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Event and Comment.

Strawberry Culture on the North Coast.

THE Minister for Agriculture and Stock, Hon. H. F. Walker, has made available a report on the strawberry plot at Palmwoods from Mr. R. L. Prest, Instructor in Fruit Culture, at Nambour.

The plot is situated at Chevallum, near Palmwoods, and has been under observation for the past twelve months, the main objective being the selection of superior strains of the Aurie and Phenomenal varieties. In each case the runners, obtained from Montville and Buderim, respectively, showed a good strike, followed by very even growth. The plants budded freely and produced an excellent crop of large-sized berries of good colour and firm texture. The best plants in each case were selected for runners for future plantings. Those two appear to be the most suitable varieties for commercial plantings in the Palmwoods district on account of their vigour, production, and the quality of fruit. It is hoped that selected runners of these varieties will be available at the end of this season for a limited distribution to interested growers. Other varieties were also under observation: Aird's and Frenchi proved to be vigorous growers, producing berries of good size, colour, and quality; they are in many ways similar to Phenomenal. Creswell Seedling, King Edward, and Wilbur grew vigorously, but produced only moderate crops of small, dark-red berries which would not command very satisfactory market prices. A reputed Marguerite-Phenomenal cross was received too late to be seen at its best, and it, together with the others mentioned, except Aird's variety, will be given further observation. Spakeman's Seedling, although a vigorous grower, produced small and poorly distributed fruit, and was very susceptible to leaf scorch.

Generally little trouble was experienced from disease, but during August and September wet weather resulted in a severe outbreak of strawberry mildew, necessitating the removal and burning of all foliage and rubbish. Weather conditions did

not favour the spread of leaf scorch and eye spot. Red spider and thrip infestation were effectively controlled by dusting with sulphur dust, and aphis by dusting with nico-dust.

For fertilizing; the plot was divided into two sections, each of which received an application of a different fertilizer at the rate of 4 cwt. to the acre on the runners becoming established, and a second similar application when the plants blossomed. Although the trials are incomplete, it would appear desirable to use a fertilizer of which the units are derived from an inorganic source.

Pastures—Their Importance.

"REGRASSING of pear-infested land presents an important problem. The experiments conducted by the Department of Agriculture in connection with finding suitable grasses for land where pear was once thick are of immense importance, and show that Perennial Canary grass (*Phalaris tuberosa*) is a grass of outstanding value for this class of country. Lucerne was seen to be doing extremely well at Palardo, and as far west as Roma, where lucerne is being used as a supplementary feed for sheep. Rhodes grass also does well on the pear country. It seems that Perennial Canary grass, lucerne, and Rhodes grass are the plants of outstanding merit on the pear land. Regrassing pear lands to the best advantage must be a problem of great importance to Southern Queensland, and the experiments being conducted by the Pasture Improvement Committee of Queensland will give a useful lead in the work. The experiments are in charge of Mr. F. F. Coleman, of the Department of Agriculture, who is also secretary of the Pasture Improvement Committee. The experiments this committee is carrying out at Lawnton, near Brisbane, are showing the great value of Perennial Canary grass for coastal conditions and also the value of improved strains of Rye grass and improved strains of Cocksfoot. All these are winter-growing grasses, and this gives them added value. Perennial Red Clover and lucerne are promising varieties of the clover family, while improved strains of White Clover seem to give much promise under conditions in South-East Queensland." The foregoing is an extract from a statement in the course of a recent Press interview by Mr. W. Davies, lecturer in Agrostology at the University of Aberystwith, Wales, who is visiting Australia on a grass research mission.

Mr. Davies added that Mr. Coleman's modern lines of grass research dealt with—(1) The introduction of new species; (2) the finding of the best varieties or strains within those species; (3) the effect of manures, phosphates, nitrogen, and lime and potash on the grass; (4) the best methods for getting the most out of these grasses after they had been made to grow, and for managing them.

"Modern grass philosophy," he continued, "can be summed up in four words—species, strain, fertility, and management—and it is along those lines that grassland experiments must be conducted. Such lines are being pursued extensively in New Zealand and Britain. My pre-eminent suggestion for Queensland is more and more investigation along the lines of improving strains of Rye grass, Paspalum, Cocksfoot, lucerne, White Clover, true Wimmera Rye grasses, and leafy strains of Italian Rye grass.

"The two major problems in Queensland, as I see them to-day, are the introduction of improved winter grasses and the introduction of clovers that are suitable to the State. It is well known that Queensland pastures generally are very deficient in plants of the clover family, due particularly to the climatic conditions and to the newness of the country. I am of the opinion that what has been achieved through the introduction of clover in the Southern States of Australia can be achieved in Queensland if a suitable clover can be found, and it can only be found if well-planned investigations are conducted, having that end in view."

Buffalo Fly—Progress in Biological Control.

IN its last annual report, published recently, the Council for Scientific and Industrial Research gives some very interesting information on its investigation of the buffalo-fly problem in Northern Australia and North-West Queensland. The Council is not charged with the duty of attempting to control the pest by quarantine measures, but it is investigating the problem with a view to the introduction and distribution of insect parasites and predators which attack the fly at some stage of its life history. Work is being carried out by the Council both in the Netherlands Indies and in Northern Australia. As a result of the work in the former country, a great deal of light has been thrown on the problem, and twelve species of parasites have been discovered. Further investigations are necessary before any definite judg-

ment can be given as to their suitability for the control of the fly in Australia, but arrangements are being made to introduce the most promising of the Javan parasites into Australia. In Northern Australia the work is centred at a field station at Burnside, where arrangements have been made for the rearing of parasites and for their distribution in the field. Surveys made by the Council's officers have shown that since 1929 the fly has spread some 60 miles eastward into Queensland, and that it has reached the east of the Leichhardt River beyond Burketown. The whole position has been the subject of several conferences, at which the advice of the Council was sought, particularly with reference to the question of setting up a buffer area. The recent spread of the fly indicates that a buffer area would have to be very considerably wider than previously anticipated. The expenditure necessary would be very great, and no guarantee could be given that it would be ultimately effective. It is considered that the eastward progress of the fly can probably be checked by the use of spray races at railheads and trucking yards and by control of stock routes. The Council is pressing on actively with its investigations on biological control in the hope that a suitable combination of parasites and competitors may be found which will reduce the intensity of the pest.

Blowfly Attack in Sheep.

PROBABLY no single problem is regarded by Australian primary producers as of equal importance, and no single source of loss as great as that caused by blow-fly attack in sheep. That is the view taken by the Council for Scientific and Industrial Research as expressed in its annual report, from which the following extract is taken:—

> Whilst the quest for a means of adequate control of this pest is by no means hopeless, it is admittedly an exceedingly difficult problem. It involves slow and laborious investigations, and where so many able workers have failed in the past it cannot be expected that early spectacular results will follow the investigations which the Council is conducting. Although, therefore, progress must inevitably be slow, already very definite advances have been made in the Council's fundamental work on the problem. For example, accurate knowledge has now been obtained of the habits of the various species of blow-fly which attack sheep, and definite information has been acquired regarding the species which are "primary," i.e., which first attack uninjured sheep, and which are, therefore, responsible for the damage, and in the second place regarding those which will only "strike" the sheep after the way has been prepared for them by the attack of "primary" species. It has been established that there is a very definite series of the flies which arrive at successive stages in the process of decomposition. If these species responsible for "primary" strike can be controlled, the problem will be largely solved. During the year 1930-31 important progress was also made in investigations on the association of body strike with a stained condition of the wool. The organism responsible for one of the types of wool stain has been isolated and by artificially implanting cultures of it in the wool of sheep, it has been found that only the areas thus infected will be struck, the remaining parts of the fleece remaining untouched. This important line of investigation is being followed up closely. Experiments on control by trapping, carcass destruction, jetting, and the application of curatives and preventatives are also being conducted.

Value of Fallowing.

WITH the adoption of a cultural system which has for its objective the conservation of moisture, the wheat production in Queensland can be increased considerably without an additional acre being added to that at present under crop to this cereal, said Mr. R. E. Soutter, manager of the Roma State farm, and wheat experimentalist, in a recent radio address.

Not only did this apply to wheat, added Mr. Soutter, but to all other cereal crops as well, more particularly those grown during the winter. Even in the more favoured districts of the Darling Downs where the meterological conditions were such that fair to good crops were obtained nearly every season, the practice of the short fallow would tend to raise the average, whereas in the Manaroa, where the rainfall was less, the adoption of the long fallow in conjunction with the short fallow was considered essential to success. That success could be looked for would be gathered from the fact that in 1918 a 30-acre paddock worked on the long fallow sown to Warren wheat in May and harvested in October, gave a return of slightly more than 24 bushels to the acre on a rainfall during the growing period of 1.96 inches. The yield obtained on the short-fallowed section was 17 bushels.

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

Mr. Edmund Jarvis, Northern Entomologist of the Bureau of Sugar Experiment Stations, has submitted the following Entomological advice to canegrowers:—

THE CANE GRUB PROBLEM.

One cannot help feeling concern at the losses experienced this season by many of our farmers from the attacks of cane grubs. This damage, unfortunately, has not been confined to farms known to be usually grub-infested, but is manifested over areas which, as a rule, enjoy more or less freedom from such injury.

At Jungara, for instance, the activities of this pest (viewed from the Kuranda train) are greatly in evidence, considerable areas of brown or yellowing cane being conspicuous amongst the surrounding sea of green leaves.

It is high time that growers began to think seriously about securing their crops against grub damage, and to profit by the advice given in previous monthly reports regarding remedial methods. On farms liable to infestation preventive measures are the best form of insurance for the farmer against low cane tonnages.

Many growers appear to be under the impression that the cost of soil fumigation is too high under existing conditions, but it should be remembered that the amount of cash received for about 5 tons of cane would defray the expense of such treatment, thus leaving the balance of, say, a 25 or 30 ton to the acre crop, free from grubs. Otherwise the risk is run of losing the lot, and also incurring the additional expense of ploughing out the damaged stools, preparing the ground afresh for another crop, purchasing another lot of seed cane, and planting. To those items may be added the employment of additional labour which could have been done without had the cane been fumigated. Another fact worth considering is that by non-treatment the farmer breeds on his land a host of greyback beetles, many of which may possibly remain in the immediate vicinity after their emergence from the ground, and perhaps oviposit in another of his cane blocks the following year.

Farmers Make Mistakes.

The other day I chanced to overhear, in a train, a farmer relating his experiences of fumigation work, which he announced to those listening had proved a failure, owing, he remarked, to the fact that a second lot of grubs had afterwards appeared and destroyed his crop, despite fumigation of the first lot; his argument, in consequence, being that such control work was no good. In reality, this man had made the not uncommon mistake of fumigating too soon in the season, before all the beetles had emerged, instead of waiting, as he should have done, until the appearance in the soil of grubs hatched from eggs laid by greybacks belonging to the final emergence.

Protect Your Beneficial Insects.

Growers are advised not to destroy soil-frequenting larvæ of insect friends of the cane farmer, but rather try to recognise the various useful species met with from time to time in plough furrows, or flying to honey-bearing blossoms occurring on headlands or in flower gardens.

Some of the commonest of these can easily be identified from the following brief descriptions:—

1. White, sleek-looking, maggot-shaped inactive larvæ about 1 inch in length, which are sometimes found attached to dead or dying cane grubs. These maggots will ultimately transform into digger-wasp parasites of our cane grubs, which may often be seen in the perfect or wasp condition flying to honey-bearing plants.

2. Oval-shaped cocoons of a dark-brown colour, about 1 inch long, with rounded ends. These are made of silk hardened to the stiffness of brown paper, and if examined will be found to contain the pupæ of our common digger-wasp.

3. White maggots, nearly 1½ inches long, which differ from those in No. 1 in being able to tunnel with ease amongst the soil by the aid of a pointed black beak. These predaceous larvæ of our large so-called "Robber Flies" attack any cane grubs met with in the ground by piercing them with their sharp-pointed beaks and afterwards sucking out the life juices of the victim.

4. Larvæ resembling large flattened wireworms, which grow to 2 inches or more in length. These predators have yellowish-brown glittering bodies, and six small legs near the head end. They are slippery, very active and aggressive creatures, and subsist on cane grubs, which they seize with their keen sickle-shaped jaws and greedily devour.

During ploughing operations collect the grubs when plentiful from furrows. These will be mostly those of the greyback and of the smaller reddish-brown cane beetle *Lepidiota frenchi* Blkb., the former during this month being in the second and third stages of growth, while the latter (frenchi) are at present fully grown third-stage grubs, about to transform into the pupal condition.

Fungus Attacking Cane Grubs.

Be on the lookout for specimens of grubs killed by the Green Muscardine fungus (*Metarrhizium anisopliæ*), which is generally in evidence throughout March and April. When attacked by this vegetable parasite, the body of a grub, instead of decomposing in the usual manner after death, retains its ordinary shape and gradually hardening turns at first white and then an olive-green colour. At this stage the body, being filled with the roots (*mycelium*) of the fungus, becomes mummified and can be broken into pieces as if made of dry cheese. The green appearance of these unfortunate grubs is due to the presence of microscopic chains of spores which encrust the body, being in reality the fruit or seed of this parasite. All such green crusted-looking grubs should be collected, crushed into powder, and then thoroughly mixed with about 1,000 times the quantity of moist finely sifted soil, rich in organic matter. This should be shaken several times through a sieve having one-sixteenth inch mesh, and then kept in a close tin until used to keep the soil from becoming quite dry. When planting any area of cane land liable to grub-infestation, a little of this spore-laden soil should be sprinkled at short intervals as thinly as possible in the furrows just ahead of the planter.

Protect Insectivorous Birds.

As mentioned in previous reports, I would again impress upon growers the value of our insect-eating birds. Any species of bird life observed to follow behind the plough deserves encouragement. The "straw-necked ibis" is admitted by all to be the farmers' best friend, and the grubs eaten in a few hours from badly infested furrows by only one of these birds would probably represent a cash value exceeding the daily wage of a field worker.

Controlling the Hopper Stage of Grasshoppers.

A watch should be kept for the first appearance of grasshoppers in the vicinity of cane lands, as the young larval condition of this pest can be more easily combated than the later nymph and winged adult forms. Control of the small hoppers when about a quarter of an inch long is obtained by spraying the swarms with soap or kerosene emulsion, or burning them by firing the grass, or with lighted torches made of sacking tied to poles dipped in some inflammable substance. A simple spray for treating tiny hoppers can be made by boiling 1½ lb. of hard soap in ½ gallon of water, and adding when boiling 2 gallons of kerosene. This is stirred well for about fifteen minutes until it emulsifies and begins to jelly. When using this, add 6 parts water to 1 part of the stock emulsion. Apply with a spray pump, using a nozzle throwing a fine spray, or if no pump be available use a watering can fitted with a fine rose.

The best time to attack these hoppers is late in the day when they are least active.

A good soap emulsion can also be made by boiling 1 lb. of caustic bar soap in about 5 gallons of water.

CANE PEST CONTROL.

Farmers on the Burdekin and elsewhere are advised by Mr. Edmund Jarvis, of the Bureau Entomological Staff, to be careful when planting to see that cane used for the purpose does not contain "white ants." Common-sense methods of fighting the so-called "giant termite" must not be neglected. It would be wise to locate the source of invasion of any canefield, which is usually in roots, tree stumps, and other debris, either in the field or on land adjoining. All infested logs, posts, or timber on or close to headlands should be burnt.

Deep ploughing during autumn months, when possible, has been found beneficial. The burying of trash or debris, and the use of organic manures on land known to harbour termites should also be avoided. When this pest is particularly troublesome, it has been found advantageous to dip the ends of setts, before planting, in a solution of lead arsenate (1 lb. arsenate to about seven gallons of water). In tropical countries success has been obtained by tarring the ends of setts, dehydrated tar having given, it is understood, better results than ordinary coal tar. Another remedy recommended as a preventive against attack is spraying the planting furrow with kerosene. All ant hills in the immediate vicinity of affected fields should, of course, be destroyed as soon as possible. Cone-shaped nests or "termitariums" can be easily treated by merely removing from the apex or summit a piece about 8 in. in diameter, and pouring into the honeycomb-like interior thus exposed about a pint of petrol. This hole should then be immediately plugged up with a lump of firm mud to prevent termites or petrol fumes from escaping. For killing termites in nests situated in old stumps or roots of large trees left in the soil after grubbing newly-cleared land, it would be best to use carbon bisulphide; while for treating hollow standing stumps a handful of paradichlorobenzene should be thrown into the cavity and covered with a spadeful or two of earth.

Grubs of the greyback cockchafer are now fully grown, most specimens having moulted into the third stage of growth, and have either caused the sticks to fall over, or eaten entirely through the basal portions of badly-attacked canes. In milder cases, in which the crop may have fallen in places but still retains some hold of the ground, the grower, Mr. Jarvis advises, need not abandon all hope, for in the event of a few heavy showers falling at intervals prior to the commencement of milling, such canes will have a chance to make enough new roots to keep the sticks from drying up until cutting time.

A grower in the Aloomba area has lately derived noticeable benefit from irrigating a patch of cane which had assumed the yellowing appearance so characteristic of grub attack. Those who have gone to the expense of fumigating their crops are now in a position to witness and realise the advantages gained by such treatment. Even now, however, some of our farmers do not seem to be quite clear as to the correct points at which to insert the spear of the injector. It should never be made in the centre of a stool, but from 2 to 4 in. away from the outer cane sticks. This applies to plant and first ratoon crops making vigorous growth, from 3 to 5 ft. in height.

Experience, both here and in other countries, has shown that injections of carbon bisulphide or of paradichlorobenzene made in the middle of a stool are almost sure to materially damage and retard normal growth of the cane, the degree of injury being dependent on the amount of moisture in the soil at the time of treatment. Should the cane be from 1 to 2 ft. high and the ground very dry, a large percentage of the stools might be killed as the result of such treatment.

TO NEW SUBSCRIBERS.

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

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

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

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

RAT CONTROL IN SUGAR-CANE FIELDS.

By H. W. KERR.

IT would be difficult to estimate the full extent of the damage effected by rats on the cane crops of the Northern districts. In addition to the canes which are totally destroyed by their depredations, there is also a large proportion of damaged cane in which the sugar content is seriously reduced, due to the entry of bacteria and fungi which follows rat injury. These organisms rapidly set up a fermentation or decomposition of the sugars stored in the stalk, and the c.c.s. value of the cane suffers accordingly.

