting of the crop is proceeded with. It is necessary also that the cotton spinners should have early intimation as to the area planted under cotton and the prospective tonnage of cotton that will be harvested, so that they can satisfactorily arrange their purchases of ginned cotton. The delay in the announcement of the fiscal policy of the Government in connection with any primary industry is detrimental.

A Serious Risk to the Industry.

Mr. Gullett (Minister for Trade and Customs) would now have us believe that economic issues which arise out of such a policy have only now been brought under the Commonwealth Government's notice. This is a misrepresentation of fact. The truth is that the original Tariff Board report of three years ago examined those aspects of the matter. With them the late Mr. Pratten and his colleagues in the present Commonwealth Government were intimately familar. Mr. Gullett also says that to do what the cotton growers and manufacturers have asked would increase the cost of clothing to the workers. If he has read the Tariff Board's report he must know that this is not the case. In the evidence submitted to the Tariff Board the spinners have guaranteed that prices would not be increased, and a schedule was also submitted showing the prices which would rule in relation to world cotton values. Mr. Gullett's argument that to do the right thing by the industry would mean that a new charge would be added to the cost of living is, therefore, a specious plea for which there appears to be little justification. He further states that a duty of 50 to 60 per cent. would be necessary. He must know that the manufacturers did not ask for such a duty, that which they sought being 35 per cent. preferential, 48 per cent. intermediate, and 55 per cent. general. He further argues that cotton growers are not specialist farmers as they also engage in other branches of agriculture. This is just where the danger lies of serious damage being done to the primary industry, as a result of continued inaction. There are large tracts of territory in Central Queensland peculiarly adapted to cotton growing, and in those districts there are a large number of farmers who confine themselves to cotton. If, as a result of continued disappointment in the attitude of the Commonwealth Government, these men take up dairying they will never come back into cotton to anything like the same extent which at present is the case.

No Tangible Security for the Cotton Grower under Existing Tariff.

The fact is that the areas of cotton planted were sown on the faith of the assurance which was given that the matter of the additional protection required for the manufacturers would be dealt with early in the parliamentary session just closed. That assurance has not been honoured, and it has been substituted for the assurance contained in Mr. Gullett's announcement to the effect that "a further statement upon the whole subject will be made early next session." The position, therefore, is that last year the cotton growers and manufacturers had an assurance that the matter would be definitely dealt with in the session just closed. This has now been transposed to an assurance of "a statement next session." This is not very tangible security upon which to plant extended acreages of cotton. The current season's estimated production of 6,000 bales could have been 40,000; in other words, £1,000,000 per annum of new wealth could have been created which is not in existence because of the doubt of the growers as to their market.

In conclusion, the Minister said that the Commonwealth Government is clearly guilty of failure to honour its obligations and to fulfill the assurances which were given by it and accepted in good faith by both growers and manufacturers. Apparently its assurances are worth nothing, and it is lamentable that Australian industries must stagnate as a result of the Commonwealth Government's failure to grant a perfectly reasonable and logical request. Meantime, the existing ridiculous state of affairs will apparently continue under which our cotton growers send their cotton overseas to find a market whilst the same ships bring back the manufactured article, and because of this many Australian citizens are unemployed.

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

PASSION FRUIT CULTURE.

By ALBERT H. BENSON, M.R.A.C.

No recent publication dealing with the culture of this fruit having been issued by this Department, it is considered desirable to bring out a new pamphlet* dealing not only with the well-known passion fruit *Passiflora edulis*, but with the less known fruits, varieties of the same natural order "Passifloreæ," that can be grown here, such as the Grandailla, *P. quadrangularis;* the "Bell Apple," *P. laurifolia;* the Mexican Passion Fruit, *P. ligularis;* and the Banana Passion Fruit, *Tacsonia mollissima.* Other varieties of the same natural order are grown for the sake of their flowers and foliage, and the papaw, "Carica papaya," is a very near relative.

All passion fruits are climbers, and the varieties above referred to are either semi-tropical or tropical, and require a well-drained, friable, rich sandy loam soil to be grown to the best advantage; but the common passion fruit can be grown on comparatively poor soils that are naturally well drained, provided they are systematically manured, well cultivated, and are not subject to severe frosts. Stagnant water at the roots is fatal and very heavy soils should not be selected.

As with all other fruits the land should be thoroughly prepared prior to planting, so as to reduce it to a state of perfect tilth, and provide the right soil conditions in which to start the young plants. This is a matter of very great importance, and one that does not receive the attention it should, as not only passion fruit but all other fruits are frequently planted in land that is very far from being in good order, and which should have received much more care and attention in order to enable it to produce healthy vigorous plants that will yield payable returns. Slovenly work is never a success in any branch of fruit culture; and nothing is "good enough" except the best; in fact, as far as the fruit itself is concerned, the only fruit in which there is any profit is "the best."

Passiflora edulis—Purple Passion Fruit.

This variety is the one that is most commonly grown, not only in Queensland, but throughout Australia. There are at least two types, the large fruited or "giant" passion fruit, sometimes called "Mexican," which attains a size of over 2 inches in diameter, and the common type which averages about 1¾ inches in diameter. The former, though a larger and more showy fruit, is somewhat disappointing, as it is frequently a shy bearer and the fruit does not contain as large a percentage of pulp as the common type, which is the best all-round commercial fruit. The best fruit has a very dark purple skin, which is filled with an orange-coloured pulp in which the seeds are imbedded. The pulp is slightly sub-acid and possesses a very distinctive agreeable flavour, so that when used as an ingredient of a fruit salad it imparts its characteristic flavour to it, and the salad is greatly improved thereby.

The plant is easily propagated from seed, all that is necessary being to select perfect fruit, fully mature, from a perfectly healthy plant that is free from leaf, root, vine, or fruit affection of any kind. The pulp, when removed from the fruit, should be placed in a tub or suitable vessel, and be covered with water, the mass being then allowed to ferment long enough to free the seeds from the pulp, when they should be strained off, well washed, and dried. If early spring ripened fruit is selected and the seed is planted as soon as ready, good strong plants will be available for summer planting, but if plants are wanted for early spring planting the seed must be sown the previous autumn. The seed should be sown in a specially prepared seed bed in soil of a light, free nature, containing a quantity of leaf mould or humus—a good potting soil—and the young plants should be sheltered from the sun and judiciously watered should the soil become dry. When the seedlings are about 1 foot high or larger they should be planted out in the permanent position, taking care to keep them moist so that they will not dry out.

Prior to planting, the land is marked off in rows not less than 10 feet apart. A trellis consisting of good fencing posts, placed 15 feet apart in the row, is erected along the row, the posts being set with their width across, not in the direction of the row. The posts should be about 8 inches wide by 3 inches thick by 6 feet 6 inches long, and be set 18 inches in the ground and 5 feet out of the ground. The end posts must be much heavier and be well strutted as they have to act as strainers, and prevent the wires that are attached to the top of the posts from sagging when they have to carry a heavy growth of vines. Two No. 8 galvanised wires are firmly fixed to the top of the posts, one on each side, so that when in

* These notes were published originally in the "Q.A.J." for March, 1926, and are reprinted in response to numerous requests.—Ed.

PLATE 88.—THE LARGE-FRUITED GRANADILLA.
Carrying specimens 9 in. x 17 in. circumference, grown by Mr. J. C. Brünnich, in his garden at Stanley Terrace, Taringa, near Brisbane.

position they form two parallel lines, 8 inches apart, on which the vines are trained. The young plants are planted midway between the posts, right under the wires, and are tied to a light stick or other temporary support till they reach the height of the wires, when they are topped and two main lateral stems are allowed to develop, all other lateral growths on the main stem from the ground to the wire being removed. The two main laterals are then trained on to the wires, and when they meet those of the adjacent plants their growth is stopped by pinching back the terminal growth, which causes secondary laterals on which fruit is borne to be thrown out all along the main lateral. These secondary laterals, if left alone, throw out further laterals and these again in turn make more lateral growth, with the result that a very dense and tangled growth of vines is produced from which it is hard to separate the primary and secondary laterals and which, owing to its dense habit of growth, is frequently prone to be attacked by disease. Systematic pruning is therefore desirable—first to keep the plants healthy, secondly to produce strong new lateral growth on which good fruit will be grown, and thirdly to bring in the crop at different periods of the year, so as to get a better distribution of the crop instead of a glut at one time and a scarcity at another. When an autumn or winter crop is desired the main summer crop must be sacrificed. This is done by pruning the vines right back to the secondary laterals when they are showing their blossoms for the summer crop, and this will have the effect of throwing out a new growth which will blossom at a later period. A word of warning is, however, necessary; don't prune hard back in dry weather—you will probably kill the plants if you do so—but wait till the ground has had a good soaking, when the plants will throw out a fresh growth very quickly and will not be permanently injured. A good dressing of quick-acting manure at this time will be found beneficial and materially increase the following crop.

Mr. Brünnich, in his last edition of "Complete Fertilisers for Farm and Orchards," recommends the following manure for passion fruit:—

> "Use per acre, in accordance with the richness of the soil, a mixture of—1 to 2 cwt., nitrate of soda; 4 to 8 cwt., blood and bone manure; 1 to 2 cwt., superphosphate; 1 to 2 cwt., sulphate of potash. A top dressing of 1 cwt. of nitrate of soda in spring will be found beneficial."

This is a complete manure rich in organic and inorganic nitrogen, citrate and water soluble phosphoric acid as well as potash, and should not only act quickly but be fairly lasting in its effect.

The passion fruit is liable to be attacked by several different pests of which the leaf disease is by far the most serious. This disease has only made its presence felt during recent years, and so far no remedial measures have been found very efficacious. The disease is of an obscure nature and attacks every part of the plant above ground—the flowers, leaves, and laterals. The latter are killed by a small portion of the stem becoming affected to such an extent that it dies and all the rest of the lateral that is beyond the part attacked shrivels and dies, frequently when it is covered with fully grown but immature fruit which shrivels up. The affection has received the careful attention of the Vegetable Pathologist, and that the result of his investigation has proved it to a new fungus controllable by Bordeaux Mixture. Red spiders and spinning mites frequently injure the leaves and young laterals. These pests can be kept in check by spraying with sulphide washes or dusting with finely-ground sulphur.

Scale insects of various kinds also attack the wood, leaves, and fruit. These may be kept in check by systematic spraying, but this can only be effectual when the vines are systematically pruned, as when grown in a dense mass the spraying material used has little chance to come in contact with the majority of the insects.

Nematodes injure the roots, and here the use of materials that can be worked under the soil such as cyano-gas are well worth taking. Fruit fly also attacks the fruit, as does also a sucking bug. The latter sometimes causes a heavy loss, as the punctured fruit either drops or if it remains on the vine becomes hard and woody. This bug is very fond of the red prickly cucumber, commonly known as the "Cape or African Cucumber," and if this is used as a trap, a large number of the bugs can be caught and destroyed.

