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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment

Allocation of Sugar Quotas.

IN opening a conference of sugar interests in Brisbane, at which proposals to establish an equitable basis for the allocation of sugar quotas were discussed, the Premier (Hon. W. Forgan Smith, LL.D.) delivered a notable address, in the course of which he said that on his return from the International Sugar Conference in London last year he publicly gave detailed information of the conclusions reached. At Mackay he had called attention to the assured quota for export and other issues. The views of the respective organisations were subsequently sought on the dissatisfaction expressed against the incidence of the peak year scheme.

At that time, said the Premier, he had pointed out that the Government had given the industry a charter, which justified him in expecting that the industry would itself prefer to keep this matter under its own jurisdiction. An important duty devolved upon the industry, and delegates were urged to consider the whole matter not as advocates, but as a tribunal upon which was cast a great responsibility.

It had always been the practice of the present and other Governments to seek recommendations from the industry itself. In the past those recommendations had been forthcoming, and he took it that such a charter and authority was something the industry should not hold lightly.

The high price of sugar in European countries was due to high tariffs and the consequent low consumption a head, compared with Australia's 112 lb. a head. It was unfortunate that it was not otherwise, but the industry must face the facts. They were living in a world that had many economic difficulties. Some of them were beyond the industry's immediate solution. In Queensland they must, therefore, recognise such powers as they had, and use them equitably and justly towards all concerned.

If sugar purchasing countries were in a position to use as much sugar as was being consumed in Australia there would be no need for this conference, but there was a limited market, based on limited capacity to buy. Therefore, they realised that they had certain known markets. Outside Australia there was a market for 400,000 tons. He had sought the utmost protection within the industry's economic ability in return for the embargo and in furtherance of the policy of settling the northern coastal regions of Queensland.

Effect was given to the White Australia policy largely by means of the sugar industry, and they owed it to the Governments who were responsible for the embargo to maintain the production of a quantum of sugar in keeping with Australia's needs and export conditions, continued the Premier. The Government was opposed to reducing settlement or the volume of employment. It desired the utmost production consistent with reasonable living conditions for farmers and wage earners.

Australia had a market for 750,000 tons of sugar, including export and home demands. It was hoped by many that the volume of sugar consumed in the countries representing the free markets would increase, and those concerned with the international agreement had bound themselves to do whatever possible to increase that consumption. But what was to be faced was that Australia's known market was about 750,000 tons.

The volume of production by the various signatories to the international agreement had not indicated any likelihood of a falling-off in their supplies. As a matter of fact, the authority set up to control the sugar agreement might be called upon to impose a further 5 per cent. cut in quotas applicable to foreign countries, to prevent glutting the free markets. Fortunately, this did not apply to the Dominions and Crown colonies, but the volume of sugar within the market must be taken into account by Australia and elsewhere.

Hopes for any great increase in world prices had not eventuated, the Premier stated, but the international agreement had really borne fruit by resisting bedrock prices. While this year's crop might realise only 4s. or 5s. a ton more than that of last year, this result had accrued despite an increase of 30s. a ton in freight. Wheat freights had been reduced, and it was hoped that later there would be a cut in favour of the sugar industry. The industry must bear in mind that it was and had been producing sugar much above the peaks.

The conference, which had been summoned by the Premier at the request of the sugar organisations, was attended by representatives from every mill district in the State. Besides sixty-six delegates there were their advisers and officials of the two sugar organisations and of the Queensland Bureau of Sugar Experiment Stations. The Minister for Agriculture and Stock (Hon. Frank W. Bulcock) also was present.

Equalisation Scheme Supported.

AT its concluding session the conference adopted the equalisation scheme formulated last year.

The conference also agreed to urge an addition of 2,500 tons to the Inkerman mill's peak quota under the official proclamation, and to recommend greater facilities for agreements in any area on control of production.

The equalisation scheme adopted sets out that the peaks and the pooling system shall be unchanged, except for two suggested alterations to give relief to certain sections.

The main alteration is that, if the No. 1 pool price could be declared at an average amount more than £17 a ton, that excess, provided it did not exceed 12s. 6d. a ton on No. 1 pool sugar, and subject to certain other minor provisoes, should be made available for distribution to the producers of No. 2 pool sugar.

Another provision is that the lighterage on excess sugar shall be met by the common pool instead of being, as at present, paid by the areas concerned.

Under existing conditions, sugar produced in Queensland is acquired by the State Government through the Queensland Sugar Board. There are, in effect, two pools. No. 1 pool is based on the peak production of any mill up to 1929, and the other constitutes sugar in excess of these peaks, and this sugar is acquired and paid for at export rate only.

In 1929 each mill was allocated a peak calculated mainly on its maximum production of sugar up to that year. The policy of the industry since then has been to agree that all sugar within the peak production should be acquired and paid for on an equal footing. Thus from the No. 1 pool Australia's requirements will be taken and paid for at the price of £24. The balance of the pool will be sold on the export market. Then an average price will be arrived at for all sugar in No. 1 pool.

No. 2 pool sugar was paid for at export price.

The aggregate quantity of sugar in the No. 1 pool is 611,428 tons.

The conference agreed that, as the Inkerman mill area had, through diversion of cane to another area, been deprived of the full benefit of its maximum production in the allocation of the 1929 quotas, the Government should be asked to add 2,500 tons to the peak quota of the mill.

At present the Regulation of Cane Prices Act provides that before an agreement can be adopted between growers and millers in any area for the control of production the agreement must be signed by 85 per cent. of the canegrowers who supply not less than 66 per cent. of the cane.

The resolution adopted by the conference asks the Government to amend the Act so that, for the control of production, an agreement shall be binding on all suppliers if signed by 70 per cent. of the growers supplying 75 per cent. of the cane, provided that it is approved by the Central Board. Agreements on matters other than the control of production shall be still subject to the original provisions.

The Apple Leafhopper.

K. M. WARD, M.Agr.Sc., Assistant Research Officer.

THE apple leafhopper* is a newcomer to apple orchards in Queensland. The insect first appeared in injurious numbers during the 1937-38 season, but it was probably present in some parts of the district at an earlier date, though not as a pest of any consequence. The recent outbreak was confined to areas lying south and south-west from Stanthorpe. The species concerned is already well known as an important pest of the apple in New South Wales, Victoria, South Australia, and Tasmania.

Description of the Insect.

The adult leafhopper (Plate 79; fig. 6) is a small, slender, winged insect measuring about one-eighth of an inch in length. Its general colour is usually canary yellow, the eyes being dark and prominent. The immature forms, known as nymphs (Plate 79; figs. 3, 4, and 5) are wingless and pale-green in colour. The size of the nymphs varies with age, newly-hatched individuals being minute, while the nearly full-grown nymph is almost the size of the adult.

Host Plants.

The only fruit tree known to be seriously attacked by this pest is the apple. Pear trees and stone fruit trees adjoining and growing among heavily infested apple trees do not become injured. The insect has been observed, however, on hawthorn trees in Tasmania, and in the Stanthorpe district, adults and nymphs have this season been noticed living on small blackberry vines near an infested apple orchard. There is no record of its feeding or breeding on common orchard weeds or on cultivated plants, other than the apple, in the deciduous fruit areas.

Life History and Habits.

In any one season, usually two generations or broods of the apple leafhopper succeed each other between spring and autumn, with the possibility of a partial third brood late in the season. The first generation arises in spring from overwintering eggs which had been deposited in the bark tissues of apple trees during the previous autumn. The spring hatching commences in September, and extends over a period of several weeks. The nymphs develop to maturity through a series of moults in five to six weeks, and the yellow winged adults may be noticed on the trees from October onwards. Though the adults make short, darting flights, especially when disturbed, they are not often seen passing from tree to tree. A faint clicking sound can be heard when the insects are moving through the tree.

During late spring and early summer, the adult females insert their minute elongate eggs (Plate 79; fig. 1) singly within the tissues of the leaves, mainly in the stalks, midribs, and main veins (Plate 79; fig. 2). In New South Wales, and probably also in Queensland, these eggs hatch between early December and mid-February. Due mainly to the warm weather, the nymphs develop more rapidly than those of the

*_Typhlocyba froggatti_ Baker.

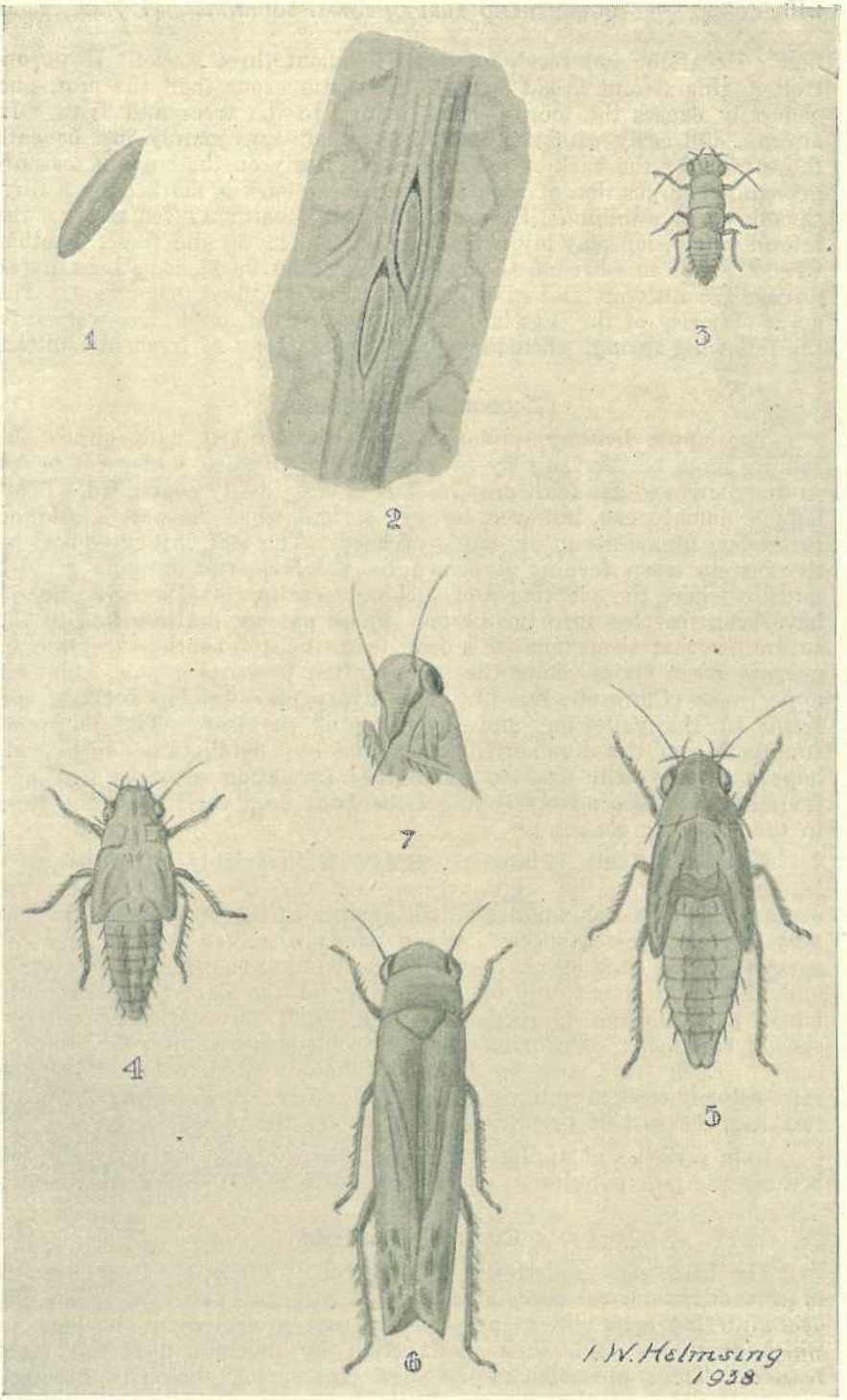


Plate 79.