An appreciation of the seriousness of the rat menace has led certain of the Northern Pest Boards to carry out intensive poisoning campaigns in an attempt to eradicate the pest. For the benefit of growers in other areas where rats are troublesome, the following particulars of the control measures adopted are presented. Most of the details supplied have been received through the courtesy of the South Johnstone and Tully Boards, to whom due acknowledgment is made.

It is found that the most effective method of control is to prepare adequate supplies of baits of proven value, which are then distributed to all growers in the area, and on an appointed day the poison baits are spread on all farms. Such a "blanket" campaign is conducted usually twice annually—in August and December.

The bait which was employed almost exclusively in the early campaigns contained as the essential ingredient barium carbonate. Whilst highly poisonous to rats, this compound does not produce fatal results if taken by human beings. Suitably compounded with crushed maize, pollard, or flour and tallow to form a stiff dough which may be rolled out, cut into squares and baked, the resulting biscuits were very convenient for field distribution. The results obtained were generally satisfactory, but it appears that the rat grows suspicious of these foods, and after a time a change of bait is attended by better success. Strychnine was found to be effective when added to a dough similar to that used for the barium carbonate, but the highly poisonous nature of this compound requires that considerable care be exercised in the handling and distribution of such mixtures. It has been the experience of the Tully Board that barium biscuits and strychnine mixtures are equally effective, and both are employed. The following are suitable recipes for the preparation of these baits:—

Barium Biscuit.

Ingredients.—Half kerosene tin barium carbonate (20·5 lb.); 2 kerosene tins flour (42·5 lb.); ½ kerosene tin pollard (8 lb.); ⅓ kerosene tin tallow (12 lb.); 1 pint salt (20 oz.); ½ oz. aniseed oil.

Mixing.—The tallow is melted, added to the dry mixture of barium, flour, and pollard, and the whole roughly mixed. The salt is dissolved in the water, which is then added to the mixture in two equal proportions. The first portion should be thoroughly worked in before adding the second. This will make a dough just moist enough to hold together. The dough is rolled out until a quarter of an inch in thickness, cut into pieces ½ inch square, and baked on trays in an oven until thoroughly dry. The aniseed oil should be added to twice its volume of water, and sprayed over the biscuits.

The foregoing mixture will make four kerosene tins of biscuits. One-third of a biscuit will kill a rat, so that the quantity to be spread will depend on the number of rats in the field. Rats are suspicious of anything bearing the odour of the human body; hence it is advisable to handle the biscuits as little as possible, and to rub a small quantity of aniseed oil on the hands before spreading the biscuits in the field.

Strychnine Mixture.

Ingredients.—Flour, 1 part; pollard, 2 parts; strychnine, 1 oz. (finely powdered); fat, sufficient to make a stiff dough; hot water, 2 to 3 pints; oil of aniseed, ½ oz.

Mixing.—The flour, pollard, and strychnine are thoroughly mixed, the remaining ingredients then added, and the whole kneaded into a smooth, stiff dough, which will hold together under all weather conditions.

An alternative strychnine mixture is prepared as follows:—Crushed maize, 10 lb.; tallow, 6 lb.; flour, 5 lb.; strychnine, 1¼ oz. The strychnine should be crushed very finely, and added to the boiling tallow. After five minutes further boiling this is poured over the dry mixture of flour and maize, and the whole well kneaded. When mixing with the hands about ten drops of aniseed oil should be sprinkled over the mixture.

At South Johnstone it has been found that the strychnine bait is most effective, and is now used almost exclusively. A further bait, employing thallium sulphate as the active ingredient, has also been tried there. A paste of flour with water containing the thallium compound is prepared, and poured over a quantity of whole wheat. By turning the mixture over repeatedly, the paste is uniformly distributed throughout the grain. When dry the treated wheat is wrapped in thin paper containers or placed in small open tins.

Unfortunately, this useful bait cannot be recommended for general use, owing to the danger involved in handling the preparation. Thallium sulphate is absorbed cumulatively through the skin, resulting in extremely harmful effects on the operator. It should only be prepared by a careful and experienced person.

Arsenical baits have also been tried, and some farmers claim that they are most effective. A suitable bait may be prepared by mixing equal parts of flour, white sugar, and white arsenic; this is spread in tins or in paper containers in the dry state. The addition of a little baking soda is said to produce even quicker results.

During the harvesting season, as the cane crops are removed from the fields, the rats which infest them are driven to seek refuge in farm buildings, where they keep the household awake at night with their noise in the rafters and their scampering across the floor. It is found also that the baits used in the fields are not readily taken because they find here an abundance of more attractive food. Slices of bread spread with phosphorous paste have cleaned out badly infested houses after two or three applications. Passion fruit cut open and treated with strychnine powder are readily eaten. Bananas sliced longitudinally and sprinkled with this powder are also effective. For baiting traps slices of fried bacon or toasted cheese are most attractive.

Finally, it should be borne in mind that preventive measures often obviate the need for troublesome cures; and every effort to keep headlands free from weeds and grass will destroy a favourite nesting haunt and drive the rodents to seek a hiding place further afield.

BIOLOGICAL CONTROL OF INSECT PESTS.

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

THE biological control of insect pests has been referred to in the Queensland press and elsewhere on numerous occasions during recent years. Hence it seems desirable to briefly review the possibilities and limitations of that method of control, indicating in the course of the review something of what has been accomplished to date by its application.

When entomologists speak of biological control they generally have in mind the control of an introduced insect and are rarely referring to the control of native pests. The term, however, may be regarded as a fairly comprehensive one, and biological control projects can be divided into three categories:—Firstly the use of native insects against native pests, secondly the use of introduced insects against native pests, and thirdly the use of introduced insects against introduced pests.

Each of these types of biological control will be dealt with in turn, commencing with the use of native beneficial insects against native pests. In this connection it may be noted that the attention of the entomologist has frequently been directed to the existence of native insects attacking native pests, and the suggestion has been made that much good might be accomplished by breeding up the beneficial insects. He has, however, always regretfully to point out that the relative abundance of the native insect pest and its native insect enemy or enemies has been determined ages ago by a variety of factors over which he has little or no control. Climatic factors, for instance, are of great importance in determining the abundance of an insect, and these quite obviously cannot be influenced except in a very minor degree. The artificial breeding of native insect enemies of destructive native insects offers, in the opinion of the entomologists of this department, no prospects of success sufficient to warrant the expenditure of time and money, which would doubtless be more profitably employed in the application of more prosaic measures such as spraying or fumigation.

Turning now to the second type, it must be recognised that the introduction from overseas of parasitic insects to aid in the control of a native insect pest is a somewhat more hopeful procedure; it has, however, seldom been attempted. In most cases it is considered that little benefit would accrue therefrom, but it seems that, when faced with serious losses from a pest that is fundamentally difficult to control by other means, it would be well worth while to explore the possibilities offered by the introduction of insects likely to attack the native insect pest.

Passing to the third type of biological control, it is evident that, although the possibilities in such a case as that just mentioned are admitted, the great field for the employment of the biological control method is that offered by the large number of instances in which insect pests have been accidentally introducted to new countries unaccompanied by their natural enemies. The number of such cases is steadily being added to as one of the accompanying evils of modern civilisation. The reasons for the increase are intimately associated with human migration, and are briefly as follows:—

The movements of primitive man were undeniably slow, and were frequently very restricted. Hence, it generally followed that insects

associated with the foodstuffs accompanying him in his wanderings exhausted their own food supply or died out for other reasons before the new home was reached. Within recent years, however, commerce has penetrated to practically every corner of the globe, and there has been developed an interchange of foodstuffs and raw materials of plant or animal origin on a scale that is without parallel in the history of the world. Accompanying this increase in volume, there has been a corresponding development in the rapidity of transport. These two factors have combined to enormously increase the chances of destructive insects establishing themselves in new homes, and in spite of the attention that is now devoted to overseas quarantine they succeed in doing so every now and again.

It has generally been found that the pests that do establish themselves in new homes are unaccompanied by their natural enemies, and in their new environment they have frequently multiplied to such an extent as to become pests of outstanding importance, whereas in their original homes they were of little consequence, usually owing to the fact that they were held in check by their natural enemies, mainly parasitic insects. In some cases native enemies have turned their attention to the newcomers, but all too frequently no effective check is imposed, and the newcomers get completely out of hand if artificial control measures, such as spraying or fumigation, are either ineffective or economically impracticable.

The objective of biological control in such cases as those now under consideration is to search for insect and other enemies of the undesirable immigrant in its original home, and by introducing these beneficial species to restore the balance of Nature and thus reduce the pest to insignificant proportions. It is this third type of biological control that has been so successfully employed in recent years.

This procedure sounds very attractive, and it is not surprising that numerous attempts have been made to eliminate the constantly recurring expense of spraying and other control measures by substituting for them a degree of biological control that would remove the insect from the pest category.

The first attempt along these lines was made as far back as 1873, when a predatory mite was introduced from North America to feed on a grape vine pest which was then threatening to wipe out the vineyards of Europe. The mite was successfully established, but little benefit is believed to have ensued from its presence.

Other attempts at biological control were subsequently made with varying degrees of success, but it was not until 1889 that a conspicuous success was achieved. A serious citrus pest, the cottony cushion scale, had been accidentally introduced from Australia to California, and in its new home it threatened to wipe out the citrus industry. A ladybird beetle, which feeds on the cottony cushion scale in Australia, was accordingly introduced to California, where it met with immediate success and reduced the cottony cushion scale to insignificant numbers.

It is unnecessary to discuss in any detail the successes in other countries that followed the Californian introduction just referred to. It might be mentioned, however, that it is no exaggeration to claim that the sugar-cane industry of Hawaii has been virtually saved from extinction by the application of the biological control method.

To come nearer home an excellent example of its success can be cited in the case of the control of the coconut moth in Fiji. This pest was so destructive on the main island of Vitei Levu that the commercial production of copra, the chief source of wealth in many South Sea Islands, was an impossibility until the pest was brought under control by the introduction of parasites from the Dutch East Indies.

In the State of Queensland, biological control has been attempted in a number of cases. Until recent years the woolly aphis of the apple was a very serious pest in the Stanthorpe district, its control necessitating the frequent application of a fairly expensive spray. A small wasp parasite was accordingly introduced, and a highly satisfactory degree of control has now been established, thus enabling the orchardist to dispense with all but one of the numerous spray applications previously required.

A fly parasite of the sugar-cane beetle borer has been successfully established in North Queensland, and has been responsible for an appreciable reduction in beetle borer losses.

A few years ago two natural enemies of the banana weevil borer were introduced from Java, but, although one species established itself and is still breeding in the plantations, it has not yet increased sufficiently to exercise any influence on beetle borer losses in bananas.

A few months ago a large colony of a parasitic fly was introduced from Canada to Bundaberg, where it is hoped that it will be of material assistance in reducing white grub losses.

Although successes have been achieved in Queensland, it is necessary to point out that generally the outstanding results have so far been achieved in small isolated areas, such as the Hawaiian and Fijian Islands. In the larger continental areas, where a much more complex insect fauna exists, the results have been by no means so uniformly successful. One exception to this statement is the success of parasites introduced to control scale insects attacking fruit trees in California; in the scale insects, however, the entomologist is dealing with an unusual group of insects in that they are firmly attached to their host plants for the greater part of their existence.

A further point to which it is necessary to direct the attention of those who may become over-enthusiastic about the biological control method is an important one. It has been rather rashly assumed by some workers that a highly destructive introduced insect that is of little consequence in its native home is so because it is there kept in check by its own insect enemies. Such is not necessarily the case, for there are definite instances in which the control is exercised not by the insect enemies, but by climatic and other factors, the natural enemies playing a very minor role.

In conclusion, it can confidently be claimed that in the past biological control has been brilliantly successful in a number of cases, and it is believed that these successes will be repeated in the future. At the same time it must be recognised that in Queensland other methods will in all probability have to be used for the control of most of the insect pests. Many of these are native insects, and for the majority of these native pests the biological control method offers no prospect of success. In the cases of some of the introduced pests there are, however, undoubted prospects of its further successful application.

THE COMING BRISBANE SHOW.

THE Royal National Association intimates that there is only a period of four weeks remaining in which entries may be lodged in the Live Stock Sections at the forthcoming Royal National Show to be held at Bowen Park, Brisbane, 8th to 13th August next. The Official Prize Schedule has just been issued, and, apart from its general attractiveness as a publication, it is most informative and complete in regard to all matters pertaining to the Royal National Show. The Schedule has been subjected to an extensive revision, bringing every section quite up to date and in accord with modern developments. There are important new classes provided, not only in the Horse Section and Ring Events, but also in the Dairy Cattle and Pig Sections. A most comprehensive range of classes carrying generous prize money is again offered in respect of all dairy breeds—viz., Ayrshires, Jerseys, Australian Illawarra Shorthorns, Guernseys, and Friesians, whilst a substantial sum of prize money has also been set aside for the Milking Competitions and Butter-Fat Tests. A further innovation is the classes instituted this year for Type and Production. The conditions of these classes should prove of interest to every stud dairy breeder who is anxious that the progeny of his stud shall not only be pleasing to the eye in the Show Ring, but also will be in a position to prove that good looks can be backed up by sound performance at the bucket.

Every studowner of note is anxious to be represented at the Brisbane Royal, not only because of the wonderful advertisement which it carries, but also because there is the opportunity of winning substantial prize money, whilst the stud disposal sales conducted during Show Week invariably attract a host of discerning buyers who are prepared to pay the right price for really good stuff.

The Grand Parade of live stock at the Royal Show each year provides one of the greatest spectacles of its kind to be seen in any part of the world, and is the admiration not only of the proud owners of the prize-winning stock and crowds of spectators, but also of large numbers of interstate and even overseas visitors whose expressed opinions are valuable.

The special attention of all pig-breeders is drawn to the fact that three new classes have been provided for porkers and baconers—viz., Special Pen of Five Porker Pigs Suitable for the Export Trade, prize money £14 10s. Also Special Pen of Five Baconer Pigs, any Breed or Cross, each 180 to 200 lb. live weight and considered most suitable for the English Market, prize money £14. A further class provides for Pen of Three Baconer Pigs of any Breed or Cross, each 140 to 170 lb. live weight, prize money £7.

There will be four A Grade Exhibits, six B Grade, and four One Farm displays; the latter provide object lessons in themselves as showing a truly remarkable range of products obtainable from a single farm. The staging of these exhibits is a very costly item to the Royal National Association, quite apart from the tremendous amount of preparatory work which has to be put into the various efforts by the respective District Organisers.

In reference to trucking expenses, live stock exhibitors are reminded that, whilst the usual concessions extended by the Queensland Railway Department to all bona fide Show exhibits will again apply, freights generally this year are considerably lower than those obtaining for the 1931 Show, there having been two substantial reductions in freight rates—of 10 per cent. and 5 per cent., respectively. This is all in the right direction, and it is hoped that many stud breeders further afield who have not previously exhibited at Brisbane will by reason of these concessions now send their cattle along to compete for the generous prize money offered.

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

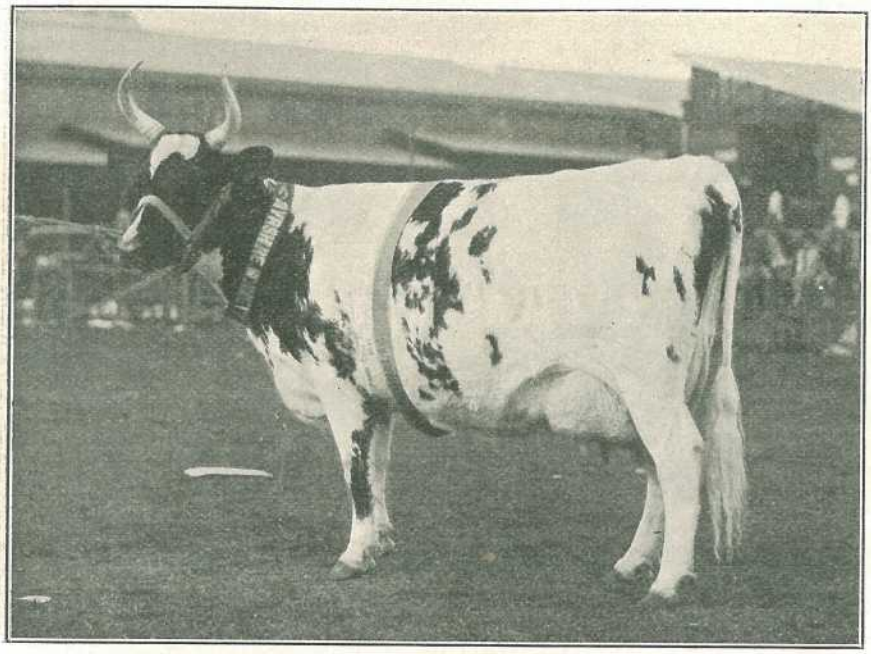

PLATE 52.
Champion Ayrshire Cow at last year's Show, "Fairview Lady Jean." (J. H. and R. M. Anderson, Southbrook.)

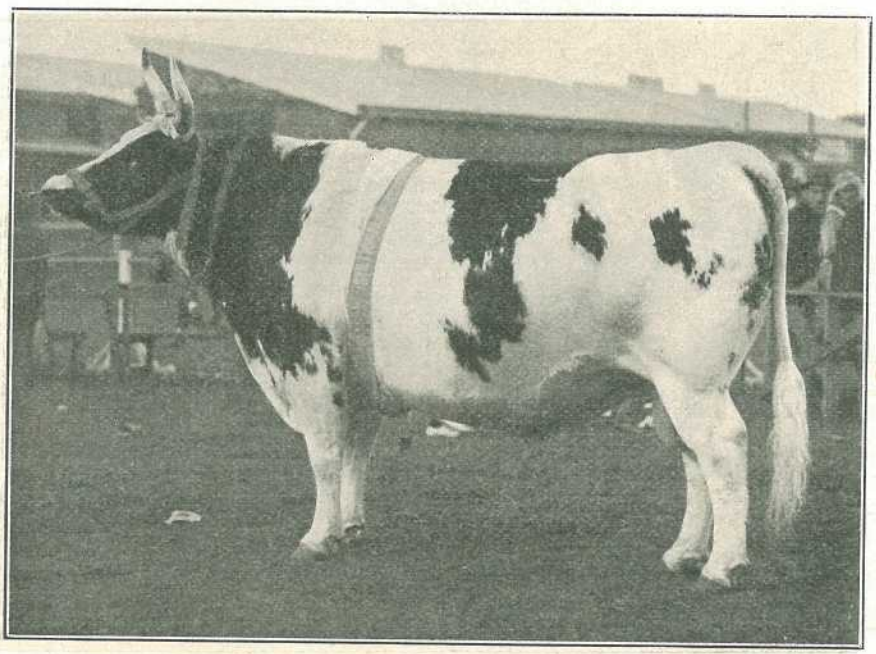

PLATE 53.
Champion Ayrshire Bull at the last Brisbane Show, "Longland's Bonnie Willie II." J. H. and R. M. Anderson, Southbrook.)