When fruit fly is troublesome, trapping with Harvey's (B) fruit fly lure as soon as the first sign of the fly's presence is seen and systematically attending to the traps will result in the destruction of large numbers of female flies, and thus reduce the loss they would cause were they allowed to lay their eggs in the immature fruit whilst the skin is still soft and before it becomes so hard that the fly cannot pierce it. As showing the attractiveness of the (B) lure the writer has recently caught no less than 1,200 Queensland Fruit Flies (*C. tryoni*) in one glass trap in five weeks,

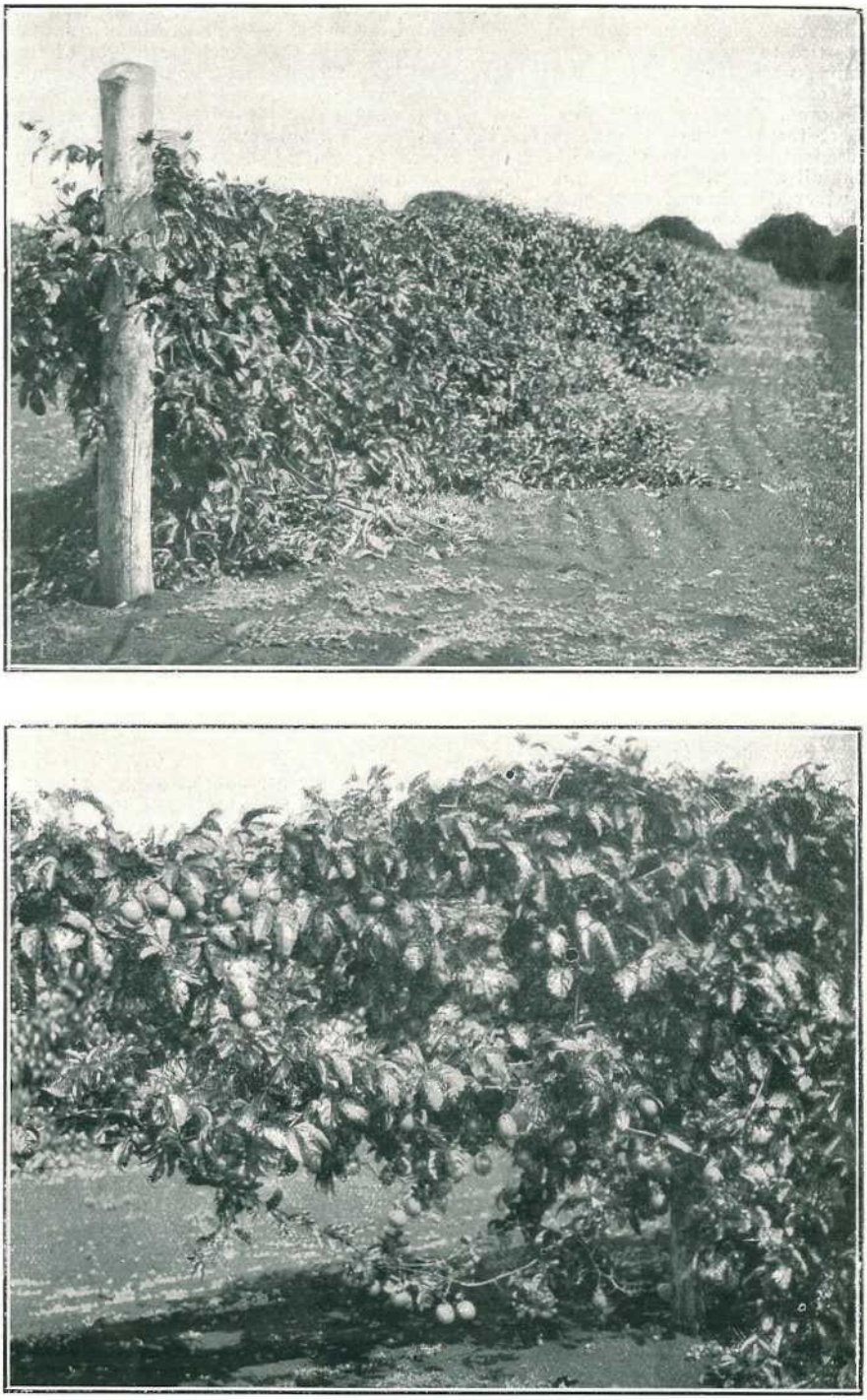

PLATE 89.—PASSION FRUIT, REDLAND BAY, SHOWING METHOD OF TRELLISING AND PART OF A VINE IN FRUIT

of which nearly 80 per cent. were females, many being full of matured eggs ready to be deposited; so that systematic trapping with an effectual lure will undoubtedly tend to reduce the loss caused by this very destructive insect.

Passiflora quadrangularis—Granadilla.

The granadilla is a tropical fruit that is better suited to the northern than to the southern part of this State, though excellent examples of the larger type of granadilla—"*Macrocarpa*"—can be produced in the coastal districts both to the south and north of Brisbane, provided the situation is a warm one, free from frost and well protected. The *macrocarpa*, as its name signifies, is a very large type of granadilla, the fruit frequently weighing several pounds. The seed cavity is small for the size of the fruit, and is surrounded by a thick layer of whitish flesh which has no distinctive flavour, but which, when flavoured with lemon or other suitable flavouring, is used for pies. It is not as a rule a heavy bearer, and must be grown on a horizontal (not lateral) trellis.

The Northern Granadilla—*quadrangularis*—is a smaller fruit of a somewhat irregular, oblong shape, about 4 to 4½ inches in diameter. The pulp cavity is large and is filled with large seeds surrounded with a pale yellow pulp of exceptionally high flavour when the fruit is fully ripe, which is known by the outer fleshy covering becoming soft, and the skin, instead of being a pale green, turns a dull yellowish-green colour. This variety when fully ripe is one of the highest flavoured tropical fruits, and eaten either alone or used in combination with the papaw, pineapple, banana, and the juice of a lemon or lime to form a fruit salad, it is very hard to beat. Unfortunately, it does not carry well and consequently can only be obtained in perfect condition where grown. The granadilla requires a deep, well-drained, rich loamy soil to be grown to perfection, and it does best when trained on an overhead trellis (as shown in illustration herewith, which was taken recently at Taringa, near Brisbane, and gives a good idea of its habit of growth). Similar manuring to that recommended in the case of the common passion fruit will be found beneficial.

Passiflora laurifolia, "Bell Apple."

The Bell Apple is not grown to any extent in this State though its fruit is quite equal to that of the previously mentioned varieties. It is a handsome and vigorous climber, and is more valuable for covering unsightly edifices or for ornamental purposes than for fruit production, and its cultivation for the latter purpose is not recommended. Without hand fertilising it carries but few fruit.

Passiflora ligularis, Mexican Passion Fruit

May be eliminated from the list. The pulp is flavourless beyond a trace of sugar.

Tacsonia mollissima, the Banana-shaped Passion Fruit.

Although this fruit has been seen in fruit shops of the Southern States for some years, it is only recently that it has been met with in our local markets. Some time ago a quantity of fruit was offered for sale locally, and met with a good demand at a very satisfactory price. It is not, however, advisable at the present time to plant this variety extensively, despite the attractive appearance of the fruit, as a taste for it will have to be acquired and a demand created before there will be a market for any large quantity of the fruit. Its culture is similar to that of other passion fruits and it is hardier than the more tropical varieties.

THE CHESTER WHITE BREED OF PIG.

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

With a view to testing their suitability for climatic conditions and their adaptability to Queensland market requirements, some breeders—Messrs. Brown Bros. of Mooroombin, Toogoolawah, and Percy V. Campbell of Lawn Hill, Lamington—have purchased a pair each of Chester White boars and unrelated in-pig sows. These pigs were in company with a consignment of Duroc-Jersey pigs shipped at Vancouver, B.C., early in January, 1929, and after a protracted voyage were delivered at Sydney on 23rd February.* After a period in quarantine at Sydney, they were delivered at Brisbane on 16th March, after nearly two and a-half months on an ocean journey. The pigs arrived in good order and condition and are considered to be typical representatives of their breed.

Historical Note.

As with several other American breeds with which breeders here have had experience, the Chester White originated in Chester County, Pennsylvania, U.S.A., and have for many years enjoyed a widespread popularity in the United States and Canada, where they are looked upon as a useful farm type, especially suited for cross-breeding purposes for the production of a popular type of butcher and bacon hog.

The record of the Chester White, according to the well-known authority, Mr. H. C. Dawson, is somewhat enmeshed in historical uncertainties, but it is known that the old Bedfordshire breed was being handled in that region at the time the first Chester Whites appeared on the scene. Those were the days when farmers did not spend much time indoors and when fountain pens, typewriters, and dictaphones were scarcely even thought of, and when herd book societies, especially organised for the purpose of recording pedigrees and fostering the interests of pig producers, were but in the making. In the year 1818 Captain James Jeffries imported white pigs from Lincolnshire, England (these were evidently of the Lincoln curly coated type), and at about the same time English and Chinese hogs were imported from England. Both were generally white in colour (the Lincolnshire pig curly in the coat), but both had black or blue spots over the body. These spots have since been largely eliminated from all the white breeds, though all show a tendency to occasionally throw progeny with odd black and blue smudges on the body.

There were also white hogs in Pennsylvania previous to these importations, but they, like many pigs of their time, were of a slow-growing, late-maturing type. As with the early development of Poland-Chinas and Duroc-Jerseys, breeders interested in the white pig used blood from the various white breeds available, and from the progeny of these, by careful selection and judicious handling, they developed a type permanently white in colour and free from the undesirable dark coloured markings.

In America, as in England, the white pigs soon gained favour, especially in the country surrounding the city of Pennsylvania and in the pig-raising areas of Ohio. Of the progeny of these early strains some were of an extremely large, coarse, slow-maturing type, while others were of lighter build and were more compact, and grew rapidly. Some of this blood was used in moulding the Poland-China, and doubtless also white pigs were originally used with red stock in the production of the Duroc-Jersey.

Among early breeders of the Chester White type may be mentioned the Todds, of Ohio, progressive farmers who originated the type known as Todd's Improved Chester between 1860 and 1870, and which eventually came to be known as the Improved Chester White. L. B. Silver, also of Ohio, developed another type from stock which he bred from Todd's strains, his requirements being more along the lines of light, quick-growing pork pigs. He was so successful that Silver's pigs finally became known and registered in the herd book in 1884 as the O.I.C. breed (Ohio Improved Chester).

Thus the Chester White is one of the oldest of the pure American breeds, and for thirty years or more they have been regarded as the butcher's model, though Queenslanders must remember that the most popular pork pig in America is of much heavier build and carries much more weight than our porkers here. Many American authorities classify the Chester White as one of the lard breeds—that is, the pig intended more for the production of fat than of flesh—but possibly climatic conditions and environment in Australia may alter this fat-producing tendency. Some authors say the pigs are not active, though they possess good capacity for development and are good feeders. The specimens we have are certainly long-bodied, growthy types, but there is a variation in the nature of the coat, one strain having fine straight hair and another a longer coat with a tendency to curl.