THE APPLE LEAFHOPPER (*Typhlocyba froggatti* Baker).—Fig. 1—egg × 30; Fig. 2—main leaf vein dissected to show eggs *in situ* × 30; Figs. 3, 4, and 5—nymphal stages × 20; Fig. 6—adult × 20; Fig. 7—view of adult head showing piercing mouthparts × 20.

first generation, and reach maturity in about three weeks. If uncontrolled, this second brood is much more numerous than the first, and generally causes the more serious injury to the trees and fruit. In autumn and early winter the adults lay their eggs mainly just beneath the surface of the bark of the tree, particularly on the current season's growth. The position of each egg under the bark is marked by a tiny, smooth, oval swelling. Some of the early-maturing females of the second generation may lay a few eggs in the leaves, and these, together with a small number of the eggs laid in the bark, sometimes hatch during the autumn and give rise to a partial third generation. The great majority of the eggs laid in the bark do not hatch, however, until the following spring, when they provide the source of fresh infestation.

Economic Importance.

The apple leafhopper can scarcely be ranked with either the codling moth or the fruit fly in economic importance, because it is not so destructive to the fruit crop, and it is more easily controlled. Leafhopper damage can, however, be very serious when the pest is allowed to become numerous in an apple orchard. The leaf injury caused by the insects when feeding is shown by the formation of pale greyish patches where the piercing and sucking mouthparts (Plate 79; fig. 7) have been inserted into the tissue. These patches coalesce late in the season, so that the whole of a leaf (sometimes with the exception of narrow green strips along the veins) often presents a pale, chlorotic appearance (Plate 80; fig. 1). The injury may develop further, and result in the yellowing and dropping of the leaf. The improper functioning of the discoloured leaves and any defoliation due to leafhopper attacks will tend to induce the formation of weak leaf and fruit buds, and so adversely affect the fruit crop carried by the trees in the following season.

Blemished fruit (Plate 80; fig. 2) is invariably associated with leafhopper attacks on apple trees, and the blemishes are due to excrement which accumulates on the surface of the fruit in the form of very numerous black specks. When partly dissolved by rain, dew, or spray material, these specks spread over the fruit as dirty brown streaks and blots. Although only on the surface of the skin, these unsightly marks are sufficient to render the fruit unfit for marketing without special treatment. Unfortunately, these blemishes cannot be removed easily. Each fruit must be wiped with a wet cloth before it can be satisfactorily cleaned; a dry cloth has little effect. Such wiping obviously increases the cost of preparing the fruit for the market.

Late varieties of apples are likely to be the most seriously affected because the pest population usually increases as the season advances.

Control Measures.

The basic idea underlying the control of the apple leafhopper is to prevent the normal seasonal increase to injurious numbers. Since the overwintering eggs laid in autumn are well protected by the bark in which they are laid, their destruction by ovicides does not seem feasible. The suppression of the first (the spring) brood is therefore essential, and control measures should be employed before any of the insects hatching in the spring can develop to the adult egg-laying stage.

Experimental work carried out in New South Wales and in Victoria has shown that nicotine sulphate is the most effective insecticide for

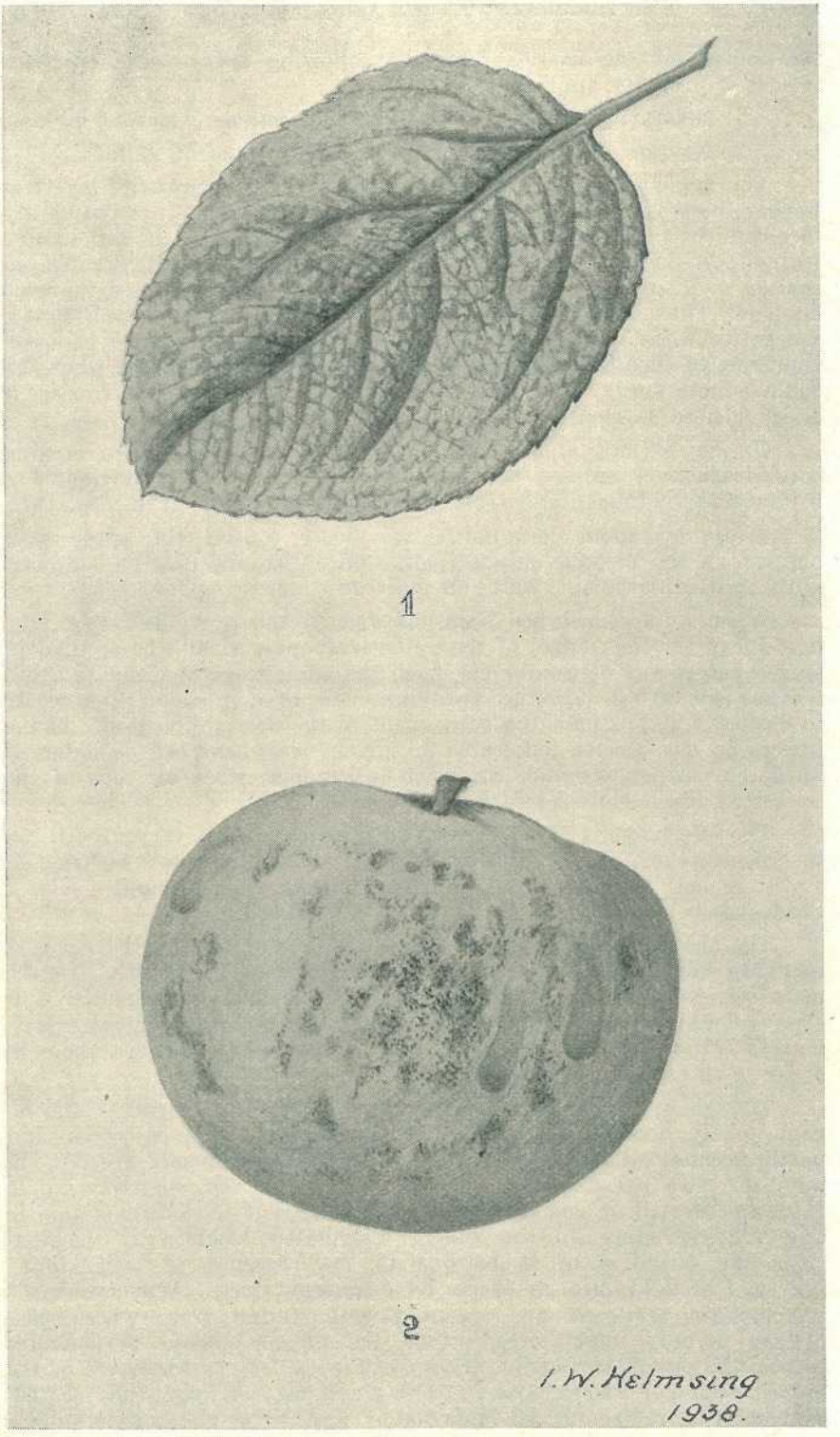


Plate 80.

Fig. 1—leaf showing chlorotic appearance caused by the apple leafhopper; Fig. 2—surface blemishes on the fruit associated with leafhopper infestation on apple trees.

the control of the insect. The two following sprays give excellent results if properly applied:—

1. Nicotine sulphate, 1 pint; white oil, 1 gallon; water, 80 gallons.
2. Nicotine sulphate, 1 pint; soap, 2 lb.; water, 80 gallons.

The apple grower has already to apply several sprays to his trees during the season for the control of codling moth, and it is frequently inconvenient to use special insecticides to check a pest such as the apple leafhopper. Fortunately, nicotine sulphate can be incorporated in codling moth sprays without losing much of its efficacy against the leafhopper. The combined spray is therefore very useful if leafhoppers are active when codling moth calyx or cover sprays have to be used. One pint of nicotine sulphate is added to 80 gallons of the prepared codling moth spray, and after thorough agitation in the vat, treatment is commenced as soon as possible.

On no account must soap be included in the combined codling moth leafhopper spray if lead arsenate is one of the ingredients as injury to both foliage and fruit may follow the use of such a mixture.

White oil alone does not satisfactorily control the apple leafhopper; in the nicotine sulphate-white oil spray, the nicotine sulphate is the active ingredient, white oil indirectly increasing its efficiency.

When an orchard has been infested in the previous season, the first spray for the control of the apple leafhopper should be applied in spring before any of the insects reach the adult stage in order to avoid further egg laying. Another spraying is required in about three weeks to destroy nymphs hatching subsequent to the first application. If the insects do not become noticeable in spring, treatment can be deferred until the position warrants attention in summer, when any one of the suggested treatments should be adopted.

The effectiveness of any spray treatment depends very greatly on the thoroughness of spraying. The whole of the tree must be treated, and it is most important that the spray should reach the under side of the leaves.

The above spray mixtures have little or no effect on the eggs, as they are always embedded in the plant tissues. These eggs are the main source of reinfestation of sprayed trees, and consequently it is always necessary to make at least two applications of an effective leafhopper spray with an interval of about three weeks between them in order to check the insect satisfactorily.

Though the apple leafhopper is winged, rapid dispersal is uncommon, partly because the insect does not fly over long distances, and partly because alternate hosts which would assist dispersal are few in number. Gradual dispersion may take place in the Stanthorpe area from an infested to a nearby uninfested district if the insect is able to live and reproduce on the widely distributed blackberry. Isolated outbreaks would seem to be due to the presence of over-wintering eggs brought into an orchard on nursery stock. When orchards are being established or replanted with young trees whose past history is only imperfectly known, the grower should periodically inspect the plants during the first two growing seasons for traces of the apple leafhopper. In the event of either nymphs or adults being located, control measures should be immediately applied in order to minimise the risk of the pest becoming a recurring trouble from year to year in the orchard.