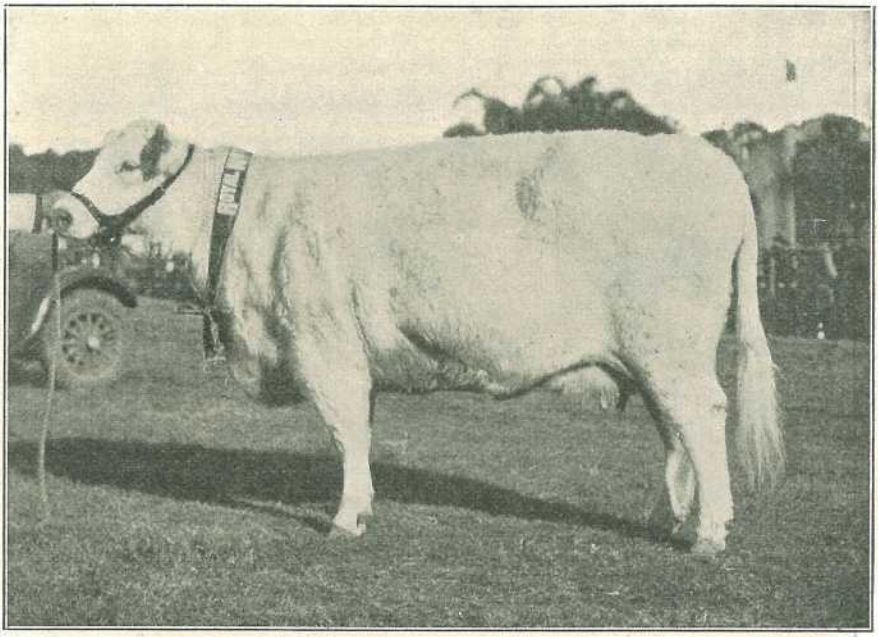

PLATE 54.
Last year's Champion Shorthorn Cow, "Melton's Lovely." (J. T. Scrymgeour, Netherby.)

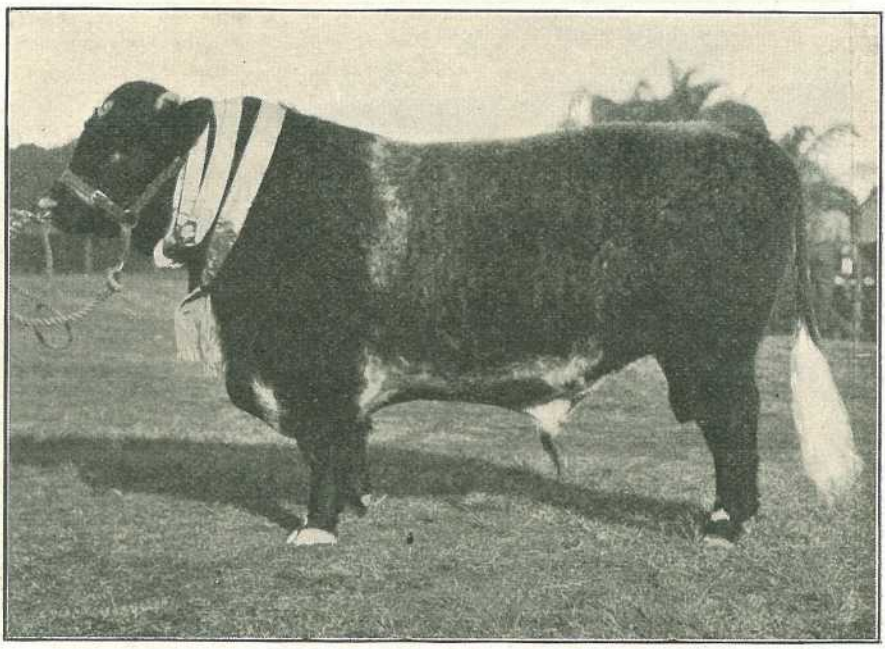

PLATE 55.
Champion Shorthorn Bull at the 1931 Brisbane Show, "Royal Challenge." (J. T. Scrymgeour, Netherby.)

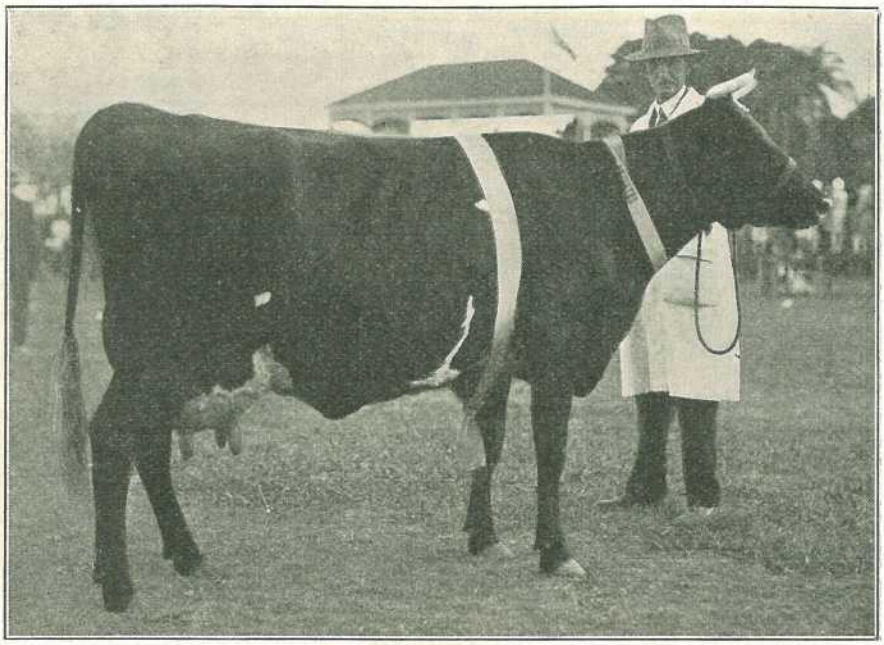

PLATE 56.
Champion A.I.S. Cow (also Reserve Champion, Butter-fat Test) at last year's Show, "Fussy V. of Railway View." (A. T. Waters, Lanefield.)

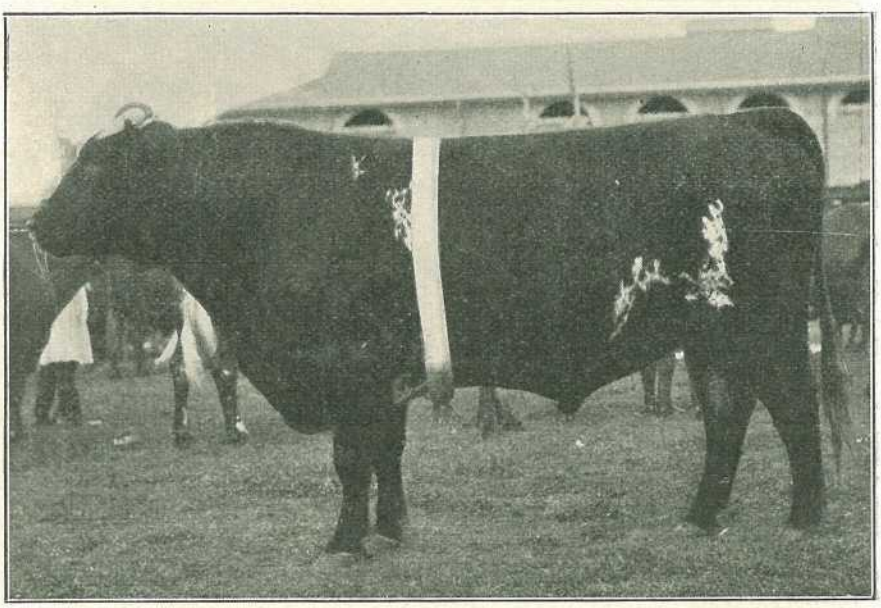

PLATE 57.
Last year's Champion A.I.S. Bull, "Daphne's Royal of Hillview." (F. O. Hayter.)

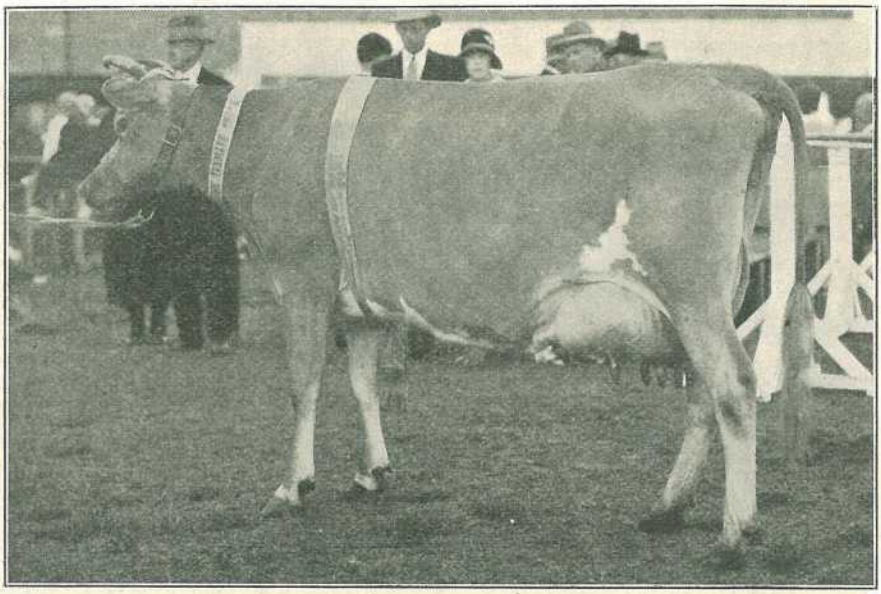

PLATE 58.
Last year's Champion Jersey Cow, "Oxford Ginger Girl." (E. Burton and Sons.)

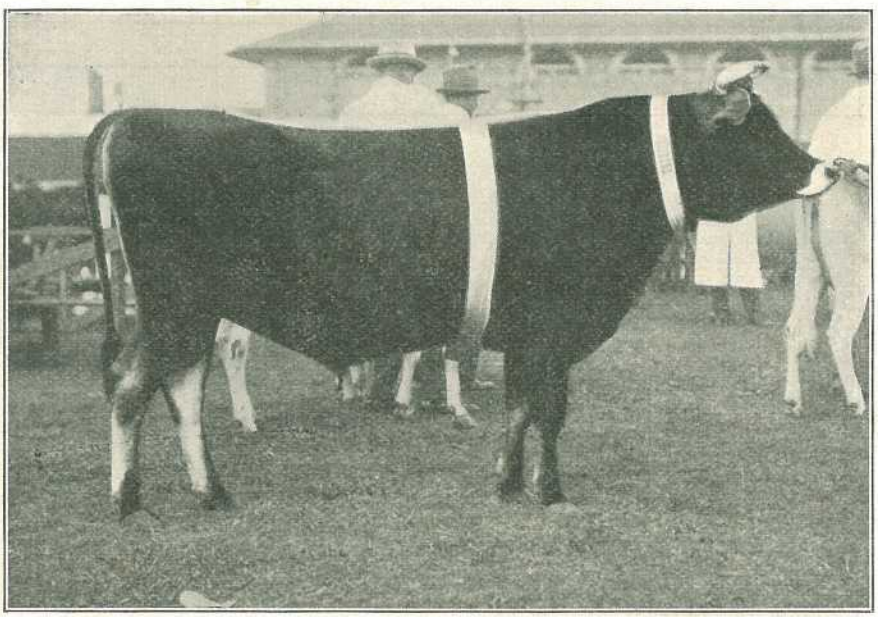

PLATE 59.
Champion Jersey Bull at last Brisbane Show, "Some Hope." (A. J. Sinnamon and Sons.)

MAMMITIS.

By J. A. RUDD, B.V.Sc., Government Veterinary Staff.*

MAMMITIS may be defined as inflammation of the mammary gland of the cow. In the past, little notice was taken of mammitis, as it was quite a simple ailment with little or no complications, but to-day we have built up the modern dairy cow and her productivity so that she will now produce more than her own live weight in butter in a single lactating period of nine months. This surprising result has been brought about chiefly through selection and survival of the fittest. Careful attention to health and diet has brought about surprising results in production, and with it we have a development of a common ailment such as mammitis into a formidable disease. If neglected, even in its early stages, it may easily cause the death of a valuable, high-producing cow. Mammitis may be divided into—

1. Simple mammitis—due to injury such as from the horns of one cow as against another cow, or such as a blow or a kick.
2. Septic mammitis.

SIMPLE MAMMITIS.

1. Simple mammitis is caused chiefly by the big blood supply enlarging the mammary gland, and this leakage of minute capillaries causing a condition of stagnation—in other words, causes a swelling of the udder at times as far forward as the front legs and well up the back of the udder, and between the hind legs. This is quite normal, provided steps are taken to care for the animal, which should be stalled and bedded down on good, clean bedding with ample water beside her, and fed, if possible, on green food in ample quantity, and failing this, such food as will tend to keep her in good general health. If green food is unavailable, bran and chaff should be given twice daily. A ration of molasses once daily should also be supplied in order to assist normal functioning of the excretory organs of the body which enable the animal to rid herself of waste products.

Clean bedding is essential as the stretched skin is liable to be broken and putrefactive organisms are liable to find entry thereby into an over-distended udder with serious results.

A few days prior to calving 1 lb. of Epsom salts with 2 tablespoonsful of ginger, 1 lb. of treacle and 1 gallon of water may be given as one drench.

If, on the other hand, the same quantity were administered in the food daily, divided into small regular doses, extending over some days, the effects would be further reaching and better results would accrue. The ration of molasses may or may not assist in establishing and preserving the normal sugar content of the blood during this difficult period, but its medicinal value should not be lost sight of. This value is far greater than its market value or its value from an analytical standpoint, and the fact that it is a by-product of one of our key industries must not be lost sight of in the general survey of likely cheap adjuvants which are well within our means and which perhaps may be useful in assisting to prevent an attack of milk fever by raising, if such is possible by this means, the sugar content of the blood of cows that have newly calved. This is definitely claimed for it by some authorities.

SEPTIC MAMMITIS.

2. Septic mammitis is definitely a diseased condition of the udder or mammary gland brought about by various agencies, due in part to the neglect of simple precautions already specified, and may be classified as follows:—

(i.) Due to germ infection.

(ii.) To fungus growths.

Germ Infection.

Mammitis, due to germ infection, may be divided into—(*a*) curable, (*b*) incurable.

Curable.—It is quite possible that septic mammitis, which is curable, may be caused by five or six different species of germs working together or singly. It is possible to cure this form of mammitis within certain limits, if it can be called a cure, by vaccination. It must be constantly borne in mind that healthy udder tissue, once it has been destroyed by germ infection, can never be replaced except by fibrous and fatty tissue; therefore, if the normal functioning tissue cannot be replaced except by tissue which does not secrete milk the utility of such an animal

*From Radio Lecture from 4QG.

is correspondingly diminished in direct ratio to the extent of such replacement. This is, therefore, a good reason why prevention is always better than cure, particularly in this form of localised infection of the udder.

Incurable.—That which is due to tuberculosis of the udder.

Disease of the Udder of Fungus Origin.

The Ray fungus which is responsible for the disease known as lumpy jaw in cattle, is very often a serious offender in this respect, and is supposed to enter the udder which is heavily distended prior to, or soon after the cow comes into profit. The mode of entry has not been proved, but it is nevertheless present in certain cases of septic inflammation of the mammary gland.

Symptoms of Septic Mammitis.

Depending on the severity of the attack, the affected animal makes a temperature sometimes as high as 106 deg. Fahr. Breathing is not regular, but rapid. She walks with a characteristic short stride of the hind legs, as if they are stilty and tries to pick her way as much as possible on even ground. Any sudden jar is met with a short grunt or even a groan. A firm foothold is always sought when walking into the bail. On manipulation of the udder, swelling of one or more quarters is generally present, and tenderness to the touch is fairly characteristic, but all this depends on severity of the attack. Curdled milk in limited quantity may be removed.

At this stage, if the cow is neglected the pus may spread through the system and the animal may succumb to septic pneumonia. Isolated instances are also seen where the joints of the legs swell, due to absorption of pus, and the animal lingers on for some weeks, and ultimately dies of general blood poisoning or septicaemia.

Treatment.

Neglect of simple precautions such as clipping all hair from the udder extending forward to the navel and across to the milk veins on each side of the abdomen and back up within 2 in. of the external genital organs and right up the tail and down to the brush, which should not be touched.

A soap lather with luke warm water and common household soap is then well rubbed into the skin of the clipped area and tail. This may be done daily for three days, and this is followed by preventive vaccination with mammitis vaccine as soon as the temperature of the animal drops to normal.

By this means, the trouble called mammitis, now very prevalent among our dairy herds, will be side-stepped and ultimately stamped out.

A Preventable Disease.

Mammitis is contagious and may be carried from cow to cow by the hands of the milker, and also by means of the teat cups of the milking machine. It does not allow a cow to do her best at the pail, and pulls down the whole average production of the herd. The annual loss through this disease cannot be estimated, but it must be considerable. It may be stated definitely here that it is preventable. Then why not take the necessary steps to prevent it and save trouble, annoyance, and expense?

Mammitis can be controlled effectually in any herd by vaccination. There is no other remedy known to be worth anything in comparison. It requires constant vigilance on the part of the owner, and this will be amply repaid. The time spent in haphazard methods of combating this disease with lotions and potions is absolutely wasted, and can never be made up at any time in the future. Prophylactic, or in other words, preventive treatment has been definitely proven to be of signal service in combating this trouble and should be carried out rigorously with only one explicit aim—that of making a clean sweep of the disease. Cows which persist in carrying the disease, after repeated doses of vaccine have been used at gradually increasing doses at stated intervals of days, should be destroyed as incurable or fattened for the butcher, as they are totally unfit, no matter how good in other ways, for retention as active units of any dairy herd.

It is not possible for butter-makers to make good butter or cheese out of milk which carries the germs of mammitis. There are 2 per cent. of cows in every infected herd which have tuberculosis of the udder, and this enables the owner to cull such cows which are active carriers of disease in every herd, and this will no doubt assist in cleaning up the source of a good deal of second quality cream.