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* Included in this shipment also were Duroc-Jersey pigs for Mr. Leo Delroy, of Murgon, and Mr. W. Koehler, of Yamsion, via Dalby.

In the development of the pigs that came to be known as the Improved Chester White, and which were developed by the Todd Brothers in 1830, pigs from New England, Delaware, and other counties were used. Some of these were known as Irish Grazers, others as Norfolk Thin Rhinds, and still others as Bedfords. In 1835, Joseph Haskin, a Massachusetts breeder, came to live in Ohio and brought with him stock known as the Byfield breed and the Thin Rhind strain, and it is but natural to presume (as is done in Australia), when there are a few breeders of any one particular type, and where unrelated strains are limited, a good deal of interbreeding goes on, and one borrows or buys from another and keeps only the best of the stock produced as foundation stock.

Later records show that another local breed of pig also had a part in the early make-up of the Chester White, the latter breed being introduced by one Joel Meade, of Norwalk, Ohio. His pigs were noted for their ability as grazers, and suited admirably the open-air system of pig-raising popular even in these days.

In 1862 a strain known as the Normandy hog (probably of French origin) appears to have been utilised in building up the improved type of Chester White. Thomas Wood, of Pennsylvania, was also interested in this breed, and shared many of the honours with the Todd brothers at the country stock shows for which America has been famous for generations.

Breed Characteristics.

It is apparent from a close study of all these records that there is no distinct relationship between the Poland-China, Duroc-Jersey, or Chester White pigs, though they are all of similar type and all have the small lopped ears characteristic of the American types. At the same time they were all bred and developed under similar environment, the colour having been distinctly a matter of fancy, and having been developed by the introduction of strains carrying the largest proportion of the most desirable colour; thus the fanciers of the Duroc-Jersey specially selected breeding stock of a cherry-red colour, the Poland-China enthusiasts stuck to the black and white, while the Chester White fanciers developed a pig wholly white in colour without reversion to the older multi-coloured hogs.

Weight.—In those days hogs of 1,000 lb. in weight were the special fancy of many breeders, and the use of large coarse hogs, so undesirable now, was forced on many breeders, even against their will.

Colour.—The hair of the Chester White pig in its several forms in America still shows a tendency to coarseness, and curly-coated pigs are not uncommon. Some of the original strains had a distinct tendency to sunburn and sunscald, and, of course, had to be eliminated. Some of the original Thin Rhind breeds—black spotted with white, or white belted with black—had this fault, and it has only been by careful selection over many years that this fault has been bred out of the white, black and white, and belted breeds (the Hampshires).

Prolificacy.—All records show the Chester White to be a prolific and hardy breed, and many breeders are of opinion that the sows of this breed are even better endowed with maternal instincts than the sows of the other breeds to which reference has been made.

Early Maturity.—One writer, in referring to their early maturing tendencies, says that it has been estimated that the Chester White will show an average gain under good conditions of 1 lb. in weight for every 3 lb. of feed given.

Standard Points.

The head of the Chester White shows a straight face, somewhat like that seen in the Poland-China, but slightly more dished. The nose has a tendency to be rather long and narrow. The ears are large, coarse, and droop forward in a manner similar to the Poland-China, but the droop or break is usually further from the tip; as a rule, too, the ear is somewhat heavier, and it is quite common for it to be loosely attached. The eyes are large, bright, and usually wide-set. It is undesirable that they should be surrounded by ridges of fat or puffy flesh, as this may affect the sight. The neck, jowl, and shoulders are full, well fleshed, and in the most approved types merge gracefully with the neck and body, the latter being long and of good depth. The chest of necessity needs to be wide, long, and deep, allowing for free action of the heart and lungs. The long, deep body permits of free action of all the digestive organs and gives to the animal a very attractive appearance from the standpoint of the bacon curer. The breeding organs also require ample room to permit of the development of thrifty litters. For preference the back should be long, but slightly arched—the rainbow-backed, stilty-legged type, being quite undesirable from the Australian point of view. Strong loins connecting up with the body, whose ribs are long, flat, and well sprung, allow for the development of weight and flesh.

Whether there will be present in the Chester White pigs produced in Australia heavy, coarse-boned legs remains to be seen; the fault is mentioned, for some of the American strains show distinctly coarse bone. Some authors seem to indicate leg weakness as a result of coarse, soft bone, but probably this fault also will be overcome by strict attention to selection. It is likewise hoped the Chester White will carry a roomy, deep, and well-fleshed ham, for under our conditions pigs need long, deep bodies and particularly well-developed hind quarters in order to attract the buyer's attention and realise top prices.

It is doubtful if the Chester White will, in so far as development of ham is concerned, be able to give a lead to the Poland-China, for the latter breed invariably carry really good hams, but the Chesters appear to carry greater length, and this no doubt accounts for their prolificacy. The colour of new breeds is always a problem with judges, but the colour of the Chester White is whole white, no black hair being admissible, though it is common for a certain number of black and bluish spots to show on the skin. As already stated, the objective is to eliminate these; hence strains showing an absence of dark spots, and being otherwise of equal merit, would be given preference.

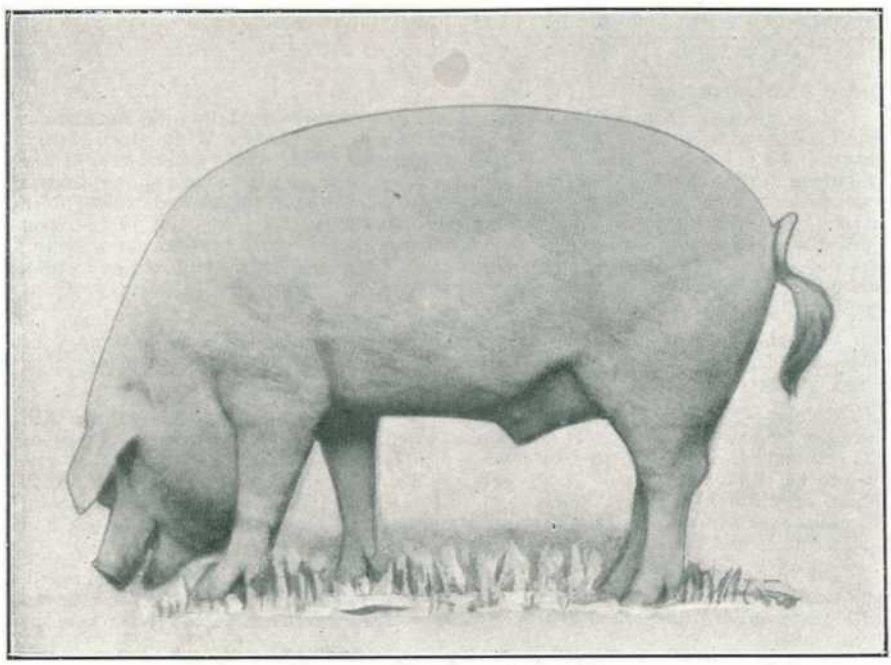


PLATE 90.—GRAND CHAMPION CHESTER WHITE, BARROW INTERNATIONAL LIVE STOCK SHOW, U.S.A., 1927. SHOWN BY ALBERT H. STUART, OF WHITEHALL, IOWA.

Points worthy of note: Type and body development, colour, and shape of ears. Note—It has been difficult securing a really good photograph of a Chester White with which to illustrate this article, but the above appears to represent a type popular in the United States where many of the pigs appear leggy and rainbow backed. In Queensland the long, level backed, deep sided and well developed hindquartered pig is the most popular.

For cross-breeding purposes doubtless the Chester White will be found to give excellent results where used on types like the Berkshire, the Tamworth X Berkshire, and the Yorkshire. It is problematical whether they would cross well with the larger breeds like the Gloucester Old Spot or Large Black, or with the Tamworth, but possibly good results would be obtained by using sows of the Poland-China type with boars of the Chester White breed.

These are all points on which further details will be made available as time goes on. Details regarding the registration of these pigs and with regard to their standard of excellence may be obtained on application to the Secretary, Australian Stud Pig Breeders' Society (Queensland Branch), 3 Inns of Court, Adelaide street, Brisbane, or from the author of this article, from whom also other particulars may be obtained.

Answers to Correspondents.

Dairy Cattle Judging—Scale of Points.

A.L.D. (Bundaberg)—

The ratio scale of points adopted by the Queensland Jersey Cattle Society is as follows:—

	Maximum Points.
1. Head—Fine; face dished, showing pure Jersey character; cheek fine; throat clean	10
2. Nostrils—High and open; muzzle encircled by a light colour	3
3. Horns—Small and incurving; eye full and placid	4
4. Neck—Straight, thin and long, and lightly placed on shoulders	3
5. Lung capacity as indicated by width and depth through body immediately behind the shoulders	4
6. Barrel—Deep, broad, and long, denoting large capacity; ribs rounding in shape	10
7. Back—Straight from withers to setting of tail; croup and setting on not coarse	4
8. Withers—Fine and not coarse at point of shoulders	2
9. Hips—Wide apart, rather prominent, and fine in the bone	4
10. Hind Legs—Squarely placed when viewed from behind, and not to cross or sweep in walking	2
11. Tail—Thin, reaching the hocks, good switch	2
12. Udder—Large, of good flexible quality and not fleshy, quarters well divided	10
13. Rear Udder—Well up, protruding behind and not rounding abruptly at the top	10
14. Fore Udder—Full and running well forward	7
15. Teats—Of good uniform length and size, wide apart, and squarely placed	3
16. Milk Veins—Large, tortuous, and prominent	4
17. Richness—As indicated by a yellow colour on horns, escutcheon, and inside of ears	3
18. Skin—Thin, loose, and mellow	2
19. Growth	3
20. General Appearance—Denoting a high-class Jersey and economical dairy cow. Clipped or shaved animals not recommended	5
Registered Pedigree	5
Perfection	100

A mature cow in good condition may run from 650 to 850 lb. live weight.

BOTANY.

Replies selected on account of their general interest from the outward mail of the Government Botanist, Mr. Cyril White, F.L.S.

Wild Millet.

W.J.P. (Wetheron, Gayndah Line)—

Your specimen of grass is *Panicum colonum*, commonly known in Queensland as Wild Millet. It is a grass very widely spread over the warmer regions of the world in cultivation. It has considerable value as a fodder, and is generally looked upon as one of the parents of the well-known fodders Japanese millet and White Panicum. Seed is not obtainable through the ordinary commercial channels, but seeds of the fodders mentioned are of course obtainable, and these yield a much heavier amount of fodder than the wild form.

Cattle Bush—Sandlewood.