Sterility in Cattle.

THE IMPORTANCE OF CONTAGIOUS VAGINITIS.

MARSHALL R. IRVING, B.V.Sc., Government Veterinary Surgeon.

THERE is probably no other factor, with exception of periodic drought conditions, which is responsible for greater economic loss to dairymen in Central Queensland than that which results from the failure of cattle to breed regularly. Indeed, the losses occasioned by sterility are rarely appreciated by the dairy farmer until the causes of sterility have become so firmly established in his herd that satisfactory treatment is practically impossible. There are several forms of sterility, each caused by certain specific diseases; but to the cattle breeder of Central Queensland that which is produced by the disease known as contagious vaginitis is at present by far the most important.

Economic Importance of Vaginitis.

Extensive observation of dairy herds in Central Queensland indicates that practically every herd is affected to a greater or less extent by contagious vaginitis. This disease is largely responsible for the frequent complaint made by farmers that they are experiencing difficulty in getting their cows in-calf. In some herds it is found that over 50 per cent. of the cows fail to conceive to the bull at a single service; while in some cases over 20 per cent. fail to conceive even after returning to the bull regularly for several months.

The losses caused by this temporary or permanent failure to reproduce may be summarised as follows:—

1. The farmer is feeding unproductive cattle even in times of scarcity.

2. It is impossible to arrange for calving to fall at a time when the pastures are at their best, and advantage cannot be taken of securing the highest returns in the flush season.

3. The farmer frequently spends much money on useless preparations which rarely contribute towards the elimination of the disease.

4. Cows from good milking strains may frequently have to be disposed of at butchers' prices.

5. Any attempt to improve the herd by the purchase of pedigree stock may be frustrated by the failure of expensive animals to reproduce, and so cause considerable financial loss to a progressive farmer.

6. The herd bull may be so overworked as to lose his breeding efficiency, particularly where the bull has free access to the herd.

Such losses are very difficult to assess, and may in some instances be very appreciable.

Causes of Sterility.

There are three main forms of sterility, each caused by a variety of diseases—

1. *Failure of the Cow to Show Oestrum (heat periods).*—This type of sterility is not very common, and is usually caused by an abnormal

condition of the ovary in which the yellow body persists from a previous pregnancy. The treatment of this condition requires a sound knowledge of anatomy, and should not be attempted except by qualified persons.

Malnutrition may also lead to sterility of this type, though it is quite common for ravenous "bone chewers" to breed fairly regularly.

2. *Cows Showing Irregular Oestrum.*—Cases of sterility where the animals come "on heat" at frequent and irregular intervals are due to the presence of a cyst in the ovary. Such cows with diseased ovaries are better spayed and disposed of. This type of sterility is not common.

3. *Regular Oestrum with Failure to Conceive.*—This type includes the vast majority of cases of sterility which are met with in Central Queensland. Cows so affected may breed intermittently; but conception is usually delayed, and several services are required over a period of some months before a cow finally becomes pregnant.

Sterility of this type may be caused by a diseased condition of any part of the genital organs, and may in some cases be permanent. The commonest cause of this form of sterility is contagious vaginitis. Other diseases which produce more permanent interference with breeding are contagious abortion and septic conditions of the womb and the other genital organs. Fortunately these are at present not very widespread in Central Queensland, though contagious abortion, the most serious of all diseases of dairy cattle, is continually spreading.

Contagious Vaginitis and Sterility.

During the past five years the incidence of contagious vaginitis in Queensland herds has greatly increased until to-day few dairy herds are free from its effects, and many beef herds are becoming involved in the serious losses caused by the sterility it produces. Proof of its ability to produce sterility lies in the fact that proper treatment will largely eliminate such losses from an infected herd.

The cause of the disease is not definitely known, though it is certainly caused by a living organism which is capable of passing from one animal to another. The disease may be carried from an infected animal to a healthy one mechanically in discharges adhering to the bull's penis through successive services. It may also be conveyed to many females by a bull whose penis and sheath have become affected by the disease. Other means of transmission also exist, since the disease has been found in calves of under six months of age. Another common method of spreading the infection is the careless use of instruments by farmers who are not aware of the dangers resulting from failure to properly disinfect instruments and utensils.

Once established in a herd, it quickly spreads to all animals, and a high percentage of breeding irregularities will follow.

Symptoms.

Unfortunately, the presence of the disease in a herd is not usually suspected by a farmer until cows commence to repeatedly return to the bull for service. By this time the lesions are generally well established.

The first sign of infection is a slight reddening and swelling of the mucous membrane lining the interior of the lips of the vulva. In a few days numerous small red spots about one-twelfth of an inch in diameter appear around the clitoris and just inside the upper corner of the vulva. These spots become raised above the surface to small shiny nodules, and the surrounding tissue become oedematous and swollen. A scanty discharge of clear sticky material appears. Usually there is no apparent interference with the general health of the animal, except in very severely inflamed cases, when the animal shows signs of irritation by frequent swishing of the tail and attempts to rub against posts.

After about one month the nodules become pale and yellowish, with a glassy appearance, and the inflammation disappears. The discharge at this stage is thick and purulent. The disease may persist thus for months and a temporary sterility result. Sometimes the symptoms subside and the cow may conceive to the bull. Later the more acute symptoms may reappear.

In the more severe cases the nodules extend well into the vagina and the discharge becomes fairly copious. In such cases treatment is very difficult, and permanent sterility may result. Abortion is sometimes attributed to this disease in its most serious form; but it must be understood that contagious abortion is quite distinct, and has no connection with contagious vaginitis.

In bulls the disease is usually not so severe. Nodules are formed on the penis and inner surface of the sheath. In bad cases bleeding frequently follows the serving of a cow. It is not uncommon where this happens to find that a bull will later be incapable of fully erecting his penis due to the stricture of the inner sheath after healing has taken place. This renders him virtually incapable of serving a cow.

Diagnosis can be readily made by examining the internal surfaces of the lips of the vulva.

Treatment.

Severe chronic cases of this disease are very obstinate and defy all attempts at treatment.

If treated early in the outbreak the sterility resulting from contagious vaginitis can be largely eliminated. This has been repeatedly demonstrated where careful treatment has been carried out. The use of the tar-stick must be condemned, if only on account of its brutality.

The most effective treatment yet discovered is carried out on the following lines:—

1. First wash the external parts of the genital organs and tail with a solution of 1 per cent. Lysol or other reliable disinfectant.

2. Douche out the vagina with a solution of 1 oz. of bicarbonate of soda to 1 gallon of water in order to eliminate all mucus and discharges from the vagina before treating.

3. On every second day for a period of one month (fifteen treatments) inject into the vagina 1 pint of a solution made up of 1 oz. of sulphate of zinc to 2 gallons of clean water. This is best done by means of a 1-pint brass "cattle syringe" with at least two nozzles so that each nozzle can be placed in a disinfectant solution between individual cows.

This precaution is necessary to avoid further mechanical transmission of the disease. The whole herd should be treated at one and the same time irrespective of pregnancy and inclusive of calves over six months of age.

The sheath of the bull should be similarly treated.

4. Repeat this treatment with each cow following calving.

5. The bull should not be permitted to run at large with the herd. Quite apart from disease control, the isolation of a herd bull in a special yard has numerous obvious advantages.

6. Cows should be douched with a solution of 1 oz. of bicarbonate of soda to 1 gallon of water three hours prior to service. This will greatly assist in early conception.

7. Strict care should be taken to prevent the access of strange bulls to the herd and vice versa. The mutual exchange of bulls by neighbours is a distinctly risky practice.

8. In the purchase of new cows an examination for contagious vaginitis should be made and the treatment applied immediately on admission to the herd.

9. Where circumstances permit, it would be a distinct advantage to avoid the use of an old herd bull on young heifers. If a fresh bull from a clean herd is procured for the heifers the chances of early infection will be greatly reduced. This practice might involve paddock difficulties, but would be easily arranged if herd bulls were permanently yarded, as is most desirable. Very satisfactory results would attend the adoption of such a system.

The treatment outlined here may be considered by some farmers to be very troublesome. It will be recognised, however, that the sterility resulting from contagious vaginitis can cause serious economic loss, and as the materials required for this treatment are comparatively inexpensive, the trouble will be well justified if satisfactory results can be obtained. Experience in other States has shown that treatment conscientiously carried out on these lines considerably reduces the losses caused by sterility.

FEED EVERY CALF SEPARATELY.

It is very important that calves should be fed separately. The practice of feeding the whole mob out of tubs or troughs must be condemned strongly, because it allows the fast drinkers to get too much milk at the expense of the others. It also tends to the formation of a bad habit. The young calves drink faster than they should, which causes a variety of digestive troubles. Slow drinkers grow best when they get their full ration of milk.

Proper pens or bails for calf-feeding are well worth the time or money entailed. Too often there is a complete lack of conveniences for this important routine job.

NAVEL INSPECTION.

In newly-born animals, the navel is a prolific source of infection. Under farm conditions, it pays to treat the umbilical cord as soon as possible after birth. First, tie it with a string in a 5 per cent. carbolic solution; then paint the cord and surrounding area with a 5 per cent. iodine solution or dettol.

A CALF-PROOF GATE.

The handy type of gate illustrated is made of round bush timber. The top rail and latch posts are made of forked posts bolted together; the fork on the top makes the gate rigid, acting as a brace; the fork on the latch post is placed at right angles, preventing the gate from sagging and holding it upright when open. The hinge end of the gate is simple. Bore a hole in the top of the post and through the top rail, and insert an iron peg with a big washer on the under side. Taper the gate post at the top to stop friction. The centre rails are hung loosely with wire.

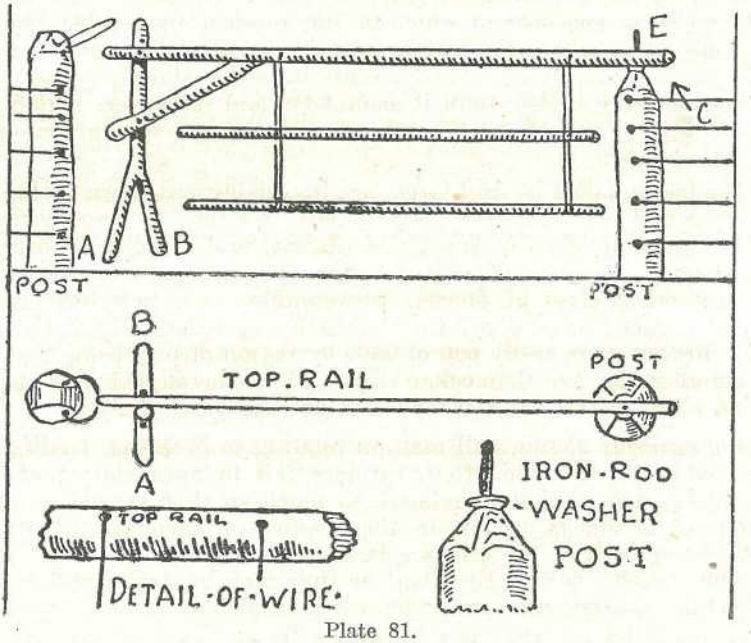


Plate 81.