CARE OF MILK AND CREAM.

Milk for cheese-making or town supply should be aerated and cooled immediately after being milked from the cow. This removes the heat, and often a "cowy" odour, as well as food flavours and gases. The cooler should be placed where it will be free from dust, and from a dusty atmosphere. If possible, water freshly drawn from a well should be used for cooling.

Separate the milk at blood heat as soon as possible after milking. Fix a cooler to the cream spout of the separator and so cool all cream—it will keep ever so much better. Do not mix new hot cream with that from the previous separating until it has been cooled. Mix the cream by pouring from one vessel to another. This allows the air to purify it and makes it keep better. For the same reason, stir the cream frequently, using an enamelled stirrer—do not use wood.

Keep the cream can in a cool, draughty, well-ventilated place and exclude flies. Keep the can covered with a piece of wire gauze fitted into a small handy wooden frame. Do not allow the direct rays of the sun to reach the cream.

When sending to the factory, fill the cans to the neck rim. This prevents churning in the can, which would mean a loss in weight and an incorrect test.

Separate in the summer to get a 40 to 42 per cent. test, and in the winter to get a 33 to 36 per cent. test. When the cream is excessively thick there is a loss of fat in the skim-milk. When it is too thin in the summer season it may become too sour, and curdled milk is formed. Do not use too much washing to get the last of the milk through the bowl. When separating, be very careful of three things—(1) Have the temperature of the milk over 90 degrees Fahr.; (2) keep the speed even and the bowl up to the specified revolutions; and (3) keep the inflow of milk to the bowl regular and full.

Keep cans of cream in the shade, especially when being carted or when waiting at the roadside for the cream van. A small shelter-box should be provided, high enough from the ground to be safe from dogs. Deliver cream to the factory daily if possible.

The cream wagon or cart should have a cover to keep the sun's rays from the cans; even a 6-inch space between the tops of the cans and the cover will do.

NEW BUTTER CHART.

THE introduction of a new butter chart for the purpose of estimating commercial butter in cream supplies has brought many inquiries from dairy farmers as to the reasons and actual effect.

Until recently O'Callaghan's Chart has been the basis on which commercial butter was credited to suppliers.

A new chart was compiled by the Department of Agriculture in New South Wales to take its place, and this chart, after the results of its application had been checked, was adopted for use in this State.

O'Callaghan's Chart was based on a moisture content of 12 per cent., but owing to the development in moisture control under modern manufacturing conditions the new tables were based on a moisture of 14 per cent., thus providing for a greater original credit to suppliers than O'Callaghan's, with the "over-run" subsequently distributed correspondingly less. Probably the position will be more clearly understood from the following examples:—

By O'Callaghan's Chart—

	Commercial Butter. Lb.
The original credit would be, say	100
4 per cent over-run = ...	4
Total credit to supplier = ...	104

By new computing tables—

	Commercial Butter. Lb.
The original credit would be, say	102
2 per cent. over-run = ...	2
Total credit to supplier = ...	104

It will be noted that the total credit must always be the same, as the factories pay out every pound of commercial butter actually manufactured.

A copy of a credit note is appended showing the amount of butter which would be credited under both the old and new charts. It will be noted that the dairy farmer was originally credited with 9 lb. more butter under the new chart, but as the factory can pay out no more butter than it actually makes, the over-run subsequently distributed is correspondingly decreased by 9 lb.

It is obviously immaterial whether the original credit is high or the over-run is high so long as the company credits the supplier with all the butter that is made from his cream. This the companies do, their books being checked by the Department's auditor.

A high over-run is no indication of efficiency. If suppliers put an undue value on the amount of over-run they receive, their agitation merely invites the company concerned to "clip" their tests, or, in other words, to read them low so that they may have sufficient in reserve to pay out a high rate of over-run.

No company wishes to do this because it cannot benefit the company in any possible way; but, unfortunately, the attitude of some suppliers through an imperfect knowledge of over-run induces a company to resort to such means to placate the suppliers.

The position will be more fully realised when it is considered that by reading a cream test as 40 per cent. instead of 41 per cent. there is an additional available over-run of 2½ per cent.

The operation of butter making on modern principles confines the over-run within definite limits from 1 to 3 per cent. Excessively high and wide variations in the over-run call for more care and attention in testing, manufacturing, and recording operations.

Date.	Lb. Cream.	Test.	Lb. of Butter.	
			New Tables.	O'Callaghan's.
1	57	38	26	26
2	54	40	26	26
3	29	40	14	14
4	67	39	32	31
5	53	38	25	24
7	99	39	47	47
8	53	38	25	24
9	39	40	19	19
11	106	37	48	47
12	48	39	23	23
14	76	40	37	37
15	51	41	26	25
16	44	38	20	20
18	101	38	47	46
19	55	40	27	27
21	81	37	37	36
22	62	37	28	28
23	53	37	24	24
25	100	37	45	44
26	41	38	19	19
28	76	39	36	36
29	59	37	27	26
30	40	39	19	19
			677	668
Over-run			10=1·47%	19=2·84%
Total credit to supplier		=	687	687

PRODUCTION RECORDING.

List of cows, officially tested by officers of the Department of Agriculture and Stock, which have qualified for entry into the Advanced Register of the Herd Book of the Australian Illawarra Shorthorn Society, the Jersey Cattle Society, the Friesian Cattle Society, the Ayrshire Cattle Society, and the Guernsey Cattle Society, production charts for which were compiled during the period 1st to 30th April, 1932 (273 days period unless otherwise stated):—

Name of Cow.	Age.	Milk Production.	Butter Fat.	Owner.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
June of Penrhos	Mature	12,132·84	525·115	A. Sandilands, Wildash
Bella 13th of Fairlie	Mature	10,022·55	416·941	Mrs. C. A. Littleton, Crow's Nest
Trixy 6th of Rosenthal	Mature	9,762	377·945	S. Mitchell, Warwick
Saucy of Penrhos	Mature	8,078	365·544	A. Sandilands, Wildash
Charity of Penrhos	Snr. (4 yrs.)	8,373	342·351	A. Sandilands, Wildash
Birdie 3rd of Kingsdale	Jnr. (3 yrs.)	7,306·9	315·896	A. A. King, Mooloolah
Fairy 5th of Fairlie	Snr. (2 yrs.)	8,209	334·670	C. B. Mitchell, Warwick
Maggie 11th of Rosenthal	Snr. (2 yrs.)	7,504·25	317·154	S. Mitchell, Warwick
Velvet IV. of Millstream	Snr. (2 yrs.)	6,188·25	271·156	W. J. Barnes, Cedar Grove
Peach 6th of Rosenthal	Jnr. (2 yrs.)	9,374·25	396·232	A. Sandilands, Wildash
Nellie of Balcarris	Jnr. (2 yrs.)	6,878·95	294·220	Mrs. C. A. Littleton, Crow's Nest
Phyllis 5th of Springdale	Jnr. (2 yrs.)	7,657·01	290·369	J. A. Montgomery, Laidley
Dnalwon Lucky Star	Jnr. (2 yrs.)	7,175·19	285·578	A. J. Caswell, Wangalpong
Jean VIII. of Blacklands	Jnr. (2 yrs.)	7,231·6	285·561	A. Pickels, Wondai
Daphne III. of Blacklands	Jnr. (2 yrs.)	7,119·65	277·720	A. Pickels, Wondai
Envy VI. of Blacklands	Jnr. (2 yrs.)	8,089·05	289·717	A. Pickels, Wondai
JERSEY.				
Violet of Lightfield	Mature	8,632·33	413·098	J. Mollenhauer, Moffatdale
Dulcie of Southport	Mature	6,870·25	391·864	E. G. Groves, Kandanga
Trinity Skylight	Mature	7,385·65	388·178	Fowler and Sons, Coalstoun Lakes
Tiny of Southport	Mature	8,196·2	382·047	A. W. Howlett, Hodgleigh
Lindleys Reckless	Mature	7,064	370·476	J. Bellert, Mundubbera
Lindleys Hope	Mature	6,602	364·941	J. Bellert, Mundubbera
Fay of Woodstock	Mature	7,510·22	359·120	W. J. Sharpe, Tara
Newhills Syria	Mature	5,812·75	358·757	J. N. Robinson, Maleny
Oceanview Laddies Maybell	Jnr. (4 yrs.)	6,907·65	382·219	H. M. Thomason, Mount Mee
Hillside Dora	Snr. (3 yrs.)	8,142·6	335·796	H. M. Thomason, Mount Mee
Oxford Rosette 3rd	Snr. (3 yrs.)	6,806·43	312·102	J. B. Keys, Gowrie Little Plains
Trinity Fairy Floss	Jnr. (3 yrs.)	5,243·7	285·183	E. J. O'Keeffe, Nambour
Oxford Astor	Snr. (2 yrs.)	6,536·26	412·335	E. Burton and Sons, Wanora
Oxford Sirius	Snr. (2 yrs.)	6,152·84	363·969	E. Burton and Sons, Wanora
Oxford Snowdrop	Snr. (2 yrs.)	6,449·44	328·558	E. Burton and Sons, Wanora
Kenmore Tiny	Snr. (2 yrs.)	5,227·65	299·419	E. L. Melville, Toogoolawah
Glenview Rosebud	Snr. (2 yrs.)	4,865·9	295·475	Fowler and Sons, Coalstoun Lakes
College Floss	Snr. (2 yrs.)	5,452·59	261·673	Q.A.H.S. and C., Gatton
Oxford Buttercup 7th	Jnr. (2 yrs.)	5,793·84	352·409	E. Burton and Sons, Wanora
Trecarne Rosella 4th	Jnr. (2 yrs.)	6,151·63	336·548	T. A. Petherick, Lockyer
Greenstock Poppy	Jnr. (2 yrs.)	7,054·16	330·484	J. B. Keys, Gowrie Little Plains
Westwood Fairy	Jnr. (2 yrs.)	5,237·2	320·793	F. Porter, Maleny
Pineview Countess	Jnr. (2 yrs.)	4,704·47	299·504	Hunter and Sons, Borallon
Morago Duchess	Jnr. (2 yrs.)	5,571·94	289·914	J. W. Evans, Boonah
Bremerside Nobles Lass	Jnr. (2 yrs.)	5,106·85	282·116	E. G. Groves, Kandanga
Carnation Dainty Locket	Jnr. (2 yrs.)	4,919·95	277·260	Spresser and Son, Brassall
Trecarnlea Daisy	Jnr. (2 yrs.)	4,879·88	265·243	T. A. Petherick, Lockyer
Patricia of Hamilton	Jnr. (2 yrs.)	5,252·89	254·905	J. W. Evans, Boonah
Glenview Eclipse	Jnr. (2 yrs.)	3,768·65	245·757	Fowler and Sons, Coalstoun Lakes
Sylvia of Hazelvale	Jnr. (2 yrs.)	4,978·6	245·55	A. W. Howlett, Hodgleigh
Mayday Glory of Morago	Jnr. (2 yrs.)	4,424·34	239·523	J. W. Evans, Boonah
Abbeystead Pride 4th	Jnr. (2 yrs.)	5,025·55	235·782	J. C. Davey, Gatton
FRIESIAN.				
Silvery Rock of Oaklands	Snr. (2 yrs.)	6,941·83	268·471	W. Richters, Tingoora
Dairymaid 5th of Oaklands	Jnr. (3 yrs.)	7,079·53	274·699	W. Richters, Tingoora
Brigalow Dinah	Jnr. (4 yrs.)	9,336	355·688	A. O. Stumer, Boonah
GUERNSEY.				
Linwood Souvenir	Snr. (2 yrs.)	5,383·55	250·135	A. S. Cooke, Maleny
Moongi Prairie Flower	Snr. (3 yrs.)	6,116·5	348·575	W. A. K. Cooke, Maleny
AYRSHIRE.				
Benbecula Bramble	Jnr. (2 yrs.)	7,046·74	281·086	T. Holmes, Yarranlea

PASTURE IMPROVEMENT.

The Minister for Agriculture and Stock (Mr. H. F. Walker) has made available the following report by Mr. F. F. Coleman, secretary of the Pasture Improvement Committee, on Grass, Clover, and Forage Plant trials at Lawnton during the year 1931-1932.

THE first official trials at Lawnton were sown on the 15th April, 1931. It is therefore possible in May, 1932, to give a brief résumé of the work carried out. During 1931 just over 200 plots were sown on land that had been ploughed, harrowed, and top dressed with a mixture of ¾ cwt. sulphate of ammonia, 2 cwt. super., 42 lb. potash per acre. It was necessary to make a start before the first crop of weeds had been killed, with the result the weed growth after rains has been particularly troublesome.

The first essential for success with grasses and clovers is an assured rainfall. At Lawnton the rainfall from 31st March to 30th October, 1931, was much below the average; the same remark applies to January-February-March of 1932.

These adverse conditions have given a good tryout to many grasses and clovers. Any strains that have persisted under the high temperatures and low rainfall, and still capable of renewed growth, may be looked on as suitable for sowing under normal Queensland coastal conditions.

The trials clearly show the difference between annual, biennial, and perennial varieties; also the difference in the strains of the various kinds.

Even the most casual observer would have noticed that the plants could be divided into those showing:—(1) Much more leaf than stem; (2) leaf and stem; (3) stem and leaf; and (4) much more stem than leaf.

Density of growth, leafiness, and persistency are the characteristics that emphasise the value of the true strains of certified Perennial Rye Grass, Akaroa Cocksfoot, *Phalaris tuberosa*, and New Zealand Certified White Clover.

To get the whole matter into the right perspective, the following table sets out the rainfalls of both Petrie (Lawnton) and Maleny:—

	Petrie (Lawnton).				Maleny.			
	Average, 42 years.	1930.	1931.	1932.	Average, 15 years.	1930.	1931.	1932.
Jenuary ..	7·24	10·79	7·28	0.72	13·24	25·73	13·97	0·95
February ..	7·46	3·69	25·45	2.19	9·78	9·43	36·03	7·07
March ..	6·59	2·80	12·66	0.87	9·38	6·50	16·03	3·67
April ..	4·08	2·11	2·78	8·23	10·38	3·82	3·35	13·50
May	2·78	7·79	2·70	..	5·37	16·50	3·79	..
June	3·16	13·53	0·55	..	5·71	21·28	1·61	..
July	2·01	1·77	1·22	..	2·72	2·64	1·56	..
August ..	1·58	2·56	1·11	..	2·06	3·01	2·92	..
September ..	2·02	0·95	1·39	..	3·06	0·47	2·50	..
October ..	2·54	2·57	0·50	..	3·17	2·93	1·50	..
November ..	3·60	1·47	5·80	..	4·63	2·51	10·48	..
December ..	5·06	2·34	7·58	..	8·86	3·02	10.81	..

Perennial Grasses.

Under the name of Perennial Rye Grass, samples representing stocks that were being sold by various seedsmen were obtained during the early part of 1931; also samples of New Zealand Certified Perennial Rye Grass seed. All the samples represented seed of good germination and gave great promise during the early stages of growth—in particular, the samples purchased as old pasture Perennial Rye Grass and Western Districts Commercial Rye Grass. The old pasture Perennial Rye Grass

sown in April was fit to graze in the middle of June. In July, there was an indication of rust. The areas cut during the third week of June and the first week in July were again in good growth at the end of September and fit for grazing. In November, after rain, the portions cut during September again responded, but it was noticed that many plants had died. By the end of December, the whole area was practically dead, and in March, 1932, no trace could be found of any live plants. The samples representing Western Districts Commercial Rye Grass have practically the same history, with this exception: All of these samples contained a trace of Cocksfoot, which gave good results during October. In December, most of the Rye Grass had disappeared. In March, 1932, a scattered growth of Cocksfoot could be found with a few plants of New Zealand White Clover, a small quantity of which was sown with the grass.

New Zealand Certified Perennial Rye Grass.

The plots sown with New Zealand Certified Perennial Rye Grass and a small quantity of New Zealand Certified White Clover were practically free from rust during all stages of growth, and made a good recovery after cutting. The plots were cut early in July and late in August. In September, they were again fit for grazing, and carried a good amount of dry feed up to the third week of December, when they were all cut down, making a regrowth during the second week of January. In March, after an exceptionally dry period, a few odd plants of New Zealand Certified White Clover could be found. After rain early in April, the plots at once responded, showing vigorous growth during the first week of May. In the various plots of New Zealand Certified Perennial Rye Grass, a small quantity of New Zealand Certified White Clover, Kentish Wild White Clover, and the ordinary White Clover were sown. The latter has practically disappeared. The Kentish Wild White shows considerable persistency. The plants, however, are small-leaved, and not growing high enough to be of much use to grazing stock.

The New Zealand Certified White Clover is showing vigorous growth, is leafy, and where given suitable shelter by grass, forms a valuable addition to the protein content of the area.

In addition to the above, several plots were sown with a mixture containing New Zealand Certified Perennial Rye Grass, New Zealand Certified White Clover, and *Paspalum dilatatum*. In each case, the New Zealand Certified Perennial Rye Grass has persisted in spite of the dry weather. These mixtures are of particular interest, as they were sown later than the others; consequently did not get any shelter from the Paspalum until about October.

Cocksfoot.

Several strains of Cocksfoot were sown in April and May, 1931. The plot sown with Akaroa Cocksfoot, New Zealand seed, was fit to graze after the third week of September, and a sample cut during the last week of September. At the end of October, the portion cut was again showing signs of a good recovery. In December there was plenty of feed, with no seed heads showing.

The area was cut down on the 23rd December, and by January showed a good recovery. In March, 1932, the plants were well alive, but suffering from want of rain. Early in May, they were making a good recovery, giving promise of good grazing. Other strains of Cocksfoot representing seed from New Zealand and Victoria were fit for grazing in September, recovered well after cutting, with an abundance of green feed right up to the third week of December, when they were showing a few seed heads. The plots were all cut off on 23rd December, early in January gave signs of recovery, and in March were well alive, but wanted rain. Unfortunately, these plots were damaged by water during the early part of December.

Perennial Canary Grass *(Phalaris tuberosa)*.

The plots of *Phalaris tuberosa* represent Australian-grown seed of this valuable grass, and saved from pastures showing the true perennial type. The plots have all done well, and from seeds sown in the middle of April, 1931, were sufficiently high for grazing during the second week of July. After being cut, they all made a good recovery, and in January, 1932, were making a good regrowth; in March the plots gave indication that they only required rain to start vigorous growth. In the third week of April, there was an abundance of green feed. One plot which was sown with Paspalum (*Phalaris tuberosa*) and New Zealand White Clover, gave excellent results, and after being cut off on 23rd December, 1931, the Phalaris gave good

indications of regrowth by the third week of January. On the 24th March, the plot was again cut down; the Phalaris is now showing with Paspalum dominant during April. The grasses have given such a dense growth that they practically shut out the New Zealand White Clover. A few plants of this, however, can be found, and will no doubt be more apparent with the return of the cooler weather.