A.B.G. (Kowguran)—

No. 1 is *Pittosporum phillyræoides*, commonly known as Cattle Bush. It is a small tree, with a very wide distribution in Southern Queensland, New South Wales, and South Australia, and is generally regarded as an excellent fodder tree.

No. 2 is *Santalum lanceolatum*, a species of Sandalwood. I do not know that it is of any fodder value. This tree is rather interesting. It occurs in the north-west of Western Australia, in the Northern Territory, throughout most of Queensland, and in a good part of New South Wales. In the Kimberleys, the Northern Territory, and Northern Quensland, the tree produces a valuable sandalwood, largely exported to the East. In the most southern parts of the State, however, and in New South Wales, the wood loses all, or practically all scent, and is in consequence valueless, though the southern trees and northern trees seem much the same in the field.

Rattle Pod—*Phaseolus semi-erectus*.

E.F.D. (Bowen)—

No. 1 is *Crotalaria striata*, a species of Rattle Pod. This plant has a wide distribution over the Tropics, and is cultivated in some countries as a green manure, particularly for tea. A bad feature of it, however, is that it is poisonous to stock, and a pamphlet on it in this respect has been posted to you.

No. 2 is *Phaseolus semi-erectus*, a native of Tropical America, but now a naturalised weed in most tropical and subtropical countries. It was originally introduced into Queensland as a fodder, though as far as my experience goes, stock do not seem to care for it.

Mulga. Bendee. Desert Poison Bush.

E.M. (Hamilton Downs)—

1. *Mulga Acacia ænura*.—A well-known fodder of Western Queensland, and not known to be poisonous in any way.
2. *Bendee Acacia curvinervia* (broad leafed form) *Acacia* sp. (narrow leafed form).—These are not known to be poisonous.
3. *Gastrolobium grandiflorum*.—Very common in parts of Western and North Queensland, the Northern Territory, and the Kimberley district of Western Australia. It is variously known as Desert Poison Bush, Heart Leaf Poison Bush, and Wallflower Poison Bush. It is one of the worst poisonous plants we have and the poison does not disappear when the plant is cut and dried. At what stage the plant is most poisonous we are not in a position to say. The symptoms of poisoning are convulsions and usually blindness.

***Euphorbia prostrata*—*Euphorbia Drummondii*.**

INQUIRER (Winton)—

1. *Euphorbia prostrata*, a red or reddish weed lying flat on the ground, common about townships in Queensland. It is widely spread over the world, but is a comparatively recent introduction into Queensland. It is not known to be poisonous, though all Euphorbias should be looked upon, perhaps, with suspicion.
2. *Euphorbia Drummondii*, the Caustic Creeper. This plant is poisonous to sheep. It has been found to contain a prussic-acid yielding glucoside, and if eaten then in any quantity death soon follows. We have examined a fair number of Queensland samples of this plant, but have only found rather doubtful traces of the glucoside and, therefore, its formation I should say is comparatively rare. There is also evidently another poisonous principle that has not been extracted, as it causes symptoms very different from those caused by a prussic-acid yielding glucoside. The chief symptom is a considerable swelling in the head and neck. Experienced sheepmen say that if this swelling is pierced a clear, amber-coloured fluid runs out, and the life of the animal may be saved. The amount of weed necessary to cause these symptoms we cannot state. It probably varies according to the stage of growth of the plant.

The Stink Grass.

W.E. Co. (Toowoomba)—

The specimen is *Eragrostis major*, the Stink Grass, so-called from the peculiar odour the grass gives forth. It is an annual grass, a native of Southern Europe, now widely spread over practically all the temperate regions of the globe. It is palatable to stock only in its young stages. Later on it becomes coarse and does not seem to be touched. It has no importance as a fodder.

Pigeon Grass.

E.A.S. (Millaa Millaa)—

The specimen is *Setaria aurea*, commonly known as Pigeon Grass, on account of birds being rather fond of the grain. It is a grass that favours, as a general rule, rather wet, swampy situations, and in such has some value as a fodder. We should not think it likely to spread and prove a nuisance.

Western Plants Identified.

Inquirer (Elderslie, Winton)—

1. *Amarantus Mitchellii.* An Amaranth. Not poisonous.
2. *Polanisia viscosa*, a small member of the Caper family. It is very abundant, but we have not heard a common name for it. It is not known to be poisonous in any way.
3. A plant of the Convolvulus family. We should say *Polymeria longifolia*, but the specimen is rather young to be sure. Plants of this family are very common in the general mixed pastures of Western Queensland, but are generally regarded as quite wholesome.
4. *Amarantus Mitchellii.* The same as No. 1.
5. *Trianthema decandra.* Hog Weed. It is not poisonous so far as known.
6. A plant of the Mallow family—Malvaceæ—but too young to determine specifically. Plants of the Mallow family are on the whole quite wholesome.
7. A plant of the Mallow family, too young for specific determination. Possibly the same as No. 6.
8. *Phyllanthus thesioides.* No common name. It is fairly frequent, and is not known to be poisonous or harmful in any way.
9. *Boerhaavia diffusa.* Tar Vine. It is not poisonous; in fact, it is generally regarded as a useful fodder.
10. *Trianthema decandra.* Hog Weed. Not poisonous so far as known. Very common. An older growth of No. 5.
11. *Marsilea Drummondii.* Nardoo. It is not poisonous.
12. *Corchorus hygrophilus.* No common name. It is not poisonous.
13. *Trianthema crystallinum.* No common name, but the plant is allied to the Pig Weeds. It is not poisonous.

We should regard none of the thirteen specimens as dangerous. All are more or less common weeds in Central-Western Queensland.

Native Sorghum.

W.T.P. (Moore, B.V. Line)—

Your specimen is a species of Sorghum, and we should say the native form of *Sorghum halepense*, commonly known as Native Sorghum. The Sorghums, however, are rather difficult to determine specifically in the absence of specimens from the basal part of the plant showing the root system. The Native Sorghum differs chiefly from Johnson Grass in that it is a perennial with small buds arising at the base of the plant. The Johnson Grass possesses long, white, underground runners or rhizomes. Sudan Grass is closely allied to both but differs in being an annual of finer growth. Like practically all the Sorghums a certain amount of danger is to be expected in feeding the plant. It is best to wilt the plant slightly before feeding, though cases of poisoning by it are not very numerous. The poisonous principle is a prussic acid-yielding glucoside.

Brown Top—Blue Grass.

W.B. (Chinchilla)—

1. *Pollinia fulva*, Brown Top. This grass has rather a mixed reputation. In New South Wales it is generally regarded as an excellent fodder plant, sweet and palatable to stock, but in Central Queensland it is very common and is generally looked upon as being coarse and innutritious. It seems to vary a good deal according to situation, and only local experience will tell you the value of the grass in your district.

2. *Andropogon intermedius*, a species of Blue Grass. It is a rather coarse grass, but provides fair amounts of leafy forage.

Yellow Grass *(Paspalum conjugatum)*.

W.T. (Pomona)—

Your specimen is *Paspalum conjugatum*, known in North Queensland as Yellow Grass or Sour Grass. It has an evil reputation in the wetter, warmer parts of the Atherton Tableland, taking possession of pastures, and written down by farmers there as next to useless for dairying purposes. The grass is a tropical one and only seems to have made its appearance in South Queensland in the last couple of years. It is very common in New Guinea, mostly on the rubber plantations, and we have seen working mules there do fairly well on it.

Chinese Burr.

J.H. (Miriam Vale)—

Your specimen is *Triumfetta rhomboidea*, the Chinese Burr, a common plant in Northern and to a lesser extent in Central Queensland. It is a very obnoxious plant if it gets a foothold. It is spread by its burr like seed vessels which adhere to clothes, feet of animals, and similar means.

PIG RAISING.

Replies selected from the outgoing mail of the Senior Instructor in Pig Raising, Mr. E. J. Shelton.

Skim Milk for Pigs.

A.G.H. (Rosewood)—

Skim milk may be successfully fed to pigs, either in a fresh state as it comes from the separator, or after it has curdled owing to acid formation.

On coming from the separator the skim milk should be allowed to stand for a short time, then the froth taken off, otherwise the pigs may get a stomach full of froth and this may cause colic.

Allowing the skim milk to stand for twelve hours or more in a barrel so that there is sufficient acid to curdle it is a good practice, provided the barrel is cleaned out thoroughly after each lot of milk has gone through it, but in practice we often find that the barrel used is in a filthy state and the milk in it, not only becomes sour and curdled but it becomes putrid owing to the growth of putrifactive organisms. So for safety, it may be better to feed skim milk after standing for about an hour after separating and before feeding to the pigs.

Skim milk alone is not a very good ration though it is a very valuable food for pigs. For best results it should be fed in conjunction with grain, green food and roots, or pumpkins and melons. To get the greatest feeding value from a given quantity of skim milk, it should be fed with grain in the proportion of 3 or 4 lb. of grain to 1 gallon of skim milk.

It is important in feeding slop foods to pigs that the troughs should be cleaned out regularly and not allowed to become filthy. A weekly wash out with a scrubbing brush and a bucket of disinfectant solution does a lot to keep the pig trough in a sanitary condition. Of course, disinfectant should not be left lying near or in the pig trough as it is poisonous to pigs.

Abscessed Ear.

W.Y. (Lagoon Pocket, Mary Valley)—

The trouble is due to accidental causes, and has probably been brought about by a bite from a dog or from another pig. The wound thus inflicted has not healed properly and has become pathogenic (disease-producing), and as a result pus formation has been set up, and this accumulation of pus enclosed under the thick skin of the ear has produced the abscess to which you refer.

We have observed the complaint more among breeds like the Large Black whose ears are large and pendulous than among breeds like the Berkshire or Tamworth whose ears are smaller and more erect in growth, although all stock are subject to abscesses. See pamphlet "Castration of Pigs" for references to other forms of abscesses productive of much pain and loss of condition.

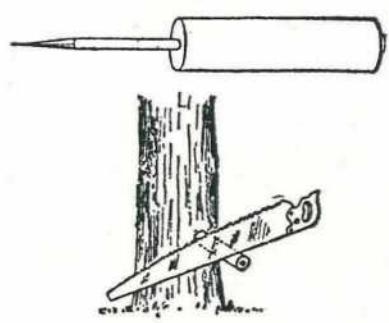
Treatment in cases of this description is best effected by lancing the abscess in some convenient spot so that the pus can drain away and let the wound be cleansed, a cut at least 1 in. long should be made, and when the pus has been forced out the wound should be syringed out with a strong disinfectant solution and then be plugged with cotton wool, and kept open by the daily renewal of washing and plugging. Smearing the wound with one of the ointments suggested in the castration pamphlet is also advised.

The trouble is not due to defective feeding or over feeding, but is due to permitting mature stock to run with the young stock and to feed together. Some sows and boars are very savage and snap and bite at other pigs, injuring them and causing disturbance in the sty.

SUPPORT FOR CROSS-CUT SAW.