The top drawing shows the gate in position. The upright latch post of the gate has a fork A B at right angles to the gate. E is the iron rod on top of the hinge post. C indicates the washer. The lower drawing shows a plan of the gate. The bottom left-hand sketch shows the position for boring holes in the top rail for wires near the upper edge of the rail. The bottom right sketch shows the gate post tapered off, the washer and the iron rod.

AN IMPROVED WIRE GATE.

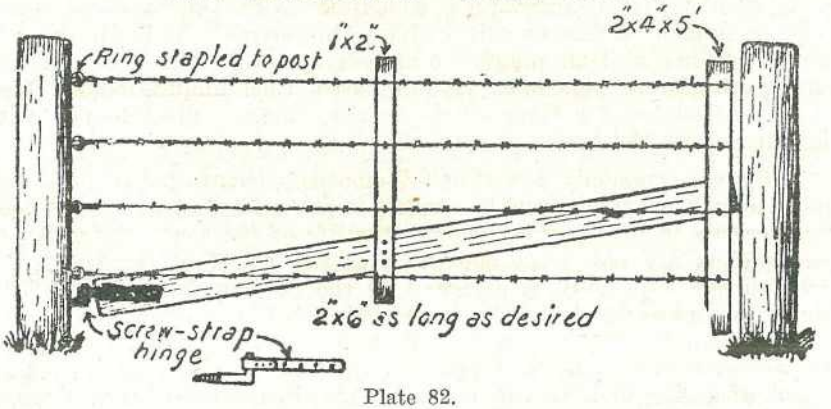


Plate 82.

An improvement on the ordinary "concertina" type of wire gate.

Management of Pigs in Relation to Disease Prevention.

A. L. CLAY, B.V.Sc., Government Veterinary Surgeon.

IT is probably impossible to even estimate the percentage of pigs farrowed in Queensland which do not reach a marketable age. All competent observers, however, appear to be in agreement that the percentage is a high one. At all events it can be stated definitely that it is considerably higher than it should be, and moreover, higher than the pig industry can afford if production is to be pursued at reasonably profitable levels.

The losses, taken by and large, are invariably put down at the door of disease and, whilst this is largely true, it would be more correct to say that they are due *indirectly* to disease, and *directly* to errors in management. Diseases of pigs are, for the most part (more so than with any other class of stock), preventable, and, therefore, can be truthfully stated to be dependent for their existence on faulty management; they are more easily preventable by reason of pigs being marketed at a much earlier age than other classes of stock, coupled with the fact that they are under direct observation at least twice daily.

Management includes all matters relating to breeding, feeding, and accommodation. All too often, farmers fail to appreciate that these three things are intimately related, so much so that excellence in one department is almost useless in the absence of adequate attention to either one or both of the others. It is not sufficient to have a "good" boar and "good" sows. Excellent as they may be, losses will occur if the feeding and/or accommodation are at fault.

Having made up his mind whether he is going to cater for the pork or bacon market, and selected a breed suitable for the purpose (this is outside the scope of this article), the farmer should then devote all his talents to securing and maintaining animals which are vigorous, thrifty, and endowed with good constitutions.

It should be remembered that it is bad practice to buy weaners or store pigs for fattening purposes. It is a questionable practice on economic grounds, but apart from this aspect, disease is often introduced amongst otherwise healthy pigs, sometimes with very serious consequences, as many a farmer can testify to his sorrow. It is far safer to aim at keeping a clean piggery and rearing one's own pigs. If, for some reason, store pigs must be purchased, then unquestionably they should be isolated for three weeks before allowing them to run with pigs already on the farm.

Gilts are commonly served at 6-7 months. This to too early an age and although often no trouble results, it can and does sometimes lead to difficulties in breeding later on in the life of the sow. Deformed or dead piglets are also sometimes seen as the result of service at too early an age, especially be it noted, if the feeding is at fault. Gilts should, as a general rule, not be served before 8-10 months old. Likewise in the case of young boars, only a very few sows should be given until they are over 10 months old. Too early and too frequent service results in lack of desire, or if service is carried out, in unsuccessful matings.

Feeding.

It is not intended in this section to deal so much with what should be fed to pigs, but rather in a general way to discuss feeding methods. On the average farm it is safe to say that the staple food for pigs is skim milk, and further that this is given in troughs made from hollowed out logs. Most farmers sense, without having to be told, that such troughs are not all that they might be. Over and above this, however, they often do not improve matters, countering criticism with the statement that they cannot afford anything better. The answer to this is that they cannot afford to be without a type of trough which represents a vast improvement on a hollowed log.

The hollowed log is a type of trough which is difficult to clean even when new, but with increasing age the presence of numerous cracks and crevices greatly increases the difficulty. Milk and swill soak into the gaps, putrefy and form an excellent medium for the development of germs. Some of these germs can and do produce disease, and as they mix with the milk each time it is poured into the "trough," the objections are obvious. As pigs will, if not prevented, get their feet into troughs, and often deposit dung and urine therein, further objections are raised, as disease producing agents are commonly distributed as a result. Over and above these considerations, if a farmer places a reasonable value on his labour, he will be greatly surprised at the cost of a hollowed-out log.

What is to take the place of a hollowed log? The designs and recommendations are numerous and only broad general principles can be discussed here. Obviously, to approach the ideal, they must be constructed of some impervious material, have no "cracks or crannies," be capable of easy and effective cleansing, and finally be so designed as to prevent pigs getting into them. Concrete is undoubtedly the best material to use, but it must be well made and well finished off (smoothed) and as milk (particularly if sour) has a very destructive action on it, the trough should be treated with silicate of soda in order to resist this action. A bung hole is usually provided at one end, but as these frequently get out of order as the trough ages, it is perhaps better to dispense with them altogether and instead have the ends of the trough curved or "scooped" inside so that food remnants can be easily removed with the aid of a brush or broom. Wrought iron troughs are also excellent but are expensive. Galvanized iron troughs are too light and have but a limited life.

Wooden troughs can be made so as to be fairly satisfactory, provided that machine-sawn hardwood is used and they are well jointed, and tarred thoroughly before use. The best of them is, however, difficult to clean, on account of the absence of rounded ends. All troughs should be swilled out with cold water shortly after skim milk has been consumed by pigs. More milk than the pigs can consume in quick time should never be placed in troughs because any surplus remaining in the troughs quickly becomes sour and unhealthy.

Whatever be the material the troughs are made from, put them on raised platforms projecting 3 feet either side, and have the platform, in turn, mounted on skids made of 6 by 4 inch timber, so that the whole thing can be moved about from time to time. In this way the ground in the immediate vicinity of the trough can always be kept reasonably sweet and clean. An overhead batten made of 4 by 1 inch

timber, and suspended at a height of 8 to 12 inches by means of uprights at either end, will effectively keep pigs out of the trough.

In regard to the handling of skim milk. The usual practice is to run off the milk from the separator into "drums" or vats, which often are not washed out, and are rarely, if ever, properly cleansed. They become coated with a most disagreeable and unhealthy scum, in many instances several inches thick. The milk becomes not only tainted but often is actually putrid. No farmer would think of feeding such milk to calves or to orphan foals or lambs, but for some obscure reason the pig is believed well able to withstand such an outrage on the digestive system. If farmers could only see and appreciate the extent of gastritis and bowel troubles in pigs fed on such material, they would very quickly change their ideas on the subject. There is no objection to sour milk for pigs if it has been allowed to sour under sanitary conditions, but even so, for pigs before and soon after weaning, skim-milk is better if fed fresh. For older pigs, if sour milk is going to be fed, it should be fed always and not interspersed with fresh, otherwise scouring is apt to occur.

If a farmer is not prepared to clean and scald his "drums," vats, buckets, and troughs at regular intervals, digestive disturbances must be expected and there need be no mystery as to why the pigs are not doing as well as they might be.

One other aspect of skim milk feeding can be dealt with here, and that is its value as a feed in relation to disease prevention. Skim milk is an unbalanced feed for pigs when fed alone. It is far too watery (does not contain enough solid matter, excellent though the quality of that may be). The result is that, in an effort to satisfy their appetites, pigs will take in a great deal more liquid than that for which their digestive systems are designed. "Pot bellies" result, and the pigs do not make rapid gains. Feeding skim milk alone is also a wasteful practice and amounts to throwing money away, by reason of the fact that it contains more protein (belonging to the more expensive class of stock foods) than the pig requires. Most farmers would probably be greatly surprised to learn that skim milk, when fed alone to pigs, may only return them as little as one half-penny per gallon, whereas when fed in conjunction with other appropriate foodstuffs, it may return under favourable conditions as much as twopence per gallon.

Apart from the above considerations it is necessary to remember that skim milk is lacking in vitamin A and has but traces of vitamin D. The former is essential for growth, and the latter for bone formation. Vitamin A also has an important bearing on diseases of the respiratory system, e.g., pneumonia, coughs and colds, and probably also worms. Adequate amounts of this vitamin in the food render pigs (in common with other animals), less susceptible to such complaints. In addition, brood sows fed on skim milk alone may fail to come in season, or if they take the boar may not breed.

Vitamin D has a bearing on "stiffness of the hind legs," and in some cases, paralysis of the hindquarters.

Liberal amounts of vitamin A are present in fresh green pasture, so that if pigs are allowed access to such pastures an important step in a campaign for disease prevention will have been taken. If it is not possible to run pigs on pasture, then fresh greenstuff (or lucerne hay) must be cut and given whenever possible, if the health of pigs is to be

safeguarded. Yellow corn (but not white corn), also supplies vitamin A but even when this is being fed, greenstuff is probably still required for best results.

Vitamin D is supplied by the action of the sun's rays on certain substances in the pig's skin. There is ordinarily therefore no need to anticipate a deficiency of this vitamin. In certain parts of Queensland, however (notably the Atherton Tableland), there are periods of the year when very little direct sunlight is in evidence for weeks on end. Under such conditions cod liver oil, which is rich in vitamin D, could with decided advantage be given in the milk, more especially to young pigs before and shortly after weaning.

The idea is doubtless revolutionary to Queensland farmers at large, but is nevertheless well worthy of trial. High-grade cod liver oils can be purchased very reasonably in one-gallon lots, and as the oil is also rich in vitamin A, its inclusion in the ration will have a double advantage.