Paspalum dilatatum.

The value for feeding purposes of *Paspalum dilatatum* on coastal areas has been under-estimated by many, owing to their grave neglect of the pastures. Seed of Queensland growth sown at Lawnton in April, 1931, was fit to graze during the third week of September. A large quantity of green feed was carried by the plots until the end of September, when they were cut. In spite of the dry weather, they made a good recovery, and were again cut off during the third week of December, 1931. In January, they were again making vigorous regrowth, and cut off during the first week of February. By the middle of March, in spite of the dry weather, there was plenty of good green feed. Somewhat similar results would no doubt be obtained by many dairymen if Paspalum was sown on land that had been previously ploughed, and the growing crop top dressed by a suitable fertilizer.

Rhodes Grass (*Chloris gayana*).

The plots sown at Lawnton in April, 1931, with seed of Queensland growth, produced an abundance of good green feed by the first week of June. In the third week of June a portion was cut and quickly made a good recovery. Another portion was cut during July. This also made a rapid recovery. In November, all portions of the plot carried a good quantity of feed in seed head, the whole plot was cut down on the 23rd December, the January regrowth being distinctly stemmy and harsh. In February, the plot was again cut, produced a good quantity of green feed which soon came into seed head, with stems of a distinctly harsh quality. The plot was again cut early in May, 1932. Undoubtedly Rhodes Grass is of more value than many graziers think, especially in districts where *Paspalum dilatatum* will not grow. It must not, however, be overlooked that the long stemmy growth is not of the high nutritive value that is often supposed.

Annual and Biennial Grasses.

Several strains of Wimmera Rye Grass were sown in April, 1931, also strains of Italian Rye Grass. All the strains of Wimmera were badly attacked by rust during July. In June, the plots carried an abundance of good feed. On being cut, they did not make a good recovery, were badly rusted during August, and in September were definitely carrying more stem than leaf. One portion of the plots was not cut until the middle of October. Those did not make any aftergrowth or respond to the November rain, consequently the plots died out during December.

Italian Rye Grass.

From April sowing, this gave good grazing by the middle of June, made a good recovery after cutting, and in October the cut portions were showing a good amount of green feed. At this time, one of the early cut portions was allowed to seed. These plants died during the second week of December, the whole area was cut off on the third week of December, and produced in January, a few plants that subsequently died owing to the prolonged droughty conditions of January, February, and March.

Grasses that gave Grazing.

Tall Oat Grass (*Avena elatior*) gave good growth for a few months, but has since died out.

Tall Fescue (*Fostuca elatior*), a bit slow to establish itself but has since given good growth, appears a bit harsh; a fair response after cutting during the third week of December. In early May it produced a good weight of green grass.

Prairie Grass, sown in April, was badly attacked by hares in June. During the third week of June it produced good feed, and a portion was cut in the middle of July; the uncut portion was in seed head during August, when it was all cut down. At the end of October there was a fair amount of green feed, also smut-infested seed heads. At the end of November there were a few dwarf stems, with smut-infested seed heads; early in December, 1931, the plants died out.

Buffel Grass (*Pennisetum cenchroides*).—This plot was sown in April and in full seed early in June. When cut it grows again but does not produce much of a second cut, or respond to rain in the manner of Certified Perennial Rye Grass. It pulls up easily, and may suffer under close grazing. It appears worthy of trial in dry areas, as, once established, it would no doubt produce enough seed to ensure its spread. When in the young stages it has a high protein content; when fully grown the plant has an excessive percentage of fibre.

Molasses Grass.—This did well during the dry, hot weather. It has, however, an objectionable smell, and probably is not palatable to animals used to young Paspalum, Rye Grass, Lucerne, or other good forage plants.

Teff Grass (*Eragrostis Abyssinica*).—This grass is of very quick growth. Seed sown 15th April was fit to graze during the third week of May, and in full seed head by the first week in June. The plant is an annual, does not recover after cutting, and will not stand grazing on account of its shallow roots.

Couch Grass (*Cynodon dactylon*).—A plot sown during April, 1931, was in seed head during the third week of September. At the end of that month the grass, although very short, was cut. Early in November the plot produced an abundance of seed heads, but very little feed. After the December rains the plot was again cut off, and has not produced at any period of its growth grass of sufficient length to merit grazing.

Grasses that did not give Grazing.

The grasses that failed to give sufficient growth to merit grazing nine months after sowing include—Crested Dogstail, Chewing's Fescue, Kentucky Blue Grass, *Paspalum compressum*, Rough Stalked Meadow Grass, Timothy, Yorkshire Fog, *Agrostis* spp., *Danthonia* spp.

Plants other than Grass or Clover.

Of the plants that are neither grasses or clovers, mention must be made of Sheep's Burnet. This has grown well under adverse conditions, has been cut several times, and recovers with the first rain. It has, when young, a high protein content, but is not palatable to stock.

The so-called Rib Grass or Lamb's Tongue grew well for a few months, but has since died out.

Clover and Trefoils.

Of the legumes the only one that has stood up to the hot dry weather without the shelter of grass is *Medicago sativa* (Lucerne). A few plants of *Lotus corniculatus* (Birds-foot Trefoil) have also persisted; this variety of Lotus may do better under other conditions. At Lawnton the plants are very small, and at no period gave quarter the weight of lucerne, which gave several good cuts and is now looking better than it did during 1931.

The rainfall table is of interest here. With the few extra inches at Maleny the two undermentioned clovers did well in association with Paspalum—New Zealand Broad-leaved Red Clover, New Zealand Certified White Clover.

At Lawnton the New Zealand Certified White Clover has persisted when given the shelter of grasses, but on its own died out. The clovers that did not do well at Lawnton include—Subterranean Clover, Trifolium Incarnatum, Yellow Suckling Clover, Alsike, Berseem, Lotus major, Red Clover (Commercial Strain), Medic Burr, Black Medic (*M. lupulina*), Trifolium cernuum, Strawberry Clover, Cluster Clover.

Eighteen grazing plots on the new area of 5 acres have been sown with some of the grasses and clovers that have persisted on the small plots. The mixtures used include strains of Wild Perennial Rye Grass, leafy strains of Cocksfoot, leafy strains of Italian Rye Grass, Montgomery late Red Clover, Yellow seeded Red Clover, Wild Red Clover, English Wild Trefoil, with long strips of most of the foregoing persistent strains of grasses, together with some of the ordinary seeds of commerce in order to show the difference in leafiness and persistency.

It is suggested that dairymen and others interested in winter-growing grasses should get into touch with the Secretary, Pasture Improvement Committee, Department of Agriculture, Brisbane, so that arrangements can be made for a thorough inspection of the various plots, which are a more convincing argument than any written matter.

CLIMATOLOGICAL TABLE—APRIL, 1932.

SUPPLIED BY THE COMMONWEALTH OF AUSTRALIA METEOROLOGICAL BUREAU, BRISBANE.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·92	87	73	89	17	65	27, 28	160	5
Herberton	..	80	59	88	10	45	27	155	8
Rockhampton	29·96	88	67	96	2	53	30	302	9
Brisbane	30·02	80	64	88	10	54	30	536	15
Darling Downs.									
Dalby	30·07	79	57	92	1	40	30	455	12
Stanthorpe	..	71	50	89	7	32	29, 30	476	17
Toowoomba	..	72	54	82	1	39	30	488	15
Mid-interior.									
Georgetown	29·88	94	67	99	3	52	28	58	2
Longreach	29·96	87	60	102	1	48	19	124	2
Mitchell	30·00	80	53	92	1, 2	37	29	93	5
Western.									
Burketown	29·92	92	68	96	1, 7, 8, 9, 24	57	19	101	2
Boulia	29·98	85	61	102	8	50	19	43	3
Thargomindah	30·00	79	58	90	1	46	29	109	3

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING APRIL, 1932, AND 1931 FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Apr.	No. of Years' Records.	Apr., 1932.	Apr., 1931.		Apr.	No. of Years' Records.	Apr., 1932.	Apr., 1931.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	4.17	31	0·83	4·03	Nambour	6·10	36	7·92	3·36
Cairns	11.58	50	1·16	12·00	Nanango	1·90	50	6·19	1·71
Cardwell	8.96	60	3·01	6·04	Rockhampton ..	2 77	45	3·02	0·51
Cooktown	8·74	56	1·60	6·52	Woodford	4·44	45	7·17	2·05
Herberton	3.85	45	1·55	2·15					
Ingham	8.08	40	2·32	9·87					
Innisfail	20·11	51	6·92	20·01	*Darling Downs.*				
Mossman Mill ..	8.46	19	1·26	6·20					
Townsville	3·47	61	1·24	3·00	Dalby	1·35	62	4·55	2·88
					Emu Vale	1·28	36	4·63	2·03
Central Coast.					Jimbour	1·32	44	4·22	2·00
					Miles	1·42	47	4·28	1·62
Ayr	2·60	45	0·50	1·67	Stanthorpe	1·72	59	4·76	1·74
Bowen	2·80	61	1·08	1·14	Toowoomba ..	2·55	60	4·88	2·79
Charters Towers ..	1·58	50	0·48	0·67	Warwick	1·63	67	4·25	0·99
Mackay	6·47	61	1·93	1·16					
Proserpine	6·01	29	2·89	3·19					
St. Lawrence	2·90	61	0·62	0·33	*Maranoa.*				
					Roma	1·35	58	2·28	0.85
South Coast.									
Biggenden	2·15	33	1·88	2·38					
Bundaberg .. .	3·09	49	2·15	1·34					
Brisbane .. .	3 77	81	5·36	3·61	*State Farms, &c.*				
Caboolture .. .	4·26	45	6·85	2·38					
Childers .. .	2·83	37	2·73	1·61	Bungeworgoral ..	1·29	18	1·36	0.74
Crohamhurst ..	6·48	39	10·91	3·03	Gatton College ..	1·81	33	4·56	1·47
Esk	2·99	45	6·19	1·41	Gindie	1·20	33	1·24	0·30
Gayndah	1·41	61	4·37	1·56	Hermitage	1·32	26	..	0·88
Gympie ..	3·37	62	7·25	1·57	Kairi	3·93	18	..	2·17
Kilkivan	2·22	53	5·31	1·64	Mackay Sugar Experiment Station ..	5·03	35	2·75	1·27
Maryborough .	3·74	60	7·73	2·89					

J. H HARTSHORN, Acting Divisional Meteorologist.

Answers to Correspondents.

BOTANY.

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

"Yellow Plum."

H.G.S. (Rockhampton)—

The specimen from Springsure is *Ximenia americana*, a shrub or small tree widely spread over the tropical regions of the world, including Queensland and New Guinea. The only local name we have heard applied to it is Yellow Plum. The fruit is said to be edible, but tests carried out with Queensland material show them at least sometimes to develop a prussic acid yielding glucoside, and if eaten in quantity they would be harmful, perhaps fatal. The plant is reputedly poisonous to stock.

Mint Weed.

C.R.T. (Brisbane)—

The botanical name of the Mint Weed reputed to have caused the deaths of stock in the Pittsworth district is *Salvia lanceifolia*. It is not indigenous to Australia, but is a native of the United States and Mexco. It is not known to occur in any State other than Queensland. At present, so far as known, it is limited to a few places on the Darling Downs and in the neighbourhood of Clermont. It is possible, however, that its distribution is more general than this.

W.A. (Townsville)—

The specimen of Mint Weed is *Hyptis suaveolens*, a native of tropical America, now a naturalised weed in many warm countries. It has been established in Queensland and New Guinea for a number of years, and is not known to possess any poisonous or harmful properties.

The other specimen is evidently a *Gomphrena*. We had fragments of the same thing a little while ago from North Queensland, and put it down as *Gomphrena flaccida*, a native species, but we do not think it is that, and it is probably only an introduction. So far we can only give you the genus, but if further particulars are obtained you will be advised. The plant belongs to the Amarantaceæ and is quite harmless—in fact, it should be a useful fodder.

Poisonous Plant *(Solanum Seaforthianum)*.

H.F.M. (Waterford)—

The plant with red berries is *Solanum Seaforthianum*, a native of tropical America, much cultivated as an ornamental vine in Queensland. It has run out into the scrubs in many places, the seeds, no doubt, being carried by birds. The berries are poisonous, and cases of children having been made violently ill through eating them are on record. However, we do not recall any fatal cases having been recorded.

"Berrigan."

H.H.C. (Dajarra, N.W.Q.)—

The specimen is a small tree or bush allied to Fuchsia (*Eremophila maculata*), but quite distinct. It is *Eremophila longifolia*, a species with a very wide distribution in Australia, and commonly known as Berrigan. It is not known to possess any harmful properties, and is generally regarded as a useful fodder bush. It is sometimes known as Dogwood, but this is a name which more properly belongs to another bush, but which is rather loosely applied in Australia to many different shrubs and small trees. We would be very pleased to name and report on any specimens of Fuchsias, &c., you care to send. We are not, however, in a position to send you specimens of the various Fuchsia bushes. As a matter of fact, the only one definitely known to be poisonous and to contain any quantity of prussic acid yielding glucoside is the common Fuchsia Bush, *Eremophila maculata*, which is abundant in Western Queensland.

Bamboo Grass.

G.M. (Merinda)—

The specimen of Bamboo Grass proved to be *Phragmites communis*, the common reed, a plant widely spread in one form or another over the tropical and temperate regions of the world—in fact, it is probably more widely spread in a native state than any other grass. It is very abundant along Queensland rivers, and, although extremely coarse, has been utilised as food for stock in times of drought.

Giant Couch.

Your other specimen is the Giant Couch or Para Grass, *Brachiari mutica*, best known in Queensland as *Panicum muticum*. It is a grass widely spread over the tropical regions of the world, and is one of the most important of tropical fodders. The Marram Grass, which is a different grass altogether, is cultivated in the Southern States and most temperate countries as a sand-binder. Conditions in Queensland, however, seem too tropical or sub-tropical for it to succeed on our coastal dunes.

Wild Lucerne.

C.W. (Peeramon, N.Q.)—

The specimen is *Stylosanthes mucronata*, commonly known in North Queensland as Wild Lucerne. This plant is a native of tropical America, but is now widely spread as a weed in most tropical countries. It has been established in North Queensland for some years, first making its appearance at Townsville. Stock eat it readily, and analysis shows it to have a high food value approximating to that of ordinary lucerne. Sometimes stock do not seem to care for the plant owing to its growing very rank, and they prefer it when it is dying off a little, or when it has been cut and allowed to wilt.

Leafy Panic Grass.

W.P.H. (Nanango)—

The specimen is Leafy Panic Grass, *Brachiaria foliosa*, a native grass with a high reputation as a fodder. Stock are very fond of it, and it is a nutritive grass worthy of encouragement. Seed is not stocked by nurserymen, and if you intended to propagate the grass you would have to do it from the material you have on hand. So far as we have observed, the grass rather likes places such as embankments, the edges of cultivation paddocks, or anywhere else where the ground has been disturbed.

Rattle Pod.

W.H.C. (Rockhampton)—

The specimen is *Crotalaria verrucosa*, the Blue-flowered Rattle Pod, a plant widely spread as a weed over most tropical countries. This particular species, so far as we know, has not previously come under suspicion, but the genus *Crotalaria*, which contains the plants popularly known as Rattle Pods, includes several species that have been proved poisonous to stock both in Australia and abroad.

Johnson Grass.

F. McC. (Mundubbera)—

The specimen is *Sorghum halepense*, Johnson Grass. This grass has a certain fodder value, but can become a very serious pest in cultivation paddocks, and on this account is generally looked upon as more of a pest than anything else. Like other Sorghums, it contains, especially in its younger and more succulent stages, a prussic-acid yielding glucoside, which may cause trouble if eaten extensively by hungry stock.

Button Grass.

E.C.D. (Townsville)—

The specimen is *Dactyloctenium ægyptium*, a species of Button Grass widely spread over the tropical regions of the world. It is very common in North Queensland, especially as a strand grass, but is of only secondary value as a fodder.

How to Send Botanical Specimens.

C.A.M. (Toowoomba)—

The best way of forwarding plants for identification is to send pieces a few inches long bearing, if possible, either flowers or fruits. If not sent fresh, the specimens should preferably be dried flat between pieces of newspaper for a few days before sending. The papers should be changed every few days until the specimens are quite dry. Of grasses, specimens dried flat are preferred, but grasses may be rolled up in pieces of newspaper and sent in that way. It is best to pluck a whole stem and double it backwards and forwards so as to roll conveniently in a piece of newspaper of reasonable size. Specimens of grasses should always bear seed-heads. When sending more than one specimen, each should be numbered and a duplicate kept, so that names may be returned corresponding to numbers.

Turpentine Bush.

W.C.H. (Gayndah)—

The plant is *Myoporum acuminatum*, commonly known as Turpentine Bush owing to the acrid nature of the leaves, due to the presence in them of oil or resin. It is also sometimes called Strychnine Bush. It is generally regarded as poisonous to stock; though we have fairly definite information on some of its allies, we have none regarding the present species. However, in view of the character borne by the plant and its allies, both here and abroad, we should say it would be dangerous to run stock in paddocks where it was growing in any quantity, especially when the stock are in a starving or low condition. Though the plant is fairly common in many places, it is generally left untouched by stock unless they are driven to it by extreme hunger.

Yellow Pea or Wild Senna.

J.H.McC. (Dalby)—

The specimen is *Cassia sophera*, commonly known as the Yellow Pea or Wild Senna. The plant belongs to the same family as the senna of commerce, and if eaten in any quantity by stock would no doubt cause severe purging. As a general rule stock seem to leave it untouched. It is very common in some places and comes up as a weed about Dalby and other inland towns. In such places it has been fairly definitely proved to be poisonous to fowls that have picked off the green shoots as they appeared. The seeds, however, are quite harmless, and are, in fact, quite a good poultry food. Allied species of Cassia very similar to this are common in coastal localities.

PIG RAISING.

Pig With a Cough.