The felling of trees by means of a one-man cross-cut saw is a very tiresome task, due to the difficulty of holding the saw at the proper angle while the cut is being started.

To overcome this in a very simple manner, one farmer has employed the roller support herewith shown.



A 12-inch length of §-inch steel rod was sharpened at one end, and a wooden roller mounted upon same by shrinking a nut over the rod 3 inches from the pointed end, and threading a nut on at the blunt end.

Before starting the cut into the side of the tree, the point of the roller device is driven into it at a determined point. The saw may then rest upon the roller as it is drawn back and forth, making a clean cut at the desired angle without undue strain or exertion upon the part of the operator. A slight twist will remove the roller after the saw is removed.

POWER KEROSENE—ITS USE IN TRACTORS.

The tractor farmer looks at his fuel from a somewhat different viewpoint to the motorist. His first consideration should be work done per unit volume of fuel. He is using his tractor in the production of income, therefore a fuel that will enable him to cover a greater acreage with his various farm implements is the one to which he would naturally wish to give preference.

Some power kerosenes are excessively volatile, and while they may give slightly quicker switch over from motor spirit, they show a high consumption, and are prone to detonation when the engine is heavily loaded or carbonised. It is generally recognised that it is impossible to exaggerate one characteristic in a fuel without sacrificing others which may be even more important. Extreme volatility is invariably accompanied by heavier consumption, and is therefore to be avoided. Of far greater importance than mere ease of starting is the production of the highest degree of working power under continuous conditions of running.

In Australia, "Cross" kerosene has come to be looked upon as the standard fuel for tractors and spark ignition kerosene engines. While allowing a sufficiently quick switch over from motor spirit, it will idle readily and pick up without spluttering or hesitation and consequent loss of power.

Best Operating Temperature.

An important point which is so often overlooked is the fact that a tractor should not only be thoroughly warmed up before changing over to kerosene, but should be operated throughout at a comparatively high temperature. Competent authorities have definitely laid it down that the most efficient working is obtained when the water in the radiator is of a temperature of 175 to 180 deg. Fahr., or even slightly more. This enables complete vaporisation of the fuel, allowing it to produce its power to the utmost limit.

Undoubtedly the chief consideration is the area of ground which can be worked per gallon. The attainment of this object is influenced by the relative volume of heat units per gallon of kerosene, and this is found to be highest in "Cross." Naturally, when these extra heat units are converted into tractive power, a correspondingly greater amount of work is obtained per gallon. This should not be overlooked, as it amounts to an appreciable saving on the year's working.

The ability of a fuel to function under heavy loads without "knocking" or "pinking," as it is variously called, is also a consideration of no little importance. The tendency to "pink" is inevitably accompanied by loss of power, which in turn increases the amount of fuel used. There is, as well, heavier wear and tear on the engine parts from this cause.

Effect on Lubricating Oil.

As every tractor owner knows, a certain amount of dilution of the oil in the crankcase is inevitable. While efforts to make tractor lubricating oils better able to resist crankcase dilution have lessened the evil, prevention is better than cure, and the use of a kerosene which is proved to have the least tendency to dilute the oil is highly desirable. Here again "Cross" has established itself in general favour, and working tests have substantiated the claim made for it that its tendency to dilute the crankcase oil is at a minimum.

To sum up: firstly, see that the engine is kept hot. If necessary, the radiator shutter should be kept closed for this purpose; secondly, use a fuel that will enable the most work to be done—that is to say, a kerosene which possesses the greatest number of heat units per gallon. With these conditions fulfilled, an appreciable saving will result in the amount of fuel used per acre.

During the last year or two, when the consumption of kerosene for power purposes on Australian farms has expanded very rapidly, the system of supplying country centres in "bulk" has been successfully developed, and "Cross" kerosene is not now seen in many districts in the well-known cases and tins as formerly. The 40-gallon drum is gradually ousting the more expensive tins and cases; but, judging by its almost universal use, "Cross" continues to hold pride of place in most farming communities in Australia.

General Notes.

Grade Standards for Fruit.

Grade standards have been issued under the Fruit and Vegetables Acts for cavendish bananas, oranges and mandarins. The grade standards for cavendish bananas are the same as those previously issued with the addition that there is now included a grade called "special," which means sound fruit, free from blemish, and having a minimum length of 9 inches and a minimum circumference of 5 inches. Further, in the "choice" and "standard" varieties, a variation of a quarter of an inch in the minimum circumference will be allowed. The grade standards for oranges and mandarins practically remain the same, with the exception that mandarins 2 inches in diameter will be allowed.

Staff Changes and Appointments.

Acting Sergeant L. Jorgensen, of Windorah, has been appointed Inspector of Brands as from 2nd March, 1929; and Constable H. Sternberg, of Monto, has been appointed Inspector of Slaughter-houses as from that date.

Messrs. J. P. Jackson and W. Onton, of Mary's Creek, via Gympie, have been appointed Honorary Inspectors under the Diseases in Plants Acts.

The Inspector of Stock at Bowen has been appointed Government Representative on the Bowen Dingo Board, vice the Police Magistrate, Bowen, relieved of the duties.

Mr. W. D. Lewis has been seconded for duty as Temporary Inspector under the Diseases in Plants Acts until 30th June, 1929.

Messrs. J. Beck, Stanwell; H. R. Brake, Wowan; G. H. Bradley, Argoon; J. Bryant, Chowey; D. C. Pryce, Toogoolawah; F. A. Kajewski, Ma Ma Creek; and L. R. Macgregor, Director of Marketing, have been appointed members of the Cotton Board as from 19th February, 1929, to the 31st December, 1931.

The Inspector of Stock at Winton has been appointed Government representative on the Gregory Dingo Board, and Messrs. G. Morgan Reade, W. C. Quartermaine, G. A. Patterson, and R. J. Edwards have been elected members of that board.

The resignation of Mr. F. W. Haynes, Inspector, Agricultural Bank, Dalby, has been accepted as from 28th February, 1929, as tendered.

The resignation of Mr. G. A. Currie, Assistant Entomologist, Cotton Section, has been accepted as from 10th March, 1929, as tendered.

The Tully Cane Pest Board has been constituted as follows:—Millowners' representatives: Messrs. G. R. Blair and J. J. Cran; canegrowers' representatives: Messrs. J. D. Irving, W. Moran, and A. J. Winter. And the South Johnstone Cane Pest Board has been constituted as follows:—Millowners' representatives: Messrs. F. Gillan and C. J. Magee; canegrowers' representatives: Messrs. M. J. McNamee, C. E. Myers, and D. V. Woods.

Constable W. T. Barclay, of Turn-off Lagoons, has been also appointed Inspector of Slaughter-houses.

Mr. H. F. Damm, of Goomboorian, via Gympie, has been appointed Honorary Inspector under and for the purposes of the Diseases in Plants Acts.

The members—millowners' representatives, canegrowers' representatives, and chairmen—of the various Local Sugar Cane Prices Boards throughout Queensland have been appointed for the forthcoming sugar season.

The following appointments have been made in the Agricultural Bank, Brisbane:—Mr. T. R. Quinn, Sub-Accountant, to be Senior Clerk, Accounts; Mr. J. McL. Hendy, Clerk, to be Clerk, Securities; Mr. J. R. Laherty, Clerk, to be Clerk, Possessions; and Mr. V. G. Dunne, Clerk, to be Clerk, Correspondence.

Mr. M. Flanagan, Inspector of Slaughter-houses, Bundaberg, has been appointed Inspector of Stock.

Mr. J. P. Ward, Clerk, Agricultural Bank, has been appointed Acting Inspector, Agricultural Bank, for a period of six months.

Mr. F. W. Schafer, C.P.S., Port Douglas, has been appointed Chairman of the Mossman Local Sugar Cane Prices Board, vice Mr. T. R. Beck, transferred.

Open Season for Goose and Duck in North Queensland.

The open season for goose and duck in North Queensland has been altered. The season will now be open on the 1st June and will close on the 31st October in each year.

Open Season for Ducks.

An Order in Council has been approved under the Animals and Birds Acts, declaring that the season for ducks in Southern Queensland will open on the 6th May, 1929, instead of the 1st April as in the preceding year. This open season will extend to 31st August, 1929.

Custard Apple Levy.

The custard apple levy regulations made under and for the purposes of the Fruit Marketing Organisation Acts in 1927 have again been extended to all custard apples marketed for the period from 1st March, 1929, to 28th February, 1930. This levy is at the rate of one half-penny per half-bushel case of custard apples marketed.

Introduction of Seed Wheat into Queensland.

By Proclamation under the Diseases in Plants Acts it has been declared that the introduction into Queensland of plants or portions of plants of all and every variety of wheat intended for seed purposes is not permitted unless a permit in writing shall have been first issued in respect thereof by an inspector.

Examination of Brands.

Regulations have been approved under the Diseases in Stock and Brands Acts, providing that an inspector may, for the purpose of identifying stock, clip or cause to be clipped or otherwise remove the hair from portions of any stock for the purpose of examining the brands upon such stock or for the purpose of ascertaining if there are any brands thereon.

Honey Board.

By Order in Council under the Primary Producers' Organisation and Marketing Acts, a Honey Board has been constituted for a period of five years to control honey and beeswax produced in Queensland by persons owning not less than five hives of bees in movable frames. The board to control the commodities will consist of four annually elected representatives of growers and the Director of Marketing.

The New Statesmanship.

"At present there is too much praise given to the safe men who, with a timidity which is often falsely called caution, cling to the old ways. The problems of human society demand a new type of statesmanship altogether, with the courage and integrity of the scientists in it, and unless the world comes under such leadership man may master the skies, but he will miserably fail to prove himself master of the earth."—Dr. Sidney Berry, in the "Yorkshire Observer."

Buffalo Fly.

In view of the danger to be apprehended from an extension of the buffalo fly pest, an Order in Council has been issued declaring a special area as a protective measure to regulate the movement of cattle from and within the present infested or suspected areas in the extreme north-western portion of the State. Action has already been taken by the Government to close Westmoreland crossing place against the entry of stock from the Northern Territory into Queensland.

Egg Board Referendum.

The question "Are you in favour of or against the extension of the duration of the Egg Board until the 31st day of December, 1933?" was submitted to 3,600 poultry growers owing fifty fowls and over who supplied their eggs to the Egg Board or its authorised agents has been decided. The result of the voting was:—

For the continuance	996 votes.
Against the continuance	417 votes.

Mr. Arthur Jones, of the Department of Agriculture and Stock, was the returning officer.

Winter Roses.

"It has been observed that often the people who have the hardest life are the most cheerful. Patients in hospital, experiencing great pain; men and women, surrounded by all sorts of troubles at home and in their work; old people who have to be very careful of their health and their savings, and often haunted by some nameless fear—these are the people who are often most brave and very happy. What is the secret of it? There is no winter in a warm heart. There are roses in winter as well as summer."—The Rev. J. T. Hodgson, in the "North-Eastern Daily Gazette."

Honey Production Returns.