The feeding of skim milk is also intimately related to tuberculosis in pigs. If some of the cows from which supplies of skim milk are obtained happen to be affected with tuberculosis, then it is quite likely that the germs of this disease will be present in the bulk milk. Pigs drinking this milk will contract the disease and condemnations with consequent loss to the farmer will follow when the pigs are slaughtered for human consumption. One other aspect of tuberculosis in pigs in relation to feeding can be noted here, and that is, if pigs are permitted to run at grass on pastures grazed over by cattle then they will be further exposed to risk of contracting the disease, as tuberculous cattle often pass tubercle germs in their dung. It is young pigs that are most frequently seen on cattle pasture, and, as young pigs as a class are more susceptible than older pigs, the risks of such a practice must be immediately apparent.

Skim milk is comparatively rich in minerals, but owing to the pig's large requirements for these substances the provision of a lick is advisable, especially when only small amounts of milk are available. A reliable lick is made by mixing stock salt (40 parts) and sterilized bone meal (60 parts). Bone meal contains lime and phosphorus, and lack of these is an exciting cause of "rickets" and paralysis. Some cases of "trembling" and "shivering" can also be traced to a lack of lime.

Salt, contrary to popular belief, is advisable for pigs. It is a valuable aid to digestion and assists in the well-being of the body as a whole.

A lick such as the one above is of especial value for brood sows, and, if desired, can be given in the food at the rate of one heaped dessertspoonful daily.

For young pigs the addition of clear lime water to skim milk at the rate of ½ pint to 1 gallon is excellent. It aids digestion, helps to prevent scouring, and ensures healthy and normal bone formation.

Accommodation.

Bad accommodation is often associated with incorrect feeding in causing disease amongst pigs. Under natural conditions pigs graze at will over large areas; they drink and bathe in running streams; and have ample shade when required. Compare this state of affairs with that to which domestic pigs are obliged to conform. Often they are

enclosed in small yards in low-lying situations; there is little or no facility for exercise, and in wet weather the yard may become a quagmire. In addition the dung and urine which is voided daily by the enclosed pigs is allowed to accumulate and, in the course of time, grossly contaminate the ground. Many of the agents which cause disease are present in dung and urine (this applies particularly to parasitic diseases) so that the importance of contaminated ground is obvious. Too often the same yards have been in continuous use for 20-30 years, and under such circumstances there should be no cause to wonder why pigs fail to do well.

The present-day pig has for so long been reared under artificial conditions that he has lost much of his former constitution and vigour, and is now affected adversely by dampness, draughts, excessive heat or cold, and more particularly by sudden changes in temperature (i.e., "changeable weather"). Pigs therefore require carefully-planned shelter if diseases such as pneumonia, catarrh, rheumatism, and paralysis are to be avoided.

In regard to the general layout of piggeries there is not the slightest doubt that, while farmers continue to hold the view that they cannot afford the time and labour necessary to keep semi-intensive piggeries in a sanitary condition, the only solution is to give over much larger areas to the raising of pigs than is the general custom at the present time. The grazing or "paddock" system represents a partial return to native conditions and has many points in its favour from a hygienic point of view. There is not the same tendency for dung and urine to contaminate the ground as is the case with the semi-intensive system, so that the pigs enjoy comparative freedom from parasites, and, in addition, benefit greatly from the continuous supply of green feed. A sufficiency of exercise (particularly important with dry sows if farrowing troubles are to be avoided) is also provided. It is, however, essential to have paddocks of sufficient area to keep them always well grassed, and to enable a paddock to be "rested" from time to time (i.e., to adopt rotational grazing). The number of pigs which can be run to the acre and allow of these considerations being fulfilled can only be determined by experience in different localities. Wherever possible the use of cultivated crops, in addition to grass pasture, should be seriously considered.

The equipment used in the paddock system should be movable. This can be effected by mounting the troughs and sheds on skids; they can then be moved about from time to time, the ground in their immediate vicinity being in this way prevented from becoming bare and contaminated.

Where it is not possible to run pigs on the paddock system and they are perforce confined to small yards, increased attention and labour is necessary if the yards are to be kept in a sanitary condition. There should be a sufficient number of yards to enable at least one to be kept empty at all times. Under this system, when a yard becomes bare and foul from constant use it can be ploughed or dug up, limed (with advantage), and a suitable crop sown. This has the two-fold effect of purifying the soil and providing good food.

A common fault with piggeries of the semi-intensive type is to have them in level or lowlying situations. In most of these instances the farmer has obviously allowed closeness to the dairy to be the prime consideration in selecting the site.*

* 150 feet is the shortest distance allowed by law between a dairy and a piggery.

Admittedly with piggeries of this type, proximity to the separator-room is an important consideration, but it should not be allowed to outweigh the necessity for a site which will give good drainage and thus eliminate the risk of disease from mudholes and quagmires. This does not mean that a piggery should be built on the top of a hill (the pigs would be exposed to every wind that blows), but rather on sloping or rising ground. The slope of the selected site should face in the opposite direction to that from which come the prevailing winds—e.g., on the Atherton Tableland all the "weather" comes from the south-east, so that there it would be a distinct advantage to be on a slope having a north-easterly aspect.

The sheds used for accommodating pigs should have an open front facing north-east. This allows the morning sun to penetrate inside the shed, and, as sunlight is an efficient disinfectant, a very good purpose will thus be effected. Floors should be impervious to moisture. Rarely is this the case on the average farm. Earth floors are commonly used but have many serious disadvantages. They cannot be kept level, and develop hollows which serve as receptacles for moisture and filth. They are often cold and nearly always damp. Added to this, they are impossible to clean and disinfect. In short, they are not conducive to the success of any campaign for the prevention of disease.

Concrete makes the most sanitary floor, but as it is cold and hard necessitates a wooden sleeping platform. Wooden slabs laid on the ground are but little better than earth floors.

A floor made of machine-sawn hardwood is, however, quite satisfactory, provided it is well jointed and tarred.

Walls of sheds must be draught-proof and allowance must be made for abundance of fresh air by leaving a ventilation space all round under the roofing.

Too often the oldest timber about the farm is used in the construction of pig houses. This is false economy. Such timber provides harbour for parasites and disease-producing agents, and brings about damp, draughty conditions inside the house.

No matter what the type of house, if it is a fixture pigs will, in the course of time, scoop out the earth on the shady side, usually the south-east side, this by reason of the fact that they lie there during the heat of the day in order to have the benefit of the breeze in addition to shade. Inside the house they get shade but no breeze. It is advisable in such circumstances to place a low wooden platform on the ground in the situation concerned, otherwise a quagmire will result in wet weather, and as this would be right alongside the house, it is particularly undesirable. Shade trees and shrubs are desirable under summer conditions in Queensland, but they should only be allowed on high ground. Adequate shade will do much to eliminate cases of heat stroke and apoplexy. The ordinary galvanized iron roof makes sheds too hot for pigs in the summer, and if additional shade is provided the comfort of the pigs will be much enhanced and a healthier and more thrifty animal result.

If the floor of a pig shed is a raised one (and if made of hardwood, it should be), another common fault is to find pigs camped under the house. This again is a most undesirable practice, as the ground under

the floor does not get any sunlight and thus is apt to become a hotbed of disease. This is particularly likely to happen where the floor is not impervious and moisture and filth drop through. The space under the floor should be effectively boarded up if risk of disease from this source is to be obviated.

Wallows, unless properly constructed of concrete, should not be tolerated. The ordinary mud wallow is a receptacle for filth and infection, and as such is a continuous source of danger to the health of pigs.

A very valuable addition to any piggery is a quarantine or isolation pen. The importance of isolating sick pigs at the earliest possible stage of an outbreak (or suspected outbreak) of infectious or contagious disease cannot be over-emphasised.

Too often a farmer fully appreciates the necessity for the isolation of sick pigs, but having no quarantine pen or "hospital" is forced to just put them "over the fence." Under such circumstances the sick pigs promptly take up a position alongside the fence separating them from their former abode and the risk of further pigs becoming infected is but little reduced.

If sick pigs are allowed to run with healthy pigs the disease, if "catching," will continue to attack fresh pigs until all the susceptible pigs in the yard are affected. On the other hand, if sick pigs are promptly removed and isolated some distance away from the main piggery, then the spread of disease will obviously be checked (by reason of the removal of a source of infection) and losses considerably reduced.

Another advantage of an isolation pen is that pigs which have become lame, either through injury or some minor disease process, can be put aside and afforded the chance of recovering without interference by their fellows.

It is perhaps hardly necessary to mention that the isolation pen should be thoroughly cleansed and limed after each period of tenancy, otherwise disease germs will tend to linger and infect future "patients."

Measures for Prevention of Parasitic Diseases.

Diseases due to parasites are responsible for such a large proportion of the total losses from disease of all kinds that they warrant some special observations, even in an article of such a general nature as this.

Reference has already been made to the fact that worm infestation arises as the result of the contamination of yards and feed troughs by dung and urine from infested pigs. It is well known by farmers that worms cause pigs to be unthrifty and slow in growth, and further that worms may be present in one or more of the following situations in the body, viz., stomach, bowels, lungs, and kidneys. It is also generally appreciated that young pigs may die if treatment is not undertaken. Just by what means pigs become worm infested is not however nearly so well understood. The position can be stated very briefly as follows:—

Male and female worms are present in an infested pig. The male fertilizes the female and the latter then lays eggs which are passed out in the dung of the pig (in the case of the kidney worm, in the urine).

The eggs are naturally very small and can only be seen with the aid of a microscope. What they lack in size, however, they make up in numbers. The female large round worm of pigs (found in the small intestine or first portion of the bowel) is said to lay as many as 27,000,000 eggs during its lifetime.

Pigs can only become infested with worms by swallowing worm eggs. Knowing this and knowing, further, that eggs are present in the dung and urine of infested pigs in enormous numbers, it must be obvious that so long as pigs are confined in small yards they will almost certainly become infested in some degree unless a very high standard of sanitation is maintained. Hence the necessity for regular collection and removal of dung, a drainage system that keeps the yards and sties as dry as possible, and the prevention of soiling of food and drinking water.

If freedom from worms is to be attained, it seems inevitable, under Queensland conditions, that at least so far as the average farmer is concerned, the semi-intensive system of raising pigs must give way to the paddock system.

Of the external parasites, lice are the commonest and are extremely prevalent throughout the State. Though farmers are generally quite conversant with measures to control them, the ill-effects arising from lice infestation are not fully realised and it is emphasised that the presence of lice is opposed to the production of thrifty and quick-growing pigs. They cause constant skin irritation and often, owing to scratching and rubbing, the skin becomes raw and may become infected. The ill-effects then become obvious, but it is the reduced rate of growth, due to continued irritation before the skin becomes raw and bleeding, that must be kept in mind.