E.M.R. (Gowrie Junction)—

Cough is not actually a disease of the pig, but a symptom of some other disease or condition. Ordinarily, coughing is largely the result of pigs being kept in insanitary surroundings, and in wet, cold sties, or in damp and exposed yards. In these cases the cough is an indication of lung or bronchial troubles (pneumonia, bronchitis, or common colds). Then, again, coughing is often induced by the presence of parasites in the stomach, intestines, liver, lungs, and other organs, especially as in certain stages of the development of intestinal and kidney worms these parasites migrate or move about from one organ to another and are sometimes found in the lungs and bronchial passages where they cause intense irritation resulting in a hacking cough and distress. Animals that suffer from disease of the lungs like those referred to and the more serious diseases like tuberculosis, are also likely to cough a good deal, especially if the affection is developing in the lungs and blocking the air passages. At other times, cough results from the use of dry, dusty, or musty foods and from the presence of dust and dirt in the pens, yards, and troughs. Foods of an irritating nature might also cause a cough. It will be seen, therefore, that there are various causes for the condition referred to, hence treatment might be along general common sense lines, and must first aim at removal of the responsible cause and at prevention of future troubles. We suggest removing the pigs from their present yards and giving them the benefit of a good grazing area when they would have the advantage of succulent grasses and fodder crops.

Allow ample mineral matter and drinking water. It is suggested a careful search be made for worms in the dung, and if a pig dies or is not worth keeping, make a careful post mortem examination, especially in the lungs, stomach, intestines, kidneys, and liver, where doubtless you will find long round white worms, and probably kidney worms which are of a tortoise-shell colour and about one to one and a-half inches long.

Land for Pig Raising.

W. (Hughenden, N.Q.)—The Senior Instructor in Pig Raising, Mr. E. J. Shelton, advises:—

It would appear from a land value point of view that in districts like the Darling Downs and the South Burnett a better working proposition could be obtained from a dairying and pig-raising point of view than on an area closer to the metropolis, though in all districts there are farms of various types available for sale or lease. It is not necessary to be close to the metropolis to actually benefit by the markets in dairying and pig-raising, for bacon pig buyers travel extensively throughout Southern Queensland and pay the same price for pigs two or three hundred miles away from the factory that they pay for those nearer at hand. The sale of porkers is treated in much the same way, and just as profitable a return can be obtained by the sale of weaners and stores at country saleyards as could, in general, be obtained at the metropolitan markets.

Land values in a district like, say, Jandowae, outside Dalby, are much lower, and larger areas can be obtained than in, say, a district like Boonah. There are many farms advertised each week where a deposit of £300 would bring about business; but careful inspection of each property by a qualified land valuer is advised.

For pig-raising, good agricultural land, where an abundance of crops may be grown, is a necessity. A good permanent water supply is also an essential, while nearness to good roads and means of communication are also important.

Information on most phases of the industry is given in the pamphlet, "Economic Phases of the Pig Industry," which, together with a number of other useful pamphlets, have been forwarded to you direct.

Piggery Management.

R.J.W. (Macknade, N.Q.)—

From your description of the trouble, one can come to one conclusion only, and that is that both the breeding and the feeding are at fault, though probably improper food and an insufficient or irregular supply is the principal fault. Pigs cannot be profitably handled unless they have a sufficient supply of nutritious food in reasonably balanced rations, and, as the pig is by nature a greedy feeder, he requires liberal supplies and a good variety of food, with clean drinking water and a supply of bone meal, burnt or charred bones, charcoal, rocksalt (to lick), and some green food. This may seem an extensive menu, but in reality when once the animal becomes accustomed to the food and quantity given many of the difficulties are overcome.

You speak of offal as food, but do not state the origin of this offal—whether it is waste food from the dining-rooms or slaughter-house offal or mill offal. The small ration of oilcake would be helpful, but it is surprising to hear of a shortage of greenstuff in a land known to be so productive.

In the absence of other greenstuff, could you utilise a proportion of lucerne chaff (soaked) in the other food, for this would add the flesh-forming elements so necessary in this class of stock? Could you keep fewer and better pigs, or must you have a stated number available? And could other foods like barley meal be purchased, or root crops like sweet potatoes and arrowroot be grown?

While willing and prepared to do all in our power to assist, it would appear to be first necessary to decide whether the sows you have are worth retaining for use with a fresh boar. Our opinion is that you should dispose of the whole of your unprofitable stock and introduce a boar and several sows, the latter either purebred or grade sows of good breeding. Fresh breeding stock are so cheap at present that it does not pay to carry on with unprofitable sorts.

The Berkshire-Yorkshire cross is a good one, and doubtless under your conditions the crossbred pigs would have other advantages, including hardiness and adaptability.

General Notes.

Staff Changes and Appointments.

Messrs. H. A. Hamilton (Rocky Bar, via Chinchilla), W. H. Kirk (Auburn, via Chinchilla), J. C. McIver (Glenwood, Mundubbera), and John Mundell (Bungaban, Wandoan) have been appointed Honorary Acting Inspectors of Stock for the recently declared infected area under the Diseases in Stock Acts in the Camboon-Auburn district.

Messrs. F. W. Heck and W. H. Heck have been appointed Millowners' Representatives, B. A. Ernst and H. W. Koppen, Canegrowers' Representatives, and J. J. Leahy as Chairman, of the Rocky Point Local Sugar Cane Prices Board.

Constables H. E. D. Warburton and H. J. Remfrey have also been appointed Inspectors under the Slaughtering Act.

Mr. R. St. G. Mitchelmore, of "Capricornia," via Mareeba, has been appointed an Honorary Ranger under the Animals and Birds Acts and the Native Plants Protection Act.

The Officer in Charge of Police, Gordonvale, has been appointed an Acting Inspector of Stock.

Mr. W. A. Winchester, Bundaberg, has been appointed an Honorary Ranger under the Native Plants Protection Act.

Mr. W. J. McFadden, of River terrace, Kangaroo Point, has been appointed an Honorary Ranger under the Animals and Birds Acts.

Honorary Rangers under these Acts have also been appointed for the Gooburrum Shire, Bundaberg—namely, the Councillors and Foreman of Works of the Gooburrum Shire Council:—Messrs. H. Poulsen, L. G. Scotney, F. W. Axam, J. Sutton, C. M. Jensen, H. V. Petersen, H. M. B. Neubecker, E. J. Grills, N. C. Brix, and W. J. Stephenson.

Bishop Island a Sanctuary.

The Administrator in Council has approved of the issue of an Order in Council under "*The Native Plants Protection Act of* 1930" declaring Bishop Island, situated in Moreton Bay, to be a district for the purposes of the Act. A second Order in Council provides for the protection of native plants which grow on Bishop Island, and any person found picking or destroying any native plants will be guilty of an offence. Mr. James Crouch, of Bishop Island, has been appointed an Honorary Ranger under the Native Plants Protection Act.

Another Bowen Sanctuary.

The property known as Wooller's Selection, Sinclair Bay, Bowen, has been declared a sanctuary under the Animals and Birds Acts, and it will accordingly be unlawful for any person to take or kill any animal or bird thereon.

Removal of Sugar-Cane Plants Prohibited.

Approval has been given to the issue of a Proclamation under the Diseases in Plants Acts, which will prohibit the removal of sugar-cane plants within an area situated in the Mackay Land Agent's district. The Proclamation, however, provides that if an Inspector is satisfied, upon inspection of a plantation, that such plantation is free from disease, he may issue a permit for the removal of sugar-cane plants to any other place mentioned in the permit.

Cane Prices Regulations Amended.

The Queensland Cane Growers' Council, at its recent Annual Conference, passed a resolution to the effect that the Cane Prices Regulations be amended to assure to the representatives of Local Sugar Cane Prices Boards twelve months term of office, or until their successors are appointed.

The Regulations at present provide that in every year the members of Local Cane Prices Boards, other than the Chairman thereof, shall be deemed to vacate office as such members on the 31st December succeeding their appointment.

An amendment of the Regulations has accordingly been approved to-day, which will provide that members of Local Boards shall be deemed to vacate office on the day preceding the day on or before which candidates for election of the next succeeding Local Board shall be nominated.

Tully Cane Assessment.

The Minister for Agriculture and Stock (Mr. H. F. Walker), acting under the provisions of the Sugar Experiment Stations Acts, has approved of the levying of an assessment of 3d. per ton on all sugar-cane received at the Tully Sugar Works during the 1932-33 season for the purposes of the Tully Cane Pest Destruction Board. This is the same as last year.

Cane Assessments.

The Governor in Council has approved of the issue of an Order in Council under the Regulation of Sugar Cane Prices Acts, fixing the assessments on sugar-cane received at any mill after 12th May, 1932, at 1¼d. per ton. This is the same assessment as last year.

The Minister for Agriculture and Stock (Mr. H. F. Walker), acting under the provisions of the Sugar Experiment Stations Acts, has approved of the levying of an assessment of ½d. per ton on all sugar-cane received at sugar-works during the season 1932-33. In this case also the amount has not been altered. The Minister has also approved of the levying of assessments for the purposes of the various Cane Pests Boards for the season 1932-33, as follows:—

Plane Creek Cane Pests Board.—On every ton of sugar-cane received at the Plane Creek Sugar Works the assessment will be at the rate of ¼d. per ton. Last year the amount was 1d.

Lower Burdekin Pest Destruction Board.—On every ton received at the Pioneer, Kalamia, Inkerman, and Invicta works, the assessment will be ¼d. Last year the amount was 1d.

Invicta Cane Pests Board (Ingham Line).—On every ton received at the Invicta works from lands between Townsville and Ingham, the assessment will be 1d. This is the same as last year.

South Johnstone Cane Pest Destruction Board.—On every ton received at the South Johnstone works, the assessment will be 1d. Last year the amount was 3d.

Mossman Cane Pests Board.—On every ton received at the Mossman works, the assessment will be 3d. Last year there was no assessment, this being a recently-constituted Board.

Mackay Cane Pests Board.—On every ton received at the Cattle Creek, Farleigh, Marian, North Eton, Pleystowe, and Racecourse works, the assessment will be 1d. This is the same as last year.

Wild Pigs as Cane Pests.

The Administrator of the Governor in Council has approved that Regulation No. 2 of "*The Sugar Experiment Stations Acts*, 1900 *to* 1923," be amended to provide for the inclusion of "wild pigs" in the Schedule of Cane Pests. Wild pigs have been causing considerable damage in the Mossman canefields, and it should be of benefit to cane farmers that this pest is now subject to control.

Pineapple Wilt.

Executive approval has been given to the issue of a Proclamation under the Diseases in Plants Acts, which provides for the inclusion of the disease "Pineapple Wilt" in the Schedule of Pests and Diseases within the meaning of the above-mentioned Acts.

Regulation No. 1 of these Acts has also been further amended to include "plum" and "pecan nut" in the paragraph giving the meaning of the term "fruit tree."

Home Butter-Making Points.

When cream will not churn—

It may be too thick—Add clean cold water sufficient to bring the cream to a consistency of well-mixed paint.

It may be too fresh—Develop slight acid flavour in the cream at churning time.

The temperature may be too low—Raise to 50 deg. to 54 deg. in summer and to 62 deg. Fahr. in winter.

The cream may be gaseous—Due to action of undesirable organisms (gas-forming species). Thoroughly cleanse and scald with near boiling water all utensils that come in contact with the milk and cream.

Do not mix hot cream with the cold cream from a previous separation. Keep separate until creams are of the same temperature. Stir cream daily during the ripening process.

Citrus Levy Regulations.

Executive approval has been given to the issue of Regulations under "*The Fruit Marketing Organisation Acts*, 1923 to 1930," empowering the Committee of Direction of Fruit Marketing to make a levy for the purposes of the said Acts on all citrus fruits marketed for the year ending 28th February, 1933.

The Regulations provide that the levy shall be payable by growers of citrus fruits on the basis of the quantity of fruit marketed, and shall be at the following rates:—

(1) 5s. per ton on all citrus sold or consigned, whether by rail, road, or boat to factories.

(2) 4s. per ton on all citrus sold or consigned by rail to any agent, person, or firm in Queensland, other than a factory.

(3) 1½d. per case, with a minimum of 2d. on all citrus sold or consigned, other than by rail, to any agent, person, or firm, except a factory.

The levy shall be deemed to have been made upon publication by the Committee of Direction of particulars of such levy.

All agents or persons who at any time hold moneys to the credit of growers shall pay to the Committee of Direction the amount of levy payable by the growers concerned.

The levy on all citrus railed from any Queensland railway station (other than Townsville, Rockhampton, Roma Street, Woolloongabba, or Brunswick Street) to any other railway station in the State, may be collected by the Commissioner for Railways to the extent of 4s. per ton.

Subject to the above, and except as hereafter provided, the levy in the first instance shall be collected—

(1) On all citrus sold or consigned to factories (*a*) if by rail, to the amount of 1s. per ton; (*b*) if not by rail, to the amount of 5s. per ton.

(2) On all citrus sold or delivered otherwise than by rail to any agent, person, or firm, other than a factory, at the rate of 1½d. per case, with a minimum of 2d.

The levy shall be collected in the case of agents or persons other than the Committee of Direction or the Commissioner for Railways by means of levy stamps, obtainable from the Head Office of the Committee of Direction, Brisbane, which shall be affixed to account sales. Such agents or persons will be entitled to deduct the value thereof from moneys held to the credit of growers, and levies so collected shall be paid to the Committee of Direction, Turbot street, Brisbane.

In the case of citrus fruits sold privately by the grower (that is, citrus not delivered to any agent or sent away by rail), the grower must furnish the Committee of Direction with a monthly statement of sales, and pay the levy at the Head Office.

If the amount of levy is not collected by the Railway Commissioner or by the agents or persons concerned, then without prejudice to the liability of the Commissioner or agent, such shall be payable by and recoverable as a debt from the grower.

Any agent, person, or company which receives citrus fruits for sale on commission shall permit any authorised officer of the Committee of Direction to inspect their books and accounts.

The sums raised by the levy shall be expended by the Committee of Direction in the purchase of posters for advertising citrus fruits, and generally in the interests of the citrus fruitgrowing industry.

The levy of 5s. per ton on factory citrus and 1½d. per case on fresh fruit has been in force for a number of years past, and these Regulations differ from previous Regulations only in respect of the arrangements made with the Commissioner for Railways to collect the levy on behalf of the Committee of Direction on citrus consignments in Queensland, with the exception of those from Townsville, Rockhampton, and Brisbane.

America's Beef Cattle Position.

Addressing a live stock conference at Kansas City a short time ago, Frank Benson, vice-president of Armour and Company, said: "There is no surplus of cattle on feed at the present time. On the contrary, I believe that there are not quite enough cattle on feed. There is no surplus of beef cattle in the country, and, with orderly marketing, there would be no over-supply at the markets. There is an under-supply of good-type, well-finished cattle on the market, and that is why this kind are bringing satisfactory prices."

Fertility in Farm Stock.

All the latest findings in the field of genetics are embodied in "Fertility and Animal Breeding," issued by the Ministry of Agriculture (Great Britain) in its Bulletin series. The physiology of the reproductive systems of the animals of the farm is dealt with in detail, and all the factors which make for fertility discussed. This work has been considerably revised, and is now issued in its third edition. It was first published in 1925 as one of a series of research monographs, the purpose of which was to give in simple language an account of the work done at the agricultural research institutes of this country. The Bulletin is based upon the research into the physiology of reproduction in farm animals that is being conducted at the Animal Nutrition Institute, Cambridge. The importance of the subject to farmers and stock-breeders needs no emphasis; a proper understanding of the conditions governing the fertility of their animals is essential to the conduct of their business. Except for the preliminary physiological descriptions, which are indispensable to the understanding of the rest of the work, the Bulletin is entirely practical in its bearing. The use of technical terms has been reduced to a minimum, and those that have been retained are duly explained in the text. The Bulletin (No. 39) is well worth the 1s. 6d. charged for it. Queensland farmers wanting it should add exchange to their order.

Feeding the Dairy Cow.

The present economic conditions demand improvement in the dairying industry, and one of the means of bringing about this improvement is by proper feeding. At present, during much of every winter, many herds are allowed to lose flesh accumulated during the favourable summer months, and become very low in condition, their production suffering in proportion.

Good grass is the best single stock-food, and should be regarded as the most important crop on the farm. No artificial food can compete in cheapness with natural grass, but to rely entirely on pasture is to fail in obtaining the principal advantages from such pastures. The paspalum pastures on the coast make excellent growth during the favourable summer months; they do not, however, make much growth during the late autumn and winter. Every dairy farmer has experienced the rapid increase in production with the flush of young grass in the spring, and has also experienced the falling off in the autumn whilst there was still an abundance of feed. The rapid increase in the spring is due to the high protein content of the young grass, which equals many of our valuable concentrates. As the grass grows and becomes coarse the protein content becomes very low, with the result that the old grass in the autumn, though abundant, is of poor feeding value. By supplementing the failing grass with green fodder crops, stock can be assured of that amount of food required to maintain them in a state of greatest efficiency.

Once an animal becomes reduced in flesh, let the owner attempt to bring it up again to its condition of greatest usefulness as a producer, and he will have brought home to him how great his loss has been through sparing the feed. Other things being equal, the animal that consumes the greatest amount of feed gives the best return. It is also clear that if an animal gets only sufficient food for bare subsistence, the farmer gets nothing in return for his feeding. It is the amount in excess of the vital demands of the animal that is devoted by it to the formation of the product its yield of which is the reason for its place on the farm.—A. and P. Notes, N.S.W. Department of Agriculture.

Urban Opinion and Agriculture.

"One of the main difficulties with which agriculture is faced is the unresponsiveness of urban opinion to its needs," said Lord Feversham in a speech at the annual dinner of the Helmsley branch of the N.F.U. (England). Out of a total population of 46,000,000 people only one person in fourteen was engaged or interested in agriculture, and whilst contemplating any steps for the betterment of agriculture the Government had to take into account the great preponderance of members representing town constituencies. It was not generally realised that agriculture was an industry to itself, and could not be treated on the narrow lines recommended for others. The mistake was often made that a farm was a kind of factory which could be closed down in times of depression and opened up again when prosperity returned. This might be the case of other industries, but once a farmer found it necessary to disband his equipment, his employees, and his capital, it was the work of generations to rebuild the industry.

With the growth of our city populations in Australia, there is also an apparent lack of knowledge and interest here in rural industries and resources, the successful development of which is so vitally important a matter in present economic circumstances.

Line-Breeding.

Line-breeding is extensively adopted in Australia, and when combined with judicious selection it produces excellent results. These are apparent in many of the heaviest producing herds of the different breeds of dairy cattle, particularly the Jersey, which have been built up by concentrating the blood of outstanding strains. In some instances in-breeding has been resorted to without any ill-effects, although it is not to be recommended, particularly when practised by inexperienced breeders.

Giving a Horse Medicine.