A regulation has been issued under the Primary Producers' Organisation and Marketing Acts requiring all beekeepers to furnish to the Minister by not later than the 23rd April information regarding the quantity of honey produced by them during the fifteen months ending on the 31st March, 1929. At the same time Metropolitan commission agents are required to furnish a return for the same period regarding the quantity of honey received by the agent from beekeepers. Further, wholesale merchants are required to furnish a return showing the quantity of honey purchased by them during the fifteen months ending 31st March, 1929.

Federal Bounties—The Case for Cotton.

Mr. F. M. Forde, M.H.R., in defending the cotton industry, has recently pointed out that, out of a total amount of £895,498 spent on bounties by the Commonwealth Government for the financial year 1927-28, only £81,453 was paid on seed cotton and £24,846 was paid on cotton yarn. The wine export bounty amounted to £482,483, and the other bounties were made up as follows:—Sulphur, £57,377 0s. 9d.; Papua and New Guinea, £194 8s. 10d.; canned fruit, £4,730 9s. 7d.; shale oil, £427 11s. 8d.; iron and steel products: wire netting £73,872 10s. 6d., fencing wire £104,485 7s. 10d., galvanised sheets £65,128 6s. 3d.; tractors, £140. Mr. Forde is now actively engaged in endeavouring to induce the Federal Government to give effective protection to the cotton industry before Parliament rises.

Valedictory.

The officers of both the Cotton Section and the Division of Entomology and Plant Pathology of the Department of Agriculture and Stock gathered on Saturday morning, 9th March, to bid farewell to Mr. G. A. Currie, who has occupied the position of Assistant Cotton Entomologist for the past few years. Mr. Currie is leaving Brisbane for Canberra for the purpose of taking up an appointment as Entomologist in Charge of the Noxious Weed Investigations under the Council for Scientific and Industrial Research.

Mr. Veitch, Chief Entomologist, presented a pair of silver-backed brushes as a token of the esteem in which Mr. Currie is held by his fellow officers, and in some well-chosen words extended the best wishes of those present. Mr. Wells, Government Cotton Specialist, in seconding Mr. Veitch, spoke in high terms of Mr. Currie and his work. Mr. Currie suitably responded, and mentioned that he hoped that his leaving Brisbane would not sever his connection with the friends he had made in the Department.

Youth's Opportunity.

"Learn to say 'No' to yourself in matters of pleasure.

"Start early at the bottom of the ladder.

"The men who 'live well,' but 'not too well,' get on best all over the world.

"The future may see lads going into a factory for two years, then to a university.

"Grumbling should be kept to oneself.

"If a young man can manage to take as much interest in the business he has entered as he does in, say, football, cricket, or motor-cars, there is not much fear of his troubling about whether the dole will be increased or diminished.

"No man will be a success in a calling he dislikes.

"The next crop of millionaires are licking our stamps now."—From a symposium on the subject of success in business, compiled by Mr. R. B. Dunwoody, Secretary of the Association of British Chambers of Commerce.

Egg Board.

By Order in Council under the Primary Producers' Organisation and Marketing Acts the constitution of the Egg Board has been extended until the 31st December, 1933. This Board deals with the owners of fifty fowls and over.

Citrus Levy Regulations.

The Citrus Levy Regulations under the Fruit Marketing Organisation Acts have been extended to all citrus fruits marketed for the year ending 28th February, 1930. The levy will be at the rate of 1d. per bushel case, ½d. per half bushel case, and 4s. per ton, payable on all citrus sent forward to any firm or person carrying on the business of a fruit-canner, fruit-preserver, jam or pulp manufacturer, or juice extractor.

New Sanctuaries for Useful Animals and Birds.

Fisherman Islands, in the estuary of the Brisbane River, have been declared a sanctuary for animals and birds.

The boundaries of a previously constituted sanctuary in the Hughenden district have been extended to include portions of Chudleigh Park and Pine Tree Holdings.

Banana Board Poll.

Following is the result of a poll to decide the question of the formation of a Banana Board:—

For the setting up of a Banana Board	854 votes.
Against the setting up of a Banana Board	1,121 „

The proposal therefore lapsed.

A Remedy for Slippery Concrete Floors.

To overcome the risk of cattle slipping on concrete floors sprinkle some ordinary ground lime (unburnt) over the floor daily after cleaning.

This treatment checks the formation of a slippery surface film that arises from the frequent hosing of the floors. It also acts as a slight disinfectant and deodorant and gives a clean white floor.

Egg Board Election.

The result of the election of the No. 5 District (Darling Downs) representatives was:—

Francis Bell Common (Toowoomba)	185 votes
William Dearling (Oakey)	113 votes

The members of the new Board will therefore be Messrs. R. B. Corbett, M. H. Campbell, A. McLauchlan, T. Hallick, F. B. Common, and L. R. Macgregor (Director of Marketing). The new members are Messrs. Hallick and Common.

Strawberry Board.

An Order in Council has been issued under the Primary Producers' Organisation and Marketing Acts constituting a Strawberry Board for a period of one year. The Board to deal with the commodity will consist of three elected representatives of growers and the Director of Marketing, such members to hold office till the date of expiry of the term of the Board. The whole of the commodity will be divested from the growers and become vested in and be the property of the Board as owners.

The following nominations have been received by the Department of Agriculture and Stock for the election of the three growers' representatives on the newly constituted Strawberry Board:—

S. J. Howe, Woombye.

H. T. Mills, Wynnum West.

G. E. Wort, Cleveland.

As only the required number has been nominated these growers, together with Mr. L. R. Macgregor, Director of Marketing, will therefore be appointed to hold office until the 27th March, 1930, the date of the expiry of the term of the Board.

Nature and Statesmanship.

"Cutting deep into the problems of modern life, are the the lessons of Nature—the nemesis of parasitism, for it spells degeneracy; the dangers of sluggish existence, when the environment is so apt to master the organism; and the risks that are run whenever Nature's sifting ceases, and is not replaced by some higher form of selection. A society that dispenses with sifting is working out its own doom. Other things equal, one would always trust the judgment of a country-bred statesman more than that of one wholly urban, for the man who is at home in the country has the deep impressions of growing and developing which cannot be safely dispensed with by those who would legislate for human life. Especially in a necessarily mechanical age is it folly to allow our children to grow up out of touch with living nature. This is not a question of educational opinion. It is a matter of life and death. It was said long ago that 'Man does not live by bread alone.' There is a complementary warning, 'Organisms cannot be nurtured on mechanisms only.'"
—Professor J. Arthur Thomson.

Man Must have a Focus.

"A philosophy of life is of immense practical value. A man has to find a focus in his life; some permanent abiding place in this world of change. He may not go far, but he will go far enough to put into some shape what he thinks to be permanent. Again, every intelligent man tries to give some sort of satisfaction to his reflective interest in the world. A philosophy of life supplies him with a standard of judgment. It gives him a sense of proportion and perspective—sometimes a sense of humour, which is the same thing—and if a man has both a sense of humour and a philosophy of life he is a happy man. A philosophy of life enables a man to link up the past, the present, and the future, to adjust himself to the necessities of circumstances, and to reconcile himself to the system of the world in which he finds himself. If there is anything that will give a man freshness from day to day it is working on a principle which is not for the moment, but which has an aspect of eternity in it."—Dr. J. B. Baillie, Vice-Chancellor of Leeds University.

The Dingo—A Few Hints on Poisoning.

In the February issue advice was given on the trapping of the dingo, and the same general principles as mentioned in connection with trapping can be followed in regard to the placing of baits, trails, and decoys.

Butter fat, fish, liver, kidney, pork, meat, and suet are all excellent baits. The first two are rolled into balls, the remainder cut into 1-in. cubes. Strychnine is probably the best poison to use, and 3 grains (as much as would fit on a threepenny piece) is sufficient. This is inserted into the middle of the ball or cube through a small knife slit. If practicable, do not touch the bait with the naked hands. If this is done, scorch it over a flame to eliminate any human odour.

One American bulletin, in reference to coyotes, states that a carcase should not be poisoned, but that coyotes should be allowed to eat some of it and the poison baits should be placed all round it, 20 to 30 ft. away. The same bulletin suggests the placing of strychnine in small gelatine capsules in the bait to prevent as far as possible its nauseating taste. In Western Australia the following plan was adopted. Sheep were placed at night in a small dog-proof yard in the middle of the paddock. From this yard radiating trails were made by dragging a carcase or a fish, and round the fence of the yard poison baits and traps were set.

Carcases of dead lambs may be poisoned by inserting 3 grains of strychnine into a muscular portion through a knife slit. When baits are placed on the ground always have them as fresh as possible, and covered with a few dried leaves or a piece of bark. Another method is to wrap the bait in a piece of newspaper. The dingo, being essentially an inquisitive animal, will unroll the paper and devour the bait. This trick may not work for long, the animals becoming very suspicious of the paper after a time.

Although, as a general rule, the best work in connection with the destruction of dingoes can be done during the spring and summer, when the young and inexperienced pups are about, there is an exception to the rule, and it is in regard to poisoning, which is best carried out in the cooler months of the year.

A Warning.—Strychnine is a powerful and deadly poison to man and animals, and should always be regarded as such. Label all containers with a poison label, and be careful to wash the hands thoroughly after using, and never allow it to be placed near any food. Domestic dogs should be chained up and neighbours notified of intention to lay poison. Notices should be erected on land and placed in local newspapers that poison baits will be laid.

Ideals, Talk, but what of Action?

"The too talkative exponents of the 'higher life' in commerce have only themselves to thank when satirists grow merry (or ferocious) over the spectacle of the business man as evangelist," says the "Manchester Guardian." "After all, a virtue that was so very well advertised would not be tolerated in other walks of life; we should soon grow tired of a doctor or lawyer who was always dwelling on his own altruistic motives, and there seems to be no reason why a business man should be allowed to sing his own praises so insistently. Service is a very fine ideal, but it is most convincing when it is least self-conscious."

Life.

"Life gets very much of its thrill and interest from the fact that it is always a going-forth into the unknown. What will come to us through the months of this year upon which we are just entering not one of us can say, but it is that very limitation of our knowledge that helps to keep the whole great enterprise of living full of zest and eagerness and expectation. Whether we will it or not, life must always be more or less of an adventuring, a trying of new paths and a meeting of unexpected difficulties and testings and opportunities. This is not something to be complained against; it is something to be rejoiced in—something, indeed, to be lived up to, to the full. Much more than many of us do, we should think of life as a great adventure, and thus keep in it the zest of great hopes and eager anticipations. There is a great truth in that thought; a truth, however, that many of us seem to miss, and just because we miss it our lives have lacked so much the zest and keenness and the interest that they ought to have."—"The New Outlook."

Motor Headlights—Dimming Condemned.