Conclusions.

It seems to be a tradition amongst many farmers that pigs can be successfully raised amongst dirt and filth on any food that is offering no matter how sour or unbalanced it may be. Such an attitude is difficult to understand. It is certainly not correct and to the farmer who claims to get good results in such circumstances all that can be said is that the day will come when he will experience serious mortalities. Over and above this it can be stated with certainty that with improved management he would market a very much higher percentage of pigs born on the farm and at much better profit to himself. The average farmer would almost certainly be greatly surprised were he to keep accurate records of pigs born on the farm and pigs marketed as porkers or baconers. In some cases the latter would be barely 50 per cent.

Given a fraction of the attention and forethought accorded to the rearing of calves, foals, or lambs, the pig would more than hold his own. As it is, losses in the pig industry from disease are high. That this state of affairs is consequent upon mismanagement and not due to natural difficulties in the rearing of pigs, all farmers can easily prove for themselves.

It can be done, simply by affording the pig a greater share of consideration in the activities of the farm, as a whole, than it has hitherto enjoyed.

Setaria (Panicum).

F. B. COLEMAN, Officer in Charge, Seeds, Fertilizers, Veterinary Medicines, Pest Destroyers, and Stock Foods Investigation Branch.

THE confusion that exists with both buyers and sellers of foxtail millet, because of the use of various names, most of which are not applied correctly, is unfortunate. The most common name used is "panicum"; this would seem to solve the matter easily, but for the fact that, botanically, this plant is a setaria, and belongs to the foxtail millet group, being so named from the appearance of the seed-heads.

The pre-war name—Hungarian millet—and the United States of America post-war name—Liberty millet—are often used.

German and Manchurian millets are yellow-grained setaria with different shaped seed-heads. Kursk millet, another variety, has red seeds, while brown-seeded forms are sometimes met with, in addition to which there are several wild forms with seeds of varying size, mostly yellow to green in colour.

The feeder of birds invariably asks for "panicum," and is not concerned as to the parent plant, but as to the seed being sound, clean, and free from musty smell.

From a series of experiments with samples of setaria from all over the State, it has been found possible to divide the foxtail millets grown in Queensland into—

(1) Early seeders of dwarf growth—Dwarf setaria (Hungarian millet).

(2) Late seeders of tall growth—Giant setaria (giant panicum).

Whether or not the plant is giant or dwarf setaria can best be determined by an examination of the plants when just over 3 inches in height. Dwarf setaria will be found to bear a profusion of hairs on the lower leaf sheath (Plate 83; figs. 1 and 1a).

Giant setaria has a freedom from such hairs (Plate 84; figs. 1 and 1a.) The hairs found on and near the ligule of dwarf setaria will also be found to be by far the longer; further, dwarf setaria is of a darker green than giant setaria.

It has been found that the presence or absence of the hairs is best observed when the roots are pointing away from the examiner.

Growing these two kinds of setaria side by side under various conditions of weather and soil, it will be found that there is always approximately two weeks difference in maturity.

The conditions of growth affect the appearance of the resultant crop so much that the tallest of the dwarf varieties, under favourable conditions, would equal the height and appearance of the shortest of the giant varieties under dry conditions. Also, the size of the seed-head would be similarly affected.

All forms of foxtail millet are quick growers, and it must not be overlooked that the highest feeding value is obtained from the leaf in its young stages, and not from stalks or stems. With the dwarf, irrespective of the weather conditions, the plants always have the

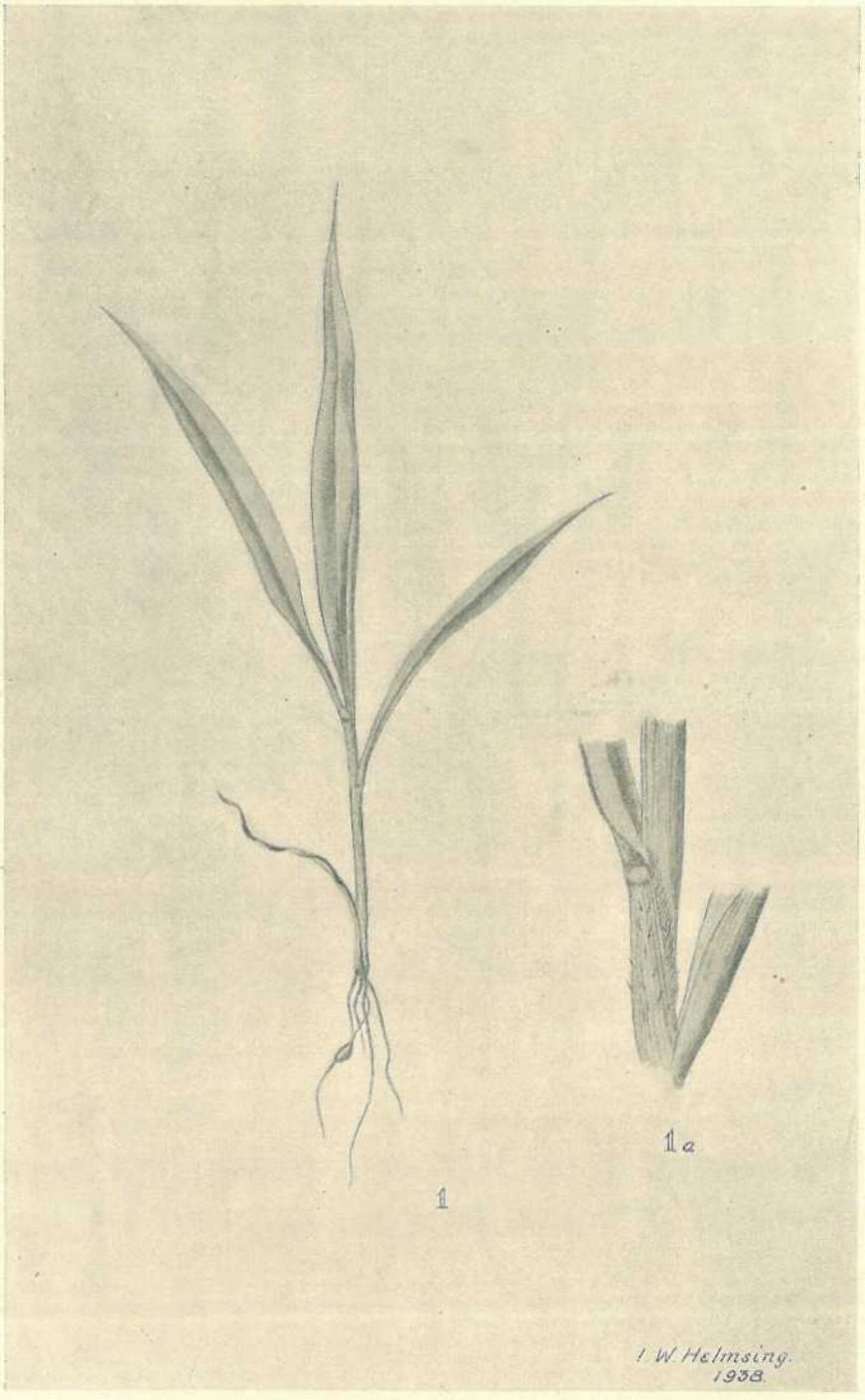


Plate 83.

DWARF SETARIA (Hungarian Millet).—Fig. 1: Seedling. Fig. 1a: Lower leaf sheath showing profusion of hairs.