A 2-oz. dose syringe is the most convenient instrument for administering liquid medicine to horses. With the animal backed up in a stall, slip the filled syringe between the front and back teeth, up over the tongue. Do not try to open the animal's mouth, or hold the tongue. Merely press the syringe handle and squire the liquid over the top of the tongue. Then hold the head up so it will run back, and the animal will swallow without a rough-and-tumble wrestling match. A drenching bottle should be handled in the same manner. Don't tie the animal's head up so high it cannot swallow, and then grasp the tongue in addition. Try to swallow some water yourself in the same position.

Points in Lamb-Marking.

There is considerable diversity of opinion among sheep-breeders as to the age at which the operation of lamb-marking should be performed, some contending that when the lamb is a fortnight old there is least risk to the animal through loss of blood, while others prefer a later age, even up to three months, claiming that the lamb has then grown sufficiently to withstand the check. In cold districts and severe seasons, the additional warmth and protection afforded the hindquarters is a reasonable argument for delay, but under average conditions it is generally conceded that from three to six weeks is the safest age for tailing and castration.

Where the lambing season is protracted there will naturally be considerable difference between the ages of the lambs dropped first and those dropped last, and it may be necessary to mark the drop in two lots. The first should include the bulk of the lambs when an average of a month old, and the second the remainder at the end of the lambing.

The choice of the site for the operation is important. It should be perfectly dry and well away from dust and dirt so as to minimise the risk of losses from lockjaw and blood-poisoning, and if the flock is not too large it is best to use temporary yards made of movable hurdles or wire-netting and stakes. With large flocks this is perhaps impracticable, and the following treatment of the yards is recommended:—Remove the surface soil of the yards to a depth of about 3 in., and place it in a heap, where it should be thoroughly mixed with quicklime; then saturate the fresh surface exposed with a strong solution of non-poisonous sheep dip.

The sheep should be mustered some time before, and the lambs allowed to settle down before the operations commence. There should be no rushing about, and dogs should be used as little as possible, as deaths from hæmorrhage are very common when lambs are marked in an excited and overheated condition. Both sexes may be treated at the same time, and a useful check will be obtained of the number of each sex marked if the tails of the male and female lambs are thrown into separate heaps.

The knife used for docking and tailing calls for special attention. The most suitable type has the blade and handle all in one piece, but in any case it should be as plain and as sharp as possible, since germs may be harboured in joints or corners and even in cracks in the blade or in slight irregularities in the cutting edge. Prior to the commencement of the operations the knife should be boiled, and it should be carried to the yards in the liquid in which it was boiled. Throughout the marking the knife should be dipped as frequently as possible in a carbolic solution or other disinfectant; and whenever it is out of the operator's hand it should be allowed to remain in the disinfectant.

This point is stressed, as it is essential that every means of preventing the germs of disease from gaining entrance into the fresh cuts made in the scrotum and tail be adopted, and although many farmers who have taken no precautions have not suffered losses, there is always the grave risk of the knife becoming infected and transmitting germs to every animal operated on.

Care should be taken when catching the lambs to ensure that no dislocation of joints or bruising occurs. Lambs should be caught round the body and not by the legs. A large percentage of lambs rejected at the abattoirs have swollen and misshapen joints, due to careless handling at marking time.

Teaching Pigs Good Habits.

Sows with young should have enough litter to keep themselves and their little ones comfortable, but not so much that the latter are able to hide themselves in it. If they should do that they may be laid on or trodden on by the sow. Only short stuff should be used—some breeders, in fact, use nothing but chaffed straw.

Afterwards, when the pigs are weaned, the amount of litter should be increased so that the pigs can find plenty of warmth, for otherwise they will miss the warmth of their mother's body and may take a chill.

Though it may be advisable during cold weather to keep newly weaned pigs shut up in the pen, they should be allowed to run out into a yard as often as possible.

This will largely prevent their bed from being soiled and lessen the labour of constant cleaning. Small pigs, in fact, should be taught cleanly habits as far as possible, and one of the best ways to do it is to turn them out into the yard for a few minutes late at night. This will encourage them to empty themselves before going to bed, and they will sleep all the better for it.—"Live Stock Journal" (England).

For Prospective Orchardists.

What constitutes a living area is a question often asked, but no definite figure can be given as universally applicable, depending as it does upon such factors as locality, nature of soil, climate, and available labour in the orchardist's family. Generally speaking, a minimum living area of stone fruit and citrus would be about 10 acres, of apples and pears 15 to 20 acres, of grapes for drying or wine 15 acres, and of grapes for table use 8 acres. Prospective planters would be well advised to plant only those varieties of commercial value which are suitable to the district, and for which there is an easily accessible and not over-supplied market. Decision as to varieties to be planted should be arrived at after only the greatest circumspection, and consideration of future marketing conditions and contingencies.

The cost of establishing an orchard depends upon so many factors that it is impossible to state definitely what the actual cost will be, but the following may offer some guide as to what would be the requirements and the approximate cost of establishing 10 acres of citrus trees. After deciding in what district it is intended to settle, a more accurate estimate could be arrived at:—

	£	s.	d.
Land at £10 per acre (15 acres)	150	0	0
Fencing	60	0	0
Clearing, £15 per acre (10 acres)	150	0	0
1,000 citrus trees	65	0	0
Ploughing and subsoiling	45	0	0
Planting trees	12	10	0
Fertiliser	8	10	0
Stable	10	0	0
Shed	80	0	0
Horse	15	0	0
Galvanised iron tank, 1,000 gallons	8	0	0
Cart to carry 30 cwt.	17	10	0
Hand spray	16	0	0
Tools	20	0	0
House	450	0	0
Incidental, harness, gates, freight on goods, &c.	100	0	0

The items enumerated above and the cost of each item mentioned, although connected with citrus-growing, will also serve as a guide to a prospective grower of pome or stone fruits.

The intending orchardist must realise his outlay does not cease with the acquirement of land, house, and plant. It does not cease with the planting of the trees; he must plan means of livelihood until trees or vines carry a payable crop. This waiting period will not cause anxiety to the grower who has sufficient capital to enable him to carry on, but to those whose capital is sufficient to meet only the initial outlay the outlook is quite different, and the question of how the period can be tided over is highly important, for it must be borne in mind that the period which must elapse between the planting of trees and the gathering of a payable crop will range from three to ten years, according to the kind of fruit grown—grapes about three years, stone fruit four to five years (with the exception of cherries, which will take from seven to ten years, according to the district and to the kind of stocks upon which the trees have been worked), citrus about six years, and apples and pears seven to ten years. Much depends upon the district and the kind and variety of trees planted.—A. and P. Notes, N.S.W. Department of Agriculture.

The Farm Family Scores.

From all quarters come evidences that, notwithstanding the hardships faced by agriculture during the period of depression and low prices, the farm family that produces a large share of its own foodstuffs is in a much better position than the family of the unemployed in towns and cities.

Where Profit Joins Up with Fat.

A cow must produce at least 300 lb. of butter-fat per year in order to be classed as profitable. A cow producing 150 lb. of butter-fat would give its owner a net loss of 25.30 dollars. By the same reasoning, a net profit of 66.20 dollars would be returned by a cow producing 500 lb. of butter-fat. So says an Idaho (U.S.A.) College man.

To Halve an Earthernware Drain Pipe.

A simple method of halving (lengthwise) a glazed earthenware drain pipe is as follows:—Stand the pipe in a vertical position with the funnel end uppermost, fill with dry earth or sand, and ram lightly down. With a light hammer the pipe is then struck a succession of medium blows 1 or 2 in. apart in an ascending direction along opposite sides for its full length, taking care to strike more lightly at the wide end, where the earth is loose. When the top is reached for the second time, the pipe should fall apart, the break following the lines where the blows were struck. If it does not, then the blows have not been sufficiently heavy.

Wrong Notions About Shell Grit.

Many poultry farmers have an idea that, as grit is more or less essential for the digestion of the food eaten by the birds, any sort of grit—ironstone, quartz, or other such substance—is all that is necessary. This, of course, is wrong.

The primary function of grit is to supply shell-making material, and for this purpose none of the substances mentioned is of any use; also burnt lime is absolutely useless—in fact, harmful, and should never be given to poultry. Either seashell or clean oyster shell, crushed to a suitable size, should be used, or perhaps best results are obtained by using a mixture of one-third by measure of oyster shell to two-thirds seashell.

The right way to supply shell grit to birds is to place it in receptacles in the yards or pens, where the birds always have access to it, and the supply should never be allowed to run out.—A. and P. Notes, N.S.W. Department of Agriculture.

Top-Dressing of Pastures Improves Food Value.

Analyses of average cuts of immature pasturage from top-dressed and unmanured paddocks at Berry Experiment Farm demonstrated conclusively that the food value of pasturage is improved by top-dressing. The manured area received ½ ton lime, 2 cwt. superphosphate, and 1 cwt. sulphate of ammonia per acre, and the results of the analyses are shown hereunder:—

——	Protein (N x 6·25).	Lime (CaO).	Phosphoric Acid (P_2O_5).
	Per cent.	Per cent.	Per cent.
Manured	12·31	0·52	0·58
Unmanured	8·64	0·26	0·43

Although a decided improvement was brought about by the top-dressing, the figures still fall much below those obtained in other parts of the world for what is considered to be good-quality pasturage. In England, grasslands that have been intensively managed and fertilised for many years past produce pasturage showing as high as 3.56 per cent. nitrogen, 2.47 per cent. lime, and 0.99 per cent. phosphoric acid; the average of forty-eight samples of cultivated pasturage was 2.93 per cent. nitrogen, 1.10 per cent. lime, and 0.76 per cent. phosphoric acid. Pasturage cut at the hay stage and containing only 0.27 per cent. lime and 0.25 per cent. phosphoric acid would, in that country, be considered as being seriously deficient in these all-important mineral constituents of animal food.

The foregoing figures have a definite bearing on the fact that to make good-quality grass silage for feeding to milking cows attention must be given to increasing the food value of the pasturage by the judicious application of suitable fertilisers, and lime if necessary.

America's Farm and Dairy Prices Drop.

The general decline in prices of American dairy products during the last two and a-half or three years has been influenced primarily by the general deflation in commodity prices and the business depression rather than by any unusually large supplies in the United States. From January, 1929, to October, 1931, the general level of wholesale prices in the United States declined 30 per cent. to approximately the pre-war level. Farm prices during this same period declined practically 50 per cent., and on 15th October they were 32 per cent. less than pre-war. During this period of generally declining prices the farm price of feed grains declined 64 per cent., as compared with a decline of about 35 per cent. in farm prices of dairy products.

Freezing of Meat.

New Zealand is trying out a new vacuum process which, if successful, may displace freezing as a means of keeping food fresh in transit. The process, which has been patented in the Dominion, is being tested with cargoes on ships at present on the way to the home country. Fifty years ago the first consignment of refrigerated meat ever carried from a Dominion to England left Port Chalmers, New Zealand, for London in the sailing ship "Dunedin." From 5,000 in 1882, the number of carcasses shipped from New Zealand has risen steadily, and in all nearly 213,000,000 carcasses have been shipped to England.

Nail Injuries in Shoeing.

All nail injuries should receive immediate attention. If neglected, suppuration follows rapidly, and the pus burrows through the tissues until it finds an escape, but in the meantime causing great pain and sometimes permanent damage to the sensitive structure of the foot. If lameness appears after shoeing, the shoe should be removed at once and the track of each nail traced by pressing firmly upon it with the pincers. If the horse flinches, the nail hole should be pared out and a small plug of tow covered with Stockholm tar pressed into the opening. The shoe may then be replaced and all nails driven home with the exception of the one in the injured place.

On Training a Colt.

Learn young; learn well. This maxim applies to the training of colts as well as to that of the child. Training should begin in early foalhood—in fact, by first teaching the youngster to lead in a halter. A colt which has been frequently haltered and led as a foal will be much easier to break to harness at two or three years old than one which has never been thus handled.

The main thing in training a colt to go in harness is to get it accustomed to bridle, bit, collar, &c. The rattle of chains is liable to startle a nervous young animal; so it is better, perhaps, to use rope traces for a turn or two, unless the chain traces are partly wound with pieces of sacking. This is a good plan in any case, because it prevents the chains from chafing the legs and ribs of the colt.

Teach the colt to have confidence in its trainer. Coax it rather than urge it unnecessarily with whip or rein. While maintaining a firm hold of the reins, never pull hard, nor jerk the reins so as to cause injury to the animal's mouth. The colt, unlike an old horse, has not yet learned how to bear the bit in its mouth. The bit is irksome. The animal may resent bitting if its mouth is but slightly injured.

There is no better yoke-fellow for a colt than a steady-going old horse. The presence of an imperturbable old animal has a soothing and settling effect upon a nervous colt or filly. It soon recognises that no harm is meant—that it is quite safe, though the unaccustomed restraint of the harness may be irritating. Let the load be light until the colt becomes accustomed to throwing its weight evenly into the collar. Short hours and light work are the making of a useful colt.—JOHN WIGHT, in the "Live Stock Journal" (Eng.).

Brumby Control.

The Administrator of the Government in Council has approved of the issue of a Proclamation under "*The Diseases in Stock Acts*, 1915 *to* 1931," declaring the Bowen and Townsville Stock Districts as districts for the control of "brumbies" or worthless horses for the period from the 1st May, 1932, to the 31st August, 1932.

The abovementioned Acts provide for the destruction of brumbies on stock holdings in Queensland. The provisions apply only, however, to such portions of the State as are proclaimed, and are limited to a period of four months in any year. Destruction of brumbies, therefore, may be carried out in the Bowen and Townsville districts by stock owners at any time during the period stipulated, provided that all formalities required by the Acts have first been observed.

Treatment of Farm Horses.

Farmers who treat their horses with consideration, which all good farmers do, are abundantly repaid by the greater efficiency of the animals. The first attention to horses in the morning is to take them to water, if there is not a regular supply laid on to the stable. When horses are allowed to drink immediately after feeding they are liable to colic. Therefore they should always be watered before, and not after, feeding.

The quantity of water consumed by horses varies; when an animal is very hot or has been long without water, only a small amount should be given at first. In such cases a safe drink is water thickened with a handful or two of oatmeal or oatmeal gruel.

Very cold water should be given in small quantities at a time. The drinking troughs should be kept clean.

Immediately after drinking the horses should receive their first allowance of bruised oats or other food for the day, and they ought not to be disturbed when feeding. Harness can be put on quickly enough after the feed is eaten.

Time should be given to grooming very carefully, and time allowed between feeding and going to work, which is advantageous to all horses.

Lucerne for Grazing—Advantages as a Pasture Proposition.

The sowing of lucerne as a grazing proposition on average wheat country that is reasonably deep has demonstrated it to be one of the best and hardiest pasture plants for comparatively dry as well as cold localities. In periods of drought, when the natural pastures have been practically useless, large areas of lucerne on typical wheat country have carried up to two sheep per acre.

The advantages of lucerne as a pasture are—

That it gives good grazing most of the year and produces rapid growing and very fattening feed.

That it provides fresh green feed at most periods.

That it can be stocked heavily with the knowledge that with a spell of a week or two fresh green feed will again be available.

That paddocks of lucerne can be kept free of "seedy" grasses.

That it provides excellent pasture on which to wean lambs or lamb down ewes.

Turkey Raising—A Profitable Side Line in Inland Districts.

The raising of turkeys, when systematically carried out, can be made a profitable side-line to other farming operations such as wheat-growing and grazing. Under these conditions, where the birds have unlimited range, they can obtain a good deal of their food requirements in the form of wheat and of seeds of weeds, such as saffron thistle, &c., which they readily eat, and in doing so should prove an asset to the farm, apart from the income derived from marketing the birds.

To breed turkeys successfully, plenty of range and proper conditions and management are essential, writes the Poultry Expert of the Department of Agriculture. Generally speaking, turkeys do better in the dry country districts than in the coastal area, but where plenty of land is available they can be reared in the outlying coastal districts with more or less success.

The breeding of turkeys on intensive lines and in small runs as in poultry farming is not practicable, because the birds do not thrive well in close confinement, and such conditions favour diseases, especially entero-hepatitis (blackhead), which has been one of the most serious drawbacks to the raising of turkeys. When the birds are run on extensive range, measures can be adopted to minimise, if not altogether overcome, this disease.

In Australia practically all the turkeys raised are the American Bronze, and for commercial purposes this is the most satisfactory breed. In Europe and America also it predominates, but other breeds such as Bourbon Red, White Holland, Black, and Narrangansett, are kept to a certain extent.

The Bronze is the hardiest when allowed free range, and is preferred on account of being a larger bird than the other breeds. In weight adult Bronze birds range from 5 to 8 lb. heavier than the other breeds mentioned, and gobblers rising two years old should weigh from 30 to 35 lb., and hens of the same age about 14 lb. less.—A. and P. Notes, N.S.W. Dept. Agric.

Temperament in the Dairy Cow.

The cow is a very nervous animal, and harsh treatment easily upsets her. Often the better the breeding and the greater the production, the more highly strung she is. Beating, scolding, and use of dogs should not be permitted in a milking yard. Not only will the quantity of milk given decrease considerably from such practices, but the fat content will likewise diminish. It has been noted frequently that a test has dropped 1 to 1.5 per cent., and the milk weight 30 to 50 per cent.

Paspalum as Silage.

The cutting and ensiling of surplus paspalum growth serves a double purpose, points out the Agrostologist of the New South Wales Department of Agriculture in a recent article—it improves the sward and it ensures a reserve of very valuable fodder. Ensilage has two advantages over curing in the form of hay, inasmuch as it demands neither the same conditions as to weather or the same quality in the pasture. The stage of growth at which the grass is cut, however, as well as the locality in which it is grown, both have an influence on the feeding value of such silage.

As early as 1908, states the writer, paspalum (*Paspalum dilatatum*) silage was made at Wollongbar Experiment Farm, Lismore, 140 tons of green pasturage being stored in two stacks. The cured material made excellent quality feed and was readily eaten by milking cows and dry stock, very little waste being experienced. Even at the present time, however, some dairy farmers in coastal districts incorrectly contend that paspalum is a grass of inferior quality and is not a satisfactory plant to store either as hay or silage. In order to obtain some data regarding its nutritive value when stored as silage, chemical analyses were recently made of silage from typical South Coast paspalum pastures, and compared with an analysis of maize silage from the same district. The analyses were made last September, the material having been ensiled the previous autumn.

The analyses given in the article show the albumenoid ratios to be as follows:—

	Albumenoid Ratio.
No. 1 sample grass silage	1 : 4.8
No. 2 sample grass silage	1 : 7.4
Maize silage	1 : 9.9

It will be seen that in the case of the No. 1 sample, especially, the comparison is much to the advantage of the grass silage.