The question as to whether a motorist should switch off his headlights upon approaching a vehicle travelling in the opposite direction has been discussed from all angles, but has been revived by what is thought to be the first case in England in which a motorist has been censured by a coroner for dimming his lights, and so causing a fatal accident. Fortunately the practice is dying out in Australia, although a number of drivers still consider it an act of courtesy to switch off their lights when approaching another car, particularly on country roads. After years of driving in the country, the writer is convinced that, generally speaking, it is a bad practice to switch the headlights on and off on meeting approaching traffic, but he is also fully convinced that there should be more rigid control of glaring headlights. Although the headlights are supposed to throw their beam of light on to the roadway not more than 60 yards in front of the car, many of them are cocked up so that the beam does not strike the road at all, but is directed right into the eyes of the drivers of approaching cars. It is the writer's practice, when approaching glaring headlights, to keep his eye on the road (excluding as much of the glare as possible), and to slow down until the "offending" car has passed.

Commenting upon the occurrence in which the coroner in England censured the driver for dimming his headlights, "The Motor" says that two men were pushing a barrow across Blackheath, and the car crashed into them from the rear, resulting in the death of one of the men. The motorist said that as he was proceeding across Blackheath another car coming in the opposite direction with headlights on dazzled him so much that he switched his own off, thinking that the other motorist would do the same. The other motorist did not do so, however, and in turning into the near side the crash occurred.

The jury returned a verdict of accidental death, but said that the accident was due to the bad driving of the defendant.

The coroner, agreeing with the jury, said that he did not think the defendant was fit to drive a car. It was not right to shut off his headlights and to blind himself so that he could not see the barrow. He considered it very bad and wicked driving —gross negligence that might have influenced the jury to return a verdict of manslaughter.

The case (says "The Motor") is one that undoubtedly clearly reveals in a tragic manner the danger of switching off, but the coroner's strictures were rather severe. There are evidently some motorists that still consider cutting out the headlights an act of courtesy, and although the risks of doing so are enormous it does not necessarily follow that a man that does it is not fit to drive a motor car.

The Home and the Garden.

OUR BABIES.

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

THE MANAGEMENT OF BABY.

On the treatment and training which an infant receives in the first twelve weeks of life depends greatly its progress during the ensuing twelve months. The opinion is frequently expressed that the new-born baby is too young to be trained; this is a mistake. Even very young babies quickly acquire habits, and it is important that they should be of the right kind.

To delay training until he is a few months old may, and probably will, result in giving mother or nurse a great deal of trouble, and the baby much unnecessary distress. So begin as you mean to go on.

The First Bath.

The first bath should be performed quickly. The new-born infant is not yet used to his new surroundings, and is very easily chilled. For this reason oil and bath him as quickly as you can; dress him, and see that he is warm and comfortable. He will probably be very drowsy and inclined to sleep for some hours. Newly-born infants should sleep more than three parts of their time, and for the first few days practically all the time they are not occupied with bathing and feeding.

The Baby's Bassinette.

From birth baby should have his own cot; he should never sleep with his mother. Not only is it healthier for him to sleep alone, but he sleeps better so. Some people think that the baby requires to sleep with his mother for warmth. This is a mistake. A healthy baby will, for most of the year, keep comfortably warm without any external heat other than that supplied by the bedclothes on his cot. For the coldest months, if he is inclined to be chilly, his bed can be warmed with a hot water bag or bottle, carefully placed with the stopper or cork inclined downward, so that there is no possibility of baby being burnt, even if the stopper or cork should accidentally come out. He should be accustomed from birth to sleep without a light. People who have had much experience with young babies notice that their sleep is more likely to be sound and undisturbed if there is no light in the room.

Feeding the Infant Australian.

Now for the feeding of the new baby. This is a most important matter, and probably more mistakes are made on this than any other point in the management of infants.

Most babies when born know how to suck. It is seldom we find one who cannot do so. This is because for long ages past babies have been fed at their mother's breasts, and at birth the sucking instinct is present. This instinct must be developed, but care taken that it is done on the right lines. It must not be either underdeveloped or overdeveloped. If baby, who very often in these first days of life is very sleepy indeed, is allowed to sleep almost undisturbed, he may at the end of a day or two be very unwilling to work for his living. For that is what sucking is to a baby, and there is no more difficult child to manage than the one who has not been trained to suck properly. Feeding him from a feeding bottle, with the hole in the teat so large that the fluid pours down his throat without effort on his part, will also result in disinclination to suck.

The instinct can be over stimulated by putting baby too frequently to the breast, or by leaving him there for too long a time. Also by giving him a dummy to suck constantly.

Vigorous sucking is necessary for his health, but it should be done regularly and at proper feeding time only. In the early months of life it forms a very important part of baby's daily exercise, for not only does it develop jaws and mouth but it improves the circulation of the whole body.

There is another reason why baby should be trained to correct feeding habits early. We all know that the mother's full milk supply does not come in until the end of the second or the beginning of the third day after baby's birth. But before the milk comes in there is a little creamy-looking fluid in the breasts. This the baby should have, for although there is very little it has high food value, and at this time no other food can take its place. In addition, the mother's health also is benefited, and she makes a quicker recovery if baby is put regularly to the breast at this time.

Put baby to the breast within about six hours of birth—as soon as the mother has rested—leaving him only about two minutes at each breast. See that he is actually sucking and not dozing. It will be sufficient to do this once every six hours for the first day. On the second day leave him three or four minutes at each breast, and feed him every four hours. On the third day, when the milk supply is usually established, put him to the breast every three hours, and leave him about fifteen minutes. The average baby takes from fifteen to twenty minutes to feed. No baby should be left at the breast for longer than thirty minutes, and it is only delicate babies or those who suck feebly who should require so long.

Alternate the commencing breast—i.e., if you begin by giving the baby the right breast for his first feed, commence with the left for the second, the right again for the third, and so on.

The Value of Early Training.

Big strong babies generally do well if fed every four hours—that is, five feeds daily—from the third day. Others are better on three hourly feeding (six feeds daily) until they are about three months old. After that time four hourly feeding suits most infants, but never jump suddenly from three to four hourly feeding. Increase the intervals by a quarter of an hour every second or third day until a four hourly interval is reached. This can be done without baby being aware that any change is being made. Give no night feeds from birth. This is most important. If this is done from the start of life baby learns to take all that he needs in the day time. This allows him and his mother to get the regular uninterrupted night's sleep which both require. A baby trained from birth to have no night feeds takes during the day all he requires to satisfy his hunger, and for his growth and development.

If fed in the day only he obtains just as much as if he were being fed both day and night. For example, careful weighing of children before and after feeding has shown that a child having, say, 30 oz. of food in the twenty-four hours, and given six feeds a day, takes 5 oz. at each feed, while if he is fed ten times a day he takes 3 oz. at each feed, thus obtaining exactly the same quality of food in the twenty-four hours.

Regular Habits.

But this training must start at birth. A baby accustomed to being fed night and day will protest vigorously if his mother suddenly lengthens his feeding intervals. He has been trained to frequent feedings, so takes only sufficient to satisfy his hunger for that period. But when started from birth on regular three or four hourly feeds, with no night feeds, he never expects anything else. So keep absolutely to regular feeding times; make no exceptions. To do so one day will almost certainly result in the baby demanding the same concession the next day. Never hesitate to wake baby during the day when feeding time comes round. Very soon he will learn to wake himself at the right time. If he is allowed to sleep over his feeding time during the day, he cannot be expected to sleep all night. He will not have had his full supply of food, so will be hungry and restless.

One more very important point before closing. Mention has already been made of the fact that the mother's milk does not come in until the second or third day. As a result, many people think it their duty to give baby artificial food during this time. This is a great mistake, which can lead to much trouble, and in many cases has been responsible for the unnecessary weaning of the baby.

Important Points to Remember.

If baby required food during the first two days of his life Nature would supply it. The very fact that it is not there proves it to be unnecessary. As previously mentioned, baby needs the little fluid there is in the mother's breasts at that time,

and should be put regularly to the breast to obtain it. Beyond this nothing but plain boiled water should be given. Babies who are fed on sweetened water or condensed milk as their first food not infrequently refuse to take their natural food later. The reason is simple. Cane sugar, which sweetens both sugar and water and condensed milk, is very sweet. Mother's milk contains a different sugar, called sugar of milk; this is only faintly sweet. Babies like sweet things, and show their preference by refusing to take their proper food.

Important points to remmber in feeding baby are—Commence training at birth; feed regularly; give no night feeds; wake baby when necessary during the day; make no exceptions.

THE COUNTRY GIRL'S OPPORTUNITIES.

What opportunities has the country girl for broadening her mind? Doesn't that to a great extent depend on the individual girl?

It is certain that, fundamentally, some one thing more than any other appeals to each one of us. It may be music, literature, art, nature study, appearance, conversation—what you please, but it is there. For the country girl some "bents" are more difficult to satisfy than others, but none is impossible.

Thin, eager persons are often obsessed by one idea that they will satisfy, come what may; their more weighty sisters of both town and country are not so eager—interest in all round them does not come to them spontaneously. They must cultivate an interest; they must—it sounds unkind, but it is true—they must thin the body and fatten the wit.

Be keen on something, anything; almost everyone has a love of reading; it begins with nursery rhymes and fairy stories; later it may develop into a desire for Deadwood Dicks—or Ethel M. Dell; perhaps from her to Zane Grey, and then to Scott's novels and ballads.

Every book, however trivial, has in it something to digest. I will admit some are calculated to give one a severe attack of dyspepsia before being assimilated; however, one can lead up to this stronger meat from the candy-and-cream-cake variety.

Motor-cars and wireless are perhaps the greatest factors in the evolution of the country girl. Both eliminate space and bring the big things of the world nearer. Many persons that cannot afford a car can afford a good wireless set, and with it much of the news and beauty that is in the world is brought right into the home.

Supposing the farm girl wants to improve her appearance, to dress better; for the reading she can have fashion articles by the world's greatest authorities; while from the advertising section she sees where to go and what to buy for her various needs.

Perhaps the happiest girls in the bush are those with a love of gardening and of wild things; and not only wild things, for they have the opportunity to keep their own horses and dogs.

Only when one has always loved the "first friend" and has no longer anywhere to keep him, does one realise how terribly empty a place he leaves, a longing that no human companionship can supply.

All Australian bush creatures are queer and thrilling. I have found baby porcupines, soft and pink and spineless, caught turtles from the river no bigger than pennies, seen bright coloured tree-snakes, and tried to track the wily platypus to his lair—and failed!

Kangaroo joeys, 'possums, &c., are more commonplace, but are very sweet and alluring babies, with soft fur and big frightened eyes.

The birds are a never-ending pageant. There are always newcomers, migrants from far-away lands; and in November nests full of queer little fledglings, bold and hungry, entirely selfish and very noisy.

Most country towns—even the bush towns—have their picture shows. Usually one reel illustrates some constructive subject that the world is interested in, and the others if not always first-class as pictures go are anyway spirit trips to other times, other places and people—travel of a sort to those who are moored in one place which, however loved, cannot quite kill the longing for adventure and the wanderlust so strong in some of us.