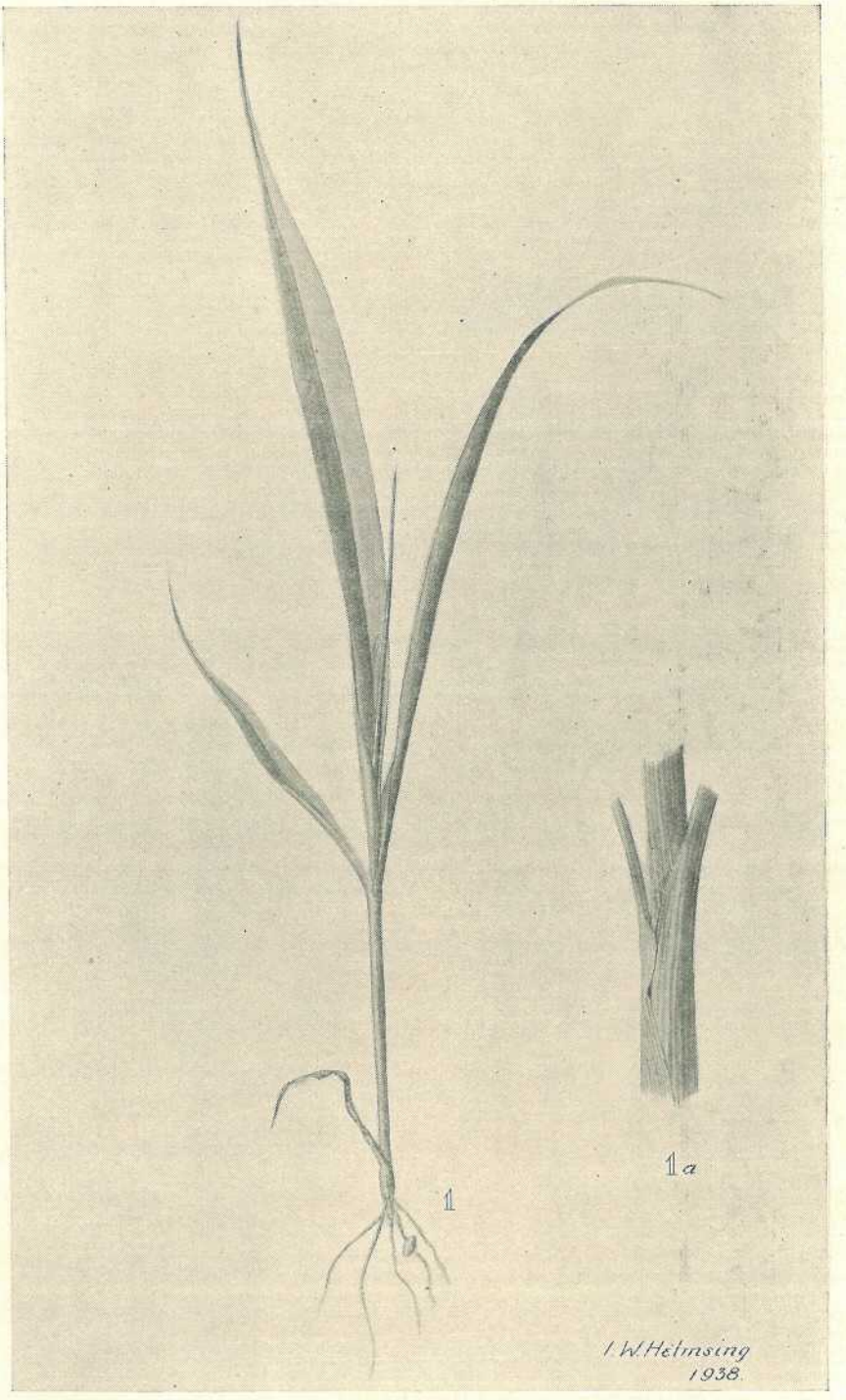
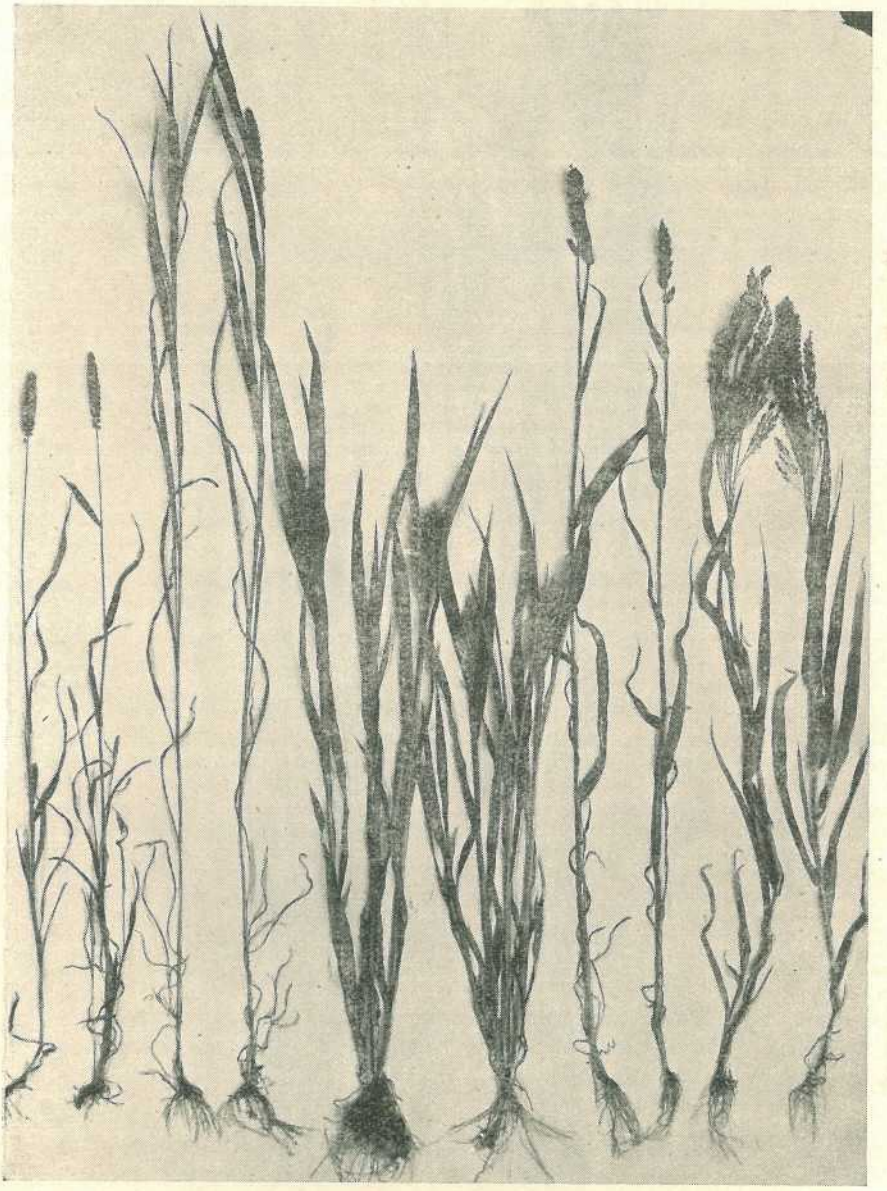


Plate 84.

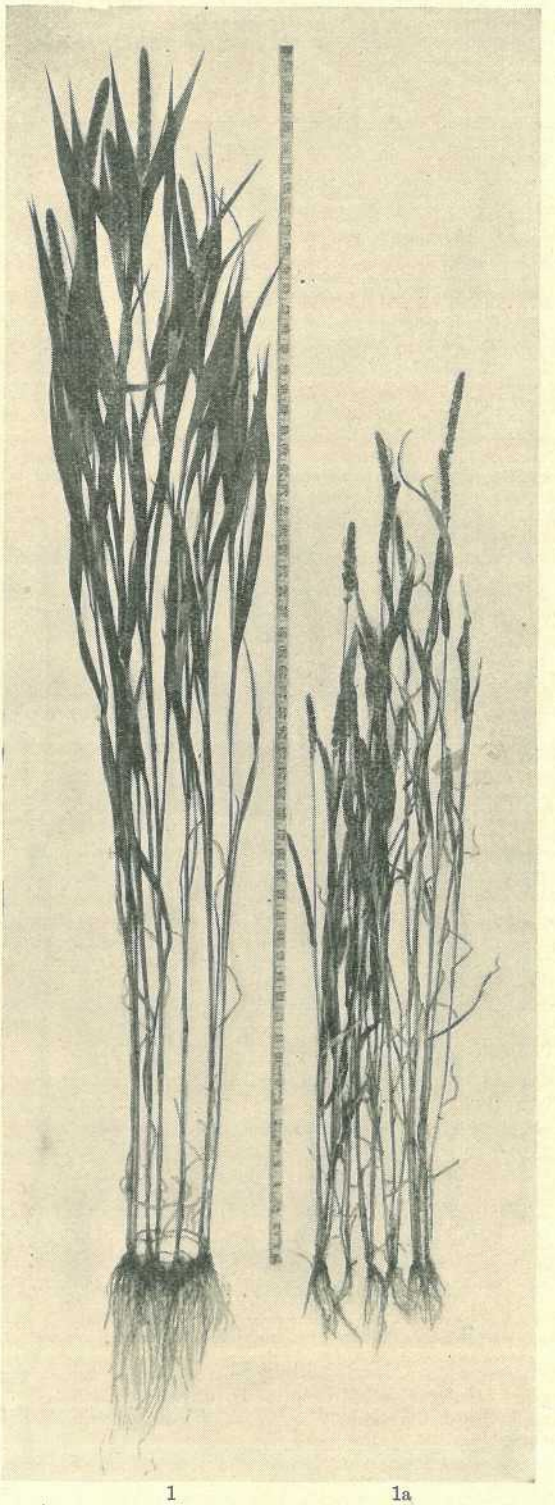
GIANT SETARIA (Giant Panicum).—Fig. 1: Seedling. Fig. 1a: Lower leaf sheath showing meagre distribution of hairs.



A. B. C. D. E.

Plate 85.

A. Dwarf Setaria (Hungarian Millet).
B. Giant Setaria (Giant Panicum).
C. White Panicum.
D. Japanese Millet.
E. White French Millet.



1 1a

Plate 86.
Giant Setaria (Giant Panicum).
Dwarf Setaria (Hungarian Millet).

tendency to rush into seed-head. If the farmer desires to grow setaria seed for sale as bird feed, his preference should be for the giant setaria, which produces a far heavier yield of seed. Repeated trials have demonstrated that the yields of the dwarf and giant varieties are in the ratio of 11 to 17.

Apart from the heavier seed yield of the giant, it should be recognised that this variety is of better feeding value than the dwarf—another instance of the nutritive value of leaves, not stems.

Some people have expressed their ability to determine by the size and shape of the seed the identity of any sample. Experience extending over a large number of samples indicates that this method is far from perfect, and therefore one should use the longer method as indicated above.

A comparison of the different millets grown in Queensland is indicated in Plate No. 85—from a photograph taken seven weeks after sowing of the seed.

The dwarf setaria (Hungarian millet), Japanese millet, and white French millet have reached maturity, while the giant setaria (giant panicum) and white panicum took two and a-half weeks and more to attain the same stage of development.

GOOD SEEDS.

Although nearly everyone will agree that better seeds mean better crops, it must not be overlooked that better cultivation means better seeds.

Seeds to be good must have a high germinating capacity, be true to variety name, and free from weed seeds, inert matter, and disease or insect infestation. No matter how careful the grower may be, all crops will contain some plants other than those which it is intended to produce. A cleaning machine should, therefore, be used before the seed is offered for sale. In Queensland, as in every other part of the world, the most critical buyers will be found among the merchants with efficient cleaning machinery.

A modern seed-cleaning plant can make good samples of uncleaned seeds better, but it cannot make bad samples good. With a full knowledge of their machinery possibilities, most merchants are willing to buy on a clean seed basis. They are not, however, inclined to purchase poor samples, and the usual market for seeds of indifferent quality is with dealers who have little appreciation of impurities. The actual seed user who insists on buying his supply on a price rather than on a quality basis encourages the vendors of goods of inferior quality. Unfortunately, seeds of indifferent quality usually carry a large profit to the seller.

Good seeds cost money to produce and money to clean, and the general improvement of farm seeds rests largely with the farmers themselves. When practically every farmer insists on a high-grade product the demand for poor-quality seeds will cease. Only the best-quality seeds are worth buying.

—*F. B. Coleman.*

Banana Growing in Queensland.

H. J. FREEMAN, Senior Instructor in Fruit Culture, and Chief Inspector of the Banana Industry Protection Board.

[*Continued from page* 125, *February*, 1938.]

CULTIVATION.

GENERALLY, the rough nature of most banana plantations in Queensland precludes the use of horse-drawn implements, and cultivation and weed control has to be done by hand with a hoe. In rich, deep, and friable soils little else is required, the suppression of weed growth being the chief object. In this class of country, five hoeings or chippings in the first year are usually necessary, while in the second year four should be sufficient. After the second year chipping becomes much lighter, provided the weed growth has not been allowed to seed. The estimated cost of chipping a plantation for the first and second years at, say, £3 an acre for each chipping is from £27 to £30 an acre.

Where the land is of a tighter nature, simply scraping the surface, which is all a chipping hoe does, is not sufficient. This class of country —embracing the light-coloured soils of the pine scrubs, some lantana country, and all hardwood forest soils—needs digging at least once a year, breaking up the soil to a depth of 6 inches or more. This controls erosion, conserves moisture, and in every way enables the plants to make better growth. Provided the land is not too stony, no better tool could be used for this work than a four-pronged hoe. In the trade these are called vine hoes and are sold with the prongs about 10 inches long, but it pays to have them cut back to 8 inches and to use a shorter handle than in an ordinary chipping hoe. There is something of an art in using the vine hoe properly. It should be driven into the soil almost to the eye, the handle canted slightly, and then pulled towards the operator. This action turns the sod completely over, burying all weed growth, trash, &c., in a way similar to the mouldboard or disc of a plough. A loose and roughened soil surface will result—an advantage providing ample aeration, preventing erosion, and satisfactorily covering all vegetative matter so necessary in building up the humus content. Where the land is too stony for using this tool, a long-bladed mattock is recommended.