The No. 1 sample of grass silage (continues the article), and also the maize silage, were obtained from the Nowra district, and No. 2 grass silage from Berry Experiment Farm. Both grass samples consisted principally of *Paspalum dilatatum*, but No. 1 was cut at what appears from the results of the analysis to be a very satisfactory stage for economical feeding of this species, viz., when the grass has made rapid and luxuriant growth, with the seed heads just formed but not reached the flowering stages.

No. 2 grass silage was made from areas which required to be cleaned up and contained much material that was well advanced in maturity; the seed was fully developed and a percentage of dead flag was present. Even under these conditions the analysis indicated that No. 2 grass silage would provide a maintenance ration, and illustrated the dual advantage to be derived from clearing such material off the paddocks—viz., (*a*) encouraging a better quality growth of short succulent pasturage and (*b*) converting the rank growth of grass, which would make an inferior type of hay, into a useful silage.

The maize silage was well made and contained an average proportion of grain; the crop was grown on a farm adjoining that on which No. 1 grass silage was produced. The types of soil were somewhat similar, although the maize land was heavier in texture with the clay subsoil closer to the surface. Both soils are described locally as second-class alluvial. The estimated yield of maize (variety Hickory King) was 20 tons, and the grass (No. 1) 6 tons green material per acre. The maize was manured with equal parts of superphosphate and blood and bone, the mixture being applied with the seed at the rate of 1½ cwt. per acre. During 1930 the No. 1 grass paddock received 2 cwt. superphosphate per acre in the autumn. It was heavily stocked during 1930 and closed up for silage towards the end of the summer season.

The No. 2 sample of grass silage was made from an unmanured paddock of third-class alluvial land.

White Cedar Berries—Poisonous to Pigs.

The poisonous properties of white cedar (*Melia azedaroch*) particularly for pigs and poultry which frequently have access to this tree, have been the subject of much controversy in the past.

Investigations undertaken as far back as 1920 at Hawkesbury Agricultural College and later (in 1927) at Glenfield Veterinary Research Station (New South Wales) proved that half a pound of green berries was toxic for a pig. More recent investigations, however, says the "New South Wales Agricultural Gazette," have demonstrated that as little as 4½ oz. of ripe berries are toxic (poisonous) for a pig weighing 44 lb.

Although the poisonous nature (toxicity) of "White Cedar" (berries) for fowls has not yet been investigated in this country, poultry keepers should be guided by the results of South African investigations which show that the most toxic part of the tree is the ripe berry, the flowers, green drupe, and bark being less toxic, and that pigs and sheep are most readily poisoned, fowls, muscovy ducks, and goats being less affected. In addition, the South African investigations proved that the only toxic part of the drupe was the soft yellowish rind (epicarp), the shell and kernel being quite harmless.

Trees on the Dairy Farm.

It seems a far cry from trees to the size of the cream cheque, but there is a connection. Where trees are so lacking that stock have insufficient shelter and dairy utensils are ineffectively cleaned because of the need for economy in firewood, the farmer's profits are affected in a very definite degree. "An acre of good shelter trees on these plains will conserve more animal heat and energy for the dairy herd than could be produced from an acre of good lucerne land," observes a New South Wales departmental writer, referring to tree shortage on the Murrumbidgee Irrigation Area in particular. "Firewood is scarce, and many farmers are averse to using sufficient to boil ample supplies of water for thoroughly washing utensils." A big proportion of second-grade cream, farmers are reminded, can be traced to the use of cold or insufficiently heated water for this purpose.

Thoughtful farmers are repenting the indiscriminate destruction of forest growth which has often been a feature of Australian land settlement, and although we have not yet reached the stage when the need for the farm tree lot has become generally pressing, there are nevertheless many districts in which its claims should be seriously considered. In older countries, points out the departmental bulletin "Tree Planting on the Farm," the wood lot receives just as much attention as any of the farm crops, and it is only a matter of time when similar conditions will obtain here. Apart from those districts where definite shortages already exist, there are many areas where the future shortage can only be met by immediate planting.

The practical advantages of a tree lot on the farm are various. Primarily it would provide all fuel, wood, fencing material, poles, and any rough timber required for the homestead and outhouses. This means a saving both in time and money. Further, it would enable the farm area to be utilised to its fullest capacity, providing a profitable crop for the poorer sections. It may take the form of a windbreak or shelter belt for stock and crops. It may be so placed as to prevent erosion of the land surface on steeper slopes and along river banks. Handled correctly, it is useful in enriching the character of poor soils. It provides a breeding place for useful birds, exercises a local effect on climate, and has a real æsthetic value. In addition, the tree lot can be a source of revenue to the farmer through the sale of fuel and timer, or some such sideline as wattlebark.

The establishment of such an area is not a difficult matter, and the cost to the farmer is represented by little more than his own time. If the property is already timbered, the indigenous species can be handled in such a way as to preserve a very useful tree lot. The maintenance of the area provides employment for slack periods during the year.

It may be argued that the farmer will not reap the direct benefit of his sowing, owing to the long periods necessary for the maturing of a forest crop. It should be remembered, however, that the farmer will probably only plant species which are quick-maturing, that he will have the benefit of all thinnings (which, after the first five or ten years, are not inconsiderable), and that a well-established tree lot would, moreover, be a decided asset should he wish to sell.

May to August are in most cases the best months for tree-planting.

Orchard Notes for July.

THE COASTAL DISTRICTS.

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

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

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

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

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

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

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

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

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

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

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

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

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

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

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

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

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

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

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

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

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

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

Farm Notes for July.

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

The Home and the Garden.

OUR BABIES.

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

WHAT BECOMES OF THE BEAUTIFUL BABIES?

IN April we published Herbert Spencer's answer to his question written seventy years ago. Has there been on the whole any real improvement since then? It is very doubtful.

Some changes have been certainly to the good. Our grandparents were just as desirous of health for their own children as we are, but they did not realise their duty to other people's children so well as we do, nor did the State consider itself responsible. The commercial exploitation of children in factories is now a frightful memory of the past. The State provides for their education, and has found that for this some degree of physical fitness is necessary. Consequently we have a school medical service and a dental service, which have done a very great deal towards the improvement of children's health. Unfortunately, many children arrive at school age in a damaged condition, and this is not easily remedied. Nor can the school medical service do much to remedy those home conditions which lead directly to the growth of sickly children. These conditions are seldom due to poverty; they are nearly always due to want of knowledge, and may be frequently observed among children of the well-to-do.

Hopeful Outlook.

Our girls have improved in health and physique since they discarded heavy clothing. Less of the body is covered, and the covering is lighter. In cold climates this has some disadvantages, but in Queensland feminine costume approaches the ideal more closely than formerly, except in footwear, which still remains barbarous. We believe that crippled feet are no longer fashionable among the ladies in China, but the women of Queensland still cling to theirs. The great popularity of surf-bathing and sun-basking of recent years, though capable of doing harm, is undoubtedly on the whole conducive to health.

The revival of breast-feeding and the greatly lessened use of artificial feeding during the first nine months of life (that great cause of deaths among babies usually

miscalled "teething") has lowered the mortality during the first year of life by one-half, and further progress in this direction would lower it yet more. Unfortunately, many mothers plunge carelessly into trouble about the time of weaning, but even at this time many are learning to seek good advice. All this is very hopeful; but there is another darker side to the picture.

The Darker Side.

No competent observer can fail to notice the large number of poorly nourished children—not from any want of quantity in their food, but from want of wisdom in the way they are fed. These children are physically easily tired, mentally either dull and listless, or unduly irritable and excitable. They fall easy victims to every infection. Even slight infections lead in them to serious complications, and a common cold may be followed by ear disease, bronchitis, or pneumonia. Such common infections as measles and whooping cough are not passed through lightly, but leave bad effects behind them. Small inflammations may lead to fatal blood-poisoning. They grow up candidates for tuberculosis or crippling rheumatism or other conditions with long names, which fill up half our hospitals. At the root of all this trouble is a diet ill-balanced, unwholesome, and defective in vitamins.

Constipation might be called a national disease. Whole industries flourish on this condition, yet, of course, it grows no less. These industries merely provide temporary aids for the crippled bowels. We do not cure cripples by giving them crutches. The main cause of this condition again is a defective diet.

Our school dentists, carefully examining the mouths of all our children as soon after they enter school as possible, have discovered the alarming fact that, on the average, only one child in ten has healthy teeth without defect. For this again diet is responsible. The diet of the children and their mothers is often deficient in elements necessary for the development of sound teeth. The diet of the children is such as readily destroys what teeth they have.

Foods that are Worse than Worthless.

One hundred years ago the foods of our people were, on the whole, really good. Since then our foods have been changed without our noticing it. They are called by the same names, we think they are the same, but some of them are comparatively worthless. Our grandmothers never worried about vitamins. They had never heard of them, nor had anyone else. They did not talk about vitamins; but they swallowed them. We have much to learn as to the right feeding of our children. The manufacture of C3 citizens out of A1 babies is at the present time the most successful secondary industry in Australia.

EAT MORE BANANAS.

The banana is not only a delicious fruit, but it also ranks very high as a nourishing foodstuff, both in the fresh state and when made up into a tasty dish.

The housewife is recommended to try the following recipes for banana creams and custard:—

Banana Chocolate Cream.—Peel and slice two or three nice sized bananas and place in a dish. Then make a pint of boiled custard to which has been added a good tablespoonful of powdered chocolate (or cocoa), a few drops of vanilla, and a piece of butter about the size of a walnut. Pour this (while hot) over the bananas and sprinkle the top with a little desiccated coconut. Serve when cold. This makes a most delicious, nourishing, and economical dish.

Banana Custard.—One pint custard, four to six bananas, and some raspberry jam, also the whites of two eggs, some chopped nuts, and two tablespoons castor sugar. Skin bananas and cut lengthwise twice, then in half across. Spread jam and join two pieces together. If the fruit is at all over-ripe, smear with lemon juice. Allow the custard to cool, then pour over the fruit. Whisk the whites of eggs and add the sugar, then heap on to the custard and sprinkle with chopped nuts.

NOTE.—The custard may be made with the yolks of eggs and a little cornflour, and the whites separated for the decoration.

Banana Cream.—Six bananas, 1 gill cream, 1 lemon, ½ cup water, 1 oz. gelatine, sugar, and flavouring. Dissolve gelatine in water, cut up bananas, add to gelatine, also juice and grated rind of lemon; sugar to taste. Simmer for ten minutes; when cold beat up with cream and flavouring; pour into wet mould. Serve with cream. Milk may be substituted for cream.

FLOWER GARDEN.

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

No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool, moist spring-time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lots, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground. Many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondi, stocks,* wallflower, and zinnias, &c., may be sown either in boxes or open beds. Mignonette is best sown where it is intended to remain. Dahlia roots may be taken up and placed in a shady situation out of doors; plant bulbs such anemones, ranunculus, fresias, snowflakes, ixias, watsonias, iris, narcissus, daffodil, &c. The Queensland climate is not suitable for tulips.

To grow these plants successfully it is only necessary to thoroughly dig the ground over to a depth of not less than 12 inches, and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should be raked over smoothly so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave the plants (if in the border) at least 4 to 6 inches apart.

THE CARE OF THE LAWN.

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

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

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

KITCHEN GARDEN.

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

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

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

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

QUEENSLAND SHOW DATES, 1932.

Maryborough: 1st to 3rd June.
Wowan: 2nd and 3rd June.
Childers: 7th and 8th June.
Bundaberg: 9th to 11th June.
Kilkivan Carnival : 10th and 11th June.
Lowood: 10th and 11th June.
Miriam Vale: 13th and 14th June.
Gladstone: 15th and 16th June.
Mount Larcom: 17th and 18th June.
Rockhampton: 21st to 25th June.
Mackay: 28th to 30th June.
Kilcoy: 30th June and 1st July.
Home Hill: 1st and 2nd July.
Townsville: 5th to 7th July.
Gatton: 6th and 7th July.
Woodford: 7th and 8th July.
Cleveland: 8th and 9th July.
Charters Towers: 13th and 14th July.
Caboolture: 14th and 15th July.
Rosewood: 15th and 16th July.
Ingham: 15th and 16th July.
Laidley: 20th and 21st July.
Nambour: 20th and 21st July.
Cairns: 19th to 21st July.
Esk: 22nd and 23rd July.
Ayr: 22nd and 23rd July.
Mount Gravatt: 23rd July.
Bowen: 27th and 28th July.
Maleny: 27th and 28th July.
Atherton: 28th to 29th July.
Pine Rivers: 30th July.
Royal National: 8th to 13th August.
Crow's Nest: 24th and 25th August.
Wynnum: 26th and 27th August.
Mary Valley, Imbil: 2nd and 3rd September.
Enoggera: 3rd September.
Pomona: 14th and 15th September.
Malanda: 14th and 15th September.
Beenleigh: 16th and 17th September.
Rocklea: 24th September.
Southport: 7th and 8th October.
Nerang: 14th October.

TO SUBSCRIBERS—IMPORTANT.

Several subscriptions have been received recently under cover of unsigned letters. Obviously, in the circumstances, it is impossible to send the journal to the subscribers concerned.

It is most important that every subscriber's name and address should be written plainly, preferably in block letters, in order to avoid mistakes in addresses and delay in despatch.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	June, 1932.		July, 1932.		MOONRISE. June, 1932.	MOONRISE. July, 1932.
Date	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	6.40	5.0	6.47	5.3	3.32	4.11
2	6.40	5.0	6.47	5.3	4.28	5.17
3	6.40	5.0	6.47	5.3	5.24	6.3
4	6.41	5.0	6.48	5.4	6.19	6.56
5	6.41	5.0	6.48	5.4	7.15	7.46
6	6.41	5.0	6.48	5.5	8.8	8.31
7	6.42	5.0	6.48	5.5	9.1	9.7
8	6.42	4.59	6.48	5.6	9.49	9.43
9	6.42	4.59	6.47	5.6	10.30	10.14
10	6.43	4.59	6.47	5.6	11.6	10.47
11	6.43	4.59	6.47	5.7	11.41 p.m.	11.19
12	6.43	4.59	6.47	5.7	12.11 p.m.	11.55 p.m.
13	6.44	4.59	6.46	5.8	12.44	12.37
14	6.44	4.59	6.46	5.8	1.19	1.22
15	6.44	4.59	6.46	5.9	1.57	2.19
16	6.45	4.59	6.46	5.9	2.39	3.22
17	6.45	5.0	6.45	5.10	3.34	4.26
18	6.45	5.0	6.45	5.10	4.34	5.31
19	6.45	5.0	6.45	5.11	5.39	6.35
20	6.46	5.0	6.44	5.11	6.45	7.37
21	6.46	5.1	6.44	5.12	7.50	8.35
22	6.46	5.1	6.44	5.12	8.54	9.30
23	6.46	5.1	6.43	5.13	9.52	10.23
24	6.47	5.1	6.43	5.13	10.46	11.17
25	6.47	5.2	6.43	5.14	11.40	...
					a.m.	a.m.
26	6.47	5.2	6.42	5.14	...	12.11
					a.m.	
27	6.47	5.2	6.42	5.15	12.33	1.5
28	6.47	5.3	6.41	5.15	1.25	2.1
29	6.47	5.3	6.41	5.16	2.20	2.56
30	6.47	5.3	6.40	5.16	3.23	3.52
31	...	...	6.39	5.17	...	4.47

Phases of the Moon, Occultations, &c.

4 June	●	New Moon	7 16 p.m.
12 ,,	☾	First Quarter	7 39 a.m.
18 ,,	○	Full Moon	10 38 p.m.
26 ,,	☽	Last Quarter	6 36 a.m.

Perigee, 16th June, at 12.10 a.m.
Apogee, 28th June, at 7.0 p.m.

On the 13th Mercury will pass from west to east of the Sun; on the 15th it will set only seven minutes later, but on the 30th it will reach a distance of 20 degrees east of the Sun and will remain above the western horizon 1 hour 20 minutes after sunset.

On the 14th it will be interesting to notice the nearness of the Moon to Spica in Virgo. An occultation will occur in the daytime in the northern hemisphere, but not visible in Australia.

Orion will set with the Sun on 15th June and will be lost to view for several months. It will reappear in the east early in the evening in November. Sirius, the finest of the fixed stars, Procyon (the lesser Dog-star), Castor and Pollux (the Twins) will all have disappeared at 8 o'clock, but in the east the splendid Scorpion, with its heart marked by the red star Antares, and with its glittering, sharply-curved tail, will be well displayed.

On the 29th Venus will pass from the east to the west side of the Sun, but as Venus will be 3 degrees (half the length of the Cross) southward of the Sun no transit will occur. On the 30th it will set 1 minute before sunset.

Mercury will be in Taurus and Gemini during June; Venus in Gemini will be in inferior conjunction with the Sun on the 29th; Mars in Aries till the 8th, then in Taurus to the end of the month; Jupiter in Leo, Saturn in Capricornus, apparently moving slowly westward.

Mercury rises at 5.33 a.m. on the 1st, and sets at 5.6 p.m., only 7 minutes after the Sun, on the 15th.

Venus sets at 7.24 p.m. on the 1st, and at 6.30 p.m. on the 15th.

Mars rises at 4.39 a.m. and sets at 3.27 p.m. on the 1st; on the 15th it rises at 4.31 a.m. and sets at 3.8 p.m.

Jupiter rises at 11.12 a.m. and sets at 9.54 p.m. on the 1st; on the 15th it rises at 10.23 a.m. and sets at 9.8. p.m.

Saturn rises at 9.1 p.m. and sets at 10.25 a.m. on the 1st; on the 15th it rises at 8.3 p.m. and sets at 9.28 a.m.

The Southern Cross will be upright about 8 p.m. on the 1st, 7 p.m. on the 15th, and at 6 p.m. on the 30th June.

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4 July	●	New Moon	8 20 a.m.
11 ,,	☾	First Quarter	1 7 p.m.
18 ,,	○	Full Moon	7 6 a.m.
25 ,,	☽	Last Quarter	11 41 p.m.

Perigee, 14th July, at 8.48 a.m.
Apogee, 26th July, 12.54 p.m.

Spica, the first magnitude star on the ecliptic in the constellation Virgo, will be occulted by the Moon on the night of the 11th. It will be observable from any part of Queensland, the time depending on the position of the observer.

Antares, the principal star in the Scorpion, will be occulted on the night of the 14th.

For places west of Warwick and nearly in the same latitude, 28 degrees 23 minutes S. add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

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

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