I have purposely left until the last the most unusual and yet most obvious pleasure for everyone; the use of that gift which places us so far above even the aristocracy of the animal world—speech. Speech, so often abused by rehearsing tittle-tattle, is still the medium of expression from one human soul to another.

The hero of one of William Morris's books describes someone very dear to him in these words: "He is my speech-friend." Most men have one particular pal in whose company they find perfect happiness, just having a yarn. He is the speech-friend.

In "The Patsy" now playing in Sydney, Patsy regrets her inability to talk wittily, so that, when she sees a book advertised as containing witty remarks for every occasion, she buys it, learns the bon mots by heart, and tries them on her distracted family, who think she has gone mad!

This is rather too drastic a way to become a conversationalist, but when all is said and done it is this gift alone that enables us to think and feel for and with others that gives sympathy and understanding to those we love. I quote from Mr. Hilaire Belloc:—

"From quiet homes and first beginnings,
Out to the undiscovered ends,
There's nothing worth the wear of winning
But laughter and the love of friends."

—"Gunyan," in "The Farmer and Settler."

KITCHEN GARDEN.

Onions which have been planted in seed beds may now be transplanted. The ground should long since have been thoroughly cleaned, pulverised, and should be rolled previous to transplanting. Onions may still be sown in the open on clean and well-prepared ground. In favourable weather plant out cabbages, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these as well as of peas, broad beans, khol-rabi, radishes, spinach, turnips, parsnips, and carrots, and, where sufficiently large, thinned out. Dig and prepare beds for asparagus, using plenty of well-rotted farmyard manure.

FLOWER GARDEN.

Planting and transplanting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, pentstemons, heliotrope, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia bulbs should be taken up and placed in a shady situation out of doors. Plant bulbs, such as anemones, ranunculus, snowflakes, freesias, ixias, watsonias, iris, narcissus, daffodils, &c. Tulips will not suit the Queensland climate, but hyacinths may be tried, although success is doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip hedges and edgings.

THE BOY, THE FARM, AND HIS OPPORTUNITY.

Apart from the fact that the prosperity of the Dominion is dependent upon the successful cultivation of the land, from which 90 per cent. of its exportable produce is derived, it is plain that the greater the number of people who are settled in country pursuits the larger must be the demand for the output of the secondary industries and the more extensive the opportunities for the employment of young people in these industries. Yet it is not by telling them this that the bias towards work in the towns on the part of the young will be overcome. It has to be brought home to their minds that, after all, their material interests are more likely to be served by their turning their attention to rural pursuits than by their remaining in the towns and hanging about the streets in the hope of their securing a place in an office or a shop or a factory that may ultimately not lead them very far. It has been pointed out that the proportion of persons engaged in the rural industries who are their own masters is several times greater than it is in any of the secondary industries or in commerce, and, consequently, that the youth who is induced to accept employment on the land has a better chance of attaining independence than he has in any calling outside the learned professions."—"Otago Daily Times" (N.Z.).

Farm Notes for May.

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

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

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

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

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

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

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

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

Orchard Notes for May.

THE COASTAL DISTRICTS.

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

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

In planting, always see that the ground immediately below the base of the tree is well broken up, so that the main roots can penetrate deeply into the soil and not run on the surface. If this is done and the trees are planted so that the roots are

given a downward tendency, and all roots tending to grow on or near the surface are removed, the tree will have a much better hold of the soil and, owing to the absence of purely surface roots, the land can be kept well and deeply cultivated, and be thus able to retain an adequate supply of moisture in dry periods. Do not forget to prune well back when planting, or to cut away all broken roots.

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

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

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

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

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

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

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

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

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

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

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

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

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

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

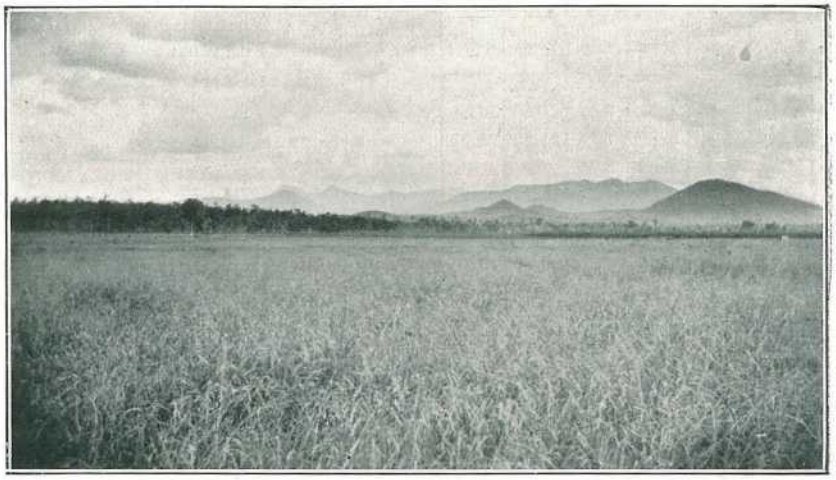


Photo.: Jean Easton.]

PLATE 1.

The Macpherson Range is an Imposing Background to this Stretch of Rich Pasture Land on Coochin.

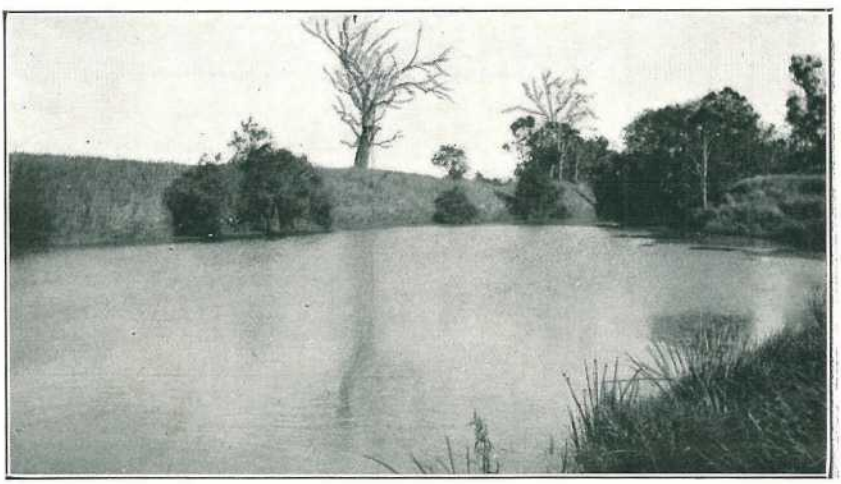


Photo.: Jean Easton.]

PLATE 92.

A Favourite Spot, when the day's work is done, the Coochin Swimming Hole.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	April, 1929.		May, 1929.		MOONRISE. April, 1929.	MOONRISE. May, 1929.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	6.4	5.48	6.21	5.17	10.25	10.54
2	6.5	5.47	6.21	5.16	11.16	11.51
3	6.5	5.46	6.22	5.15	0.0	
					a.m.	a.m.
4	6.6	5.45	6.23	5.14	12.11	12.49
5	6.7	5.43	6.24	5.14	1.6	1.48
6	6.7	5.42	6.24	5.13	2.5	2.47
7	6.8	5.41	6.25	5.13	3.5	3.48
8	6.8	5.39	6.25	5.12	4.4	4.50
9	6.9	5.38	6.26	5.11	5.5	5.55
10	6.9	5.37	6.26	5.11	6.6	7.8
11	6.10	5.36	6.27	5.10	7.10	8.17
12	6.10	5.35	6.27	5.10	8.16	9.27
13	6.11	5.34	6.28	5.9	9.25	10.33
14	6.11	5.33	6.28	5.9	10.34	11.31
					p.m.	p.m.
15	6.12	5.32	6.29	5.8	11.40	12.23
					p.m.	
16	6.12	5.30	6.29	5.7	12.40	1.3
17	6.13	5.29	6.30	5.7	1.35	1.40
18	6.13	5.28	6.30	5.6	2.22	2.12
19	6.14	5.27	6.31	5.6	3.2	2.42
20	6.14	5.26	6.32	5.5	3.38	3.12
21	6.15	5.25	6.33	5.5	4.9	3.43
22	6.15	5.24	6.34	5.4	4.39	4.16
23	6.16	5.23	6.34	5.4	5.11	4.52
24	6.16	5.22	6.35	5.3	5.40	5.30
25	6.17	5.21	6.35	5.3	6.16	6.14
26	6.17	5.20	6.36	5.2	6.53	7.3
27	6.18	5.19	6.36	5.2	7.35	7.54
28	6.18	5.18	6.37	5.1	8.23	8.48
29	6.19	5.18	6.37	5.1	9.12	9.42
30	6.19	5.17	6.38	5.0	10.5	10.40
31			6.38	5.0		11.36

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.

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

2	Apr.	☽ Last Quarter	5 29 p.m.
10	,,	● New Moon	6 32 a.m.
17	,,	☾ First Quarter	12 9 a.m.
24	,,	○ Full Moon	7 37 a.m.

Apogee, 1st April, at 11 12 a.m.
Perigee, 13th April, at 7 30 a.m.
Apogee, 29th April, at 5 0 a.m.

Mercury will be passing from the west to the east side of the Sun on the 17th, only very slightly above its upper limb. It will, of course, be entirely invisible in that position, but will not set till about 45 minutes after the Sun on the 30th.

On the 20th, Venus will be passing the Sun on the earth-side of its orbit, but nearly 6 degrees below it at midday; it will then have its dark side to the earth, but will come into view as a morning star a few days later, and will be seen about an hour before sunrise near the eastern horizon at the end of the month.

The Moon will be passing about 5 degrees south of Saturn soon after midnight on the 28th.

Mars will be, apparently, amongst the stars of Gemini during this month; Jupiter in Aries; Saturn, almost stationary, in Sagittarius; Uranus moving very slowly eastward in Pisces; and Neptune very near Regulus in Leo.

The Southern Cross on the 1st April will be at position IX, on an imaginary clock face in the sky, 30 degrees east of the south celestial pole at about 6 p.m., and at position III., 30 degrees west of the pole about 6 a.m. It will, therefore, be upright and at its highest position (58 degrees above the southern horizon at Warwick) at midnight. This imaginary clock face, having the south celestial pole as its centre, with a diameter of 68 degrees, will afford all the varying positions of the Cross throughout the year and during every twenty-four hours. The pole will always be the same number of degrees above the southern horizon that the observer is from the equator.

2	May	☽ Last Quarter	11 25 a.m.
9	,,	● New Moon	4 7 p.m.
16	,,	☾ First Quarter	6 56 a.m.
23	,,	○ Full Moon	8 49 p.m.

Perigee, 11th May, at 6.6 a.m.
Apogee, 26th May, at 5·54 p.m.

The conjunction of the Moon and Venus on the 7th will take place too nearly in the direction of the Sun to be observable.