For dealing with the weeds during the rest of the year, the usual chipping hoe (sizes 4 inches wide in stony country and 7 inches wide in land carrying few or no "floaters") will be found quite satisfactory.

Many growers favour the use of poison sprays for weed control, and experience has shown that arsenic-pentoxide used at the rate of 1 lb. to 4 gallons of water plus 2 oz. of phenyle (as a spreader) will give satisfaction, provided the growth consists more or less of a soft weed type, and that spraying is used only as a temporary measure of control. Spraying is recommended only (1) where abundance of water is readily available, as approximately 80 gallons of spray are required to the acre; (2) where it is necessary to immediately prevent weeds from seeding (a man accustomed to this work can spray an acre a day with reasonable ease); and (3) where a crop of young weeds appears

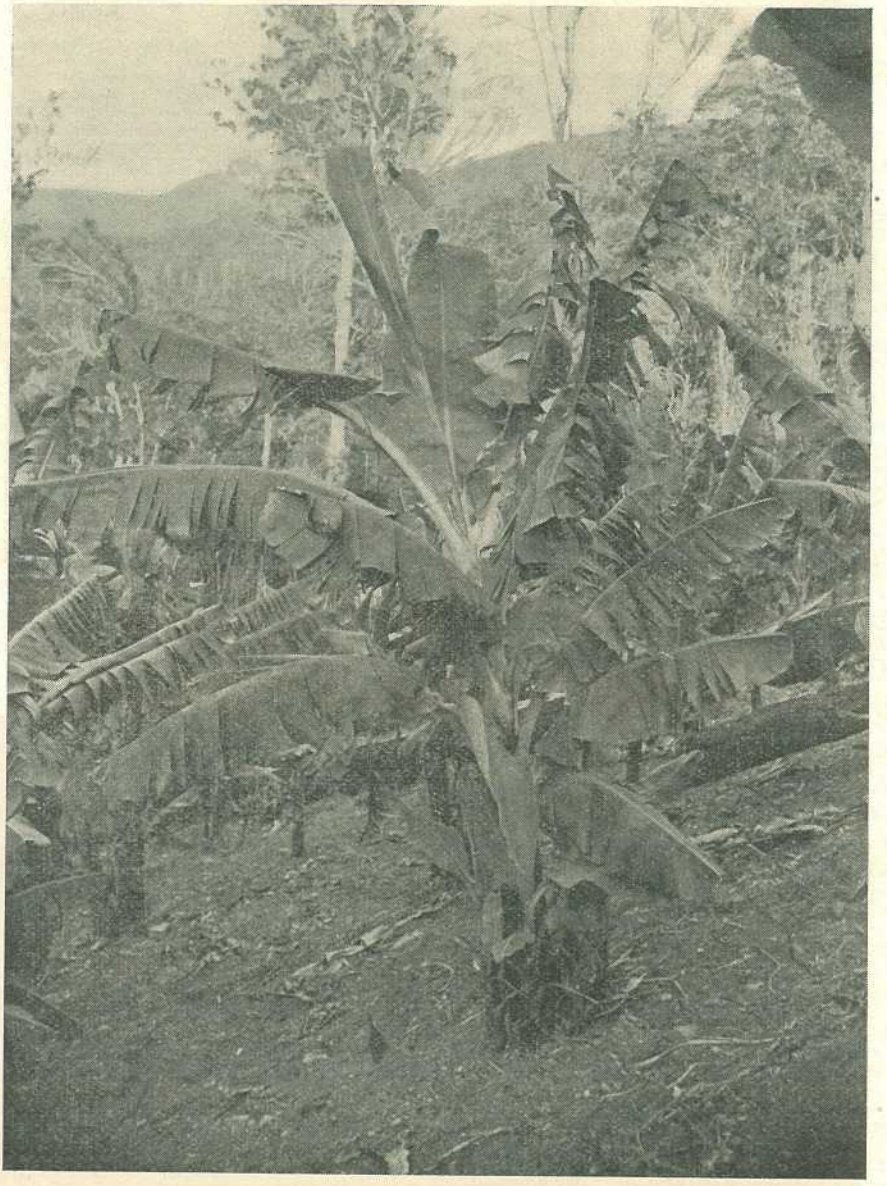


Plate 87.

A properly cultivated twelve-months-old Vie Mama plantation at Upper Mudgeeraba. Only hand cultivation is possible in this class of country.

Plate 88.
Sugar bananas, Bundaberg district. One of the few plantations in Queensland where horse cultivation is practicable.

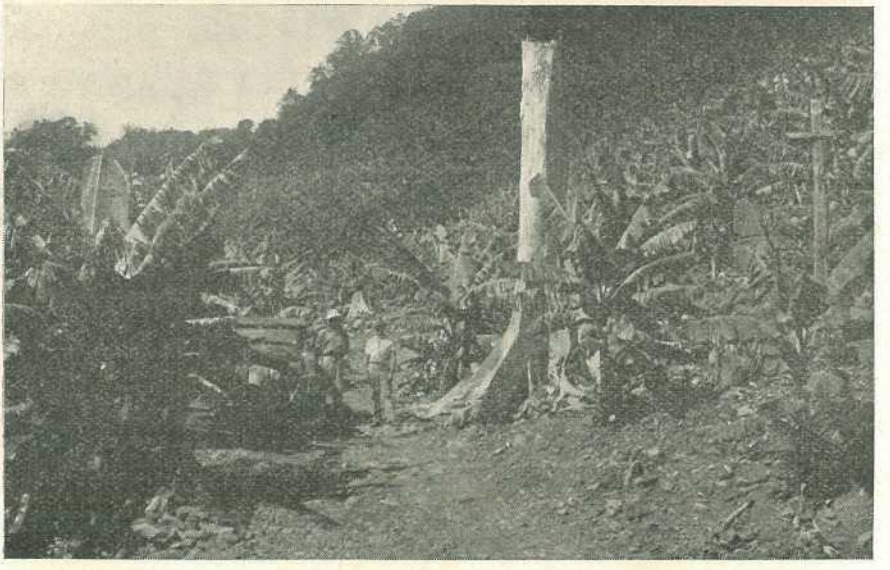


Plate 89.
Typical of most banana plantations in Queensland. Cultivating all done by hand. Note stony nature of the surface of the ground, which is in no way detrimental.

within a few weeks of *the first spraying,* and where, by destroying this growth, practically all the viable weed seed in the plantation becomes exhausted.

Two sprayings applied at intervals of approximately one month should be followed by a good chipping, for even though the soil may be rich in quality, some cultivation, if only 2 or 3 inches deep, is necessary.

Points to be remembered are:—The chipping hoe must always be kept sharp. Do not chip from plant to plant across the hill when working up between the rows. This has the very detrimental effect of dragging the soil away from beneath the stools, thus baring the roots and weakening the stools on the lower side. It is far better to make the row of plants the centre of the row that is being chipped, thus naturally allowing the soil to be drawn in under the lower side of the stool, as against building up the centre of the rows, which is the case when one chips a strip from plant to plant. By this method much work is saved in later years through avoiding the necessity of building up the downhill side of a row of plants in a hillside plantation.

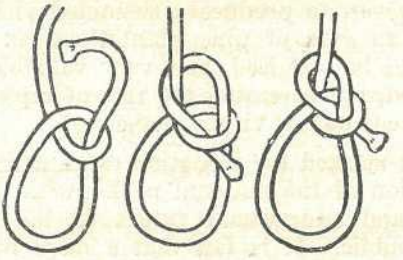
Banana chippers should always carry a sheath knife. Chip the row of plants first, and on the return journey—i.e., from the top of the row just finished down to the commencement of the next row—remove the trash from the plants just chipped, thus completing the job of cleaning up the plantation in one act.

Some growers use home-made bush hoe-handles, but when the time spent in shaping a young sapling into something like a presentable and usable handle is considered, the effort is scarcely worth while. Machine-turned hoe-handles can be bought for about 1s. 3d. each. Seven-inch all-steel chipping hoes are worth 3s. 4d. each, while 4-inch hoes are slightly cheaper. A forked vine hoe as recommended is a necessity on almost every banana plantation, and is worth 5s. 3d.

[TO BE CONTINUED.]

A KNOT TO KNOW.

"Enquirer" (Moggill).—This is how the bowline knot is made:—



I. II. III.

Plate 90.

The bowline, used when a loop is necessary at the end of a rope, is made by forming a loop in an anti-clockwise direction by placing the end of the rope over the standing part. Pass the end up through the loop formed (Fig. I.) under and around the standing part on a clockwise direction and take through the loop (Fig. II.). To tighten, hold the end of the rope and one side of the newly-formed loop and pull the standing part.

Forestry in Queensland.

LAST year was a record one in Queensland forestry. The total log cut from Crown lands, nearly 162,000,000 superficial feet, the largest annual cut yet recorded, exceeded the best previous figure (in 1935-36) by over 13,000,000 superficial feet, and represented approximately 63 per cent. of the total log cut of the State.

Because of the increasing demand for Crown supplies, it has been found necessary to increase the road construction programme, not only to make further timber stands available, but also to speed up the rate of delivery by mechanical haulage.

It has been found possible to concentrate still further on the urgent work of the improvement, protection, and regeneration of natural hardwood and cypress pine areas. The main feature of the year's work has been the great improvement in the forest fire protection system, some 600,000 acres now being within the fireline system. Some 932 miles of new firebreaks were prepared, a further 950 miles maintained, whilst 110 miles of telephone were constructed, and twenty fire lookouts are now in operation. Despite an exceptionally bad fire season last year, a surprisingly small portion of the protected area was burned over, and it is expected that even better results will be achieved in future.

The improvement and regeneration treatment covered 41,700 acres of forest not previously under management, making 110,750 acres so treated for the past three years, an area in excess of the total of the previous ten years' operations.

Despite the very dry conditions, excellent establishment figures were recorded in the plantation operations.

Good progress has been made during the past three years, during which period over 35 per cent. of the present planted area of 17,000 acres has been established.

The more sympathetic consideration accorded to reforestation work during the last five years must be acknowledged.

In order, however, to produce a sustained yield equal to the pine cut of last year, an area of pine plantations six or seven times the present area would be required, and very valuable reproductive work could be performed, by increasing the rate of replanting the hoop pine lands as they are cut out of virgin timber.

The past year marked the initiation of an active policy of development and protection of the national parks, with the object of making the recreational and educational values of the parks more readily available to the public. It is felt that a more intensive development of our parks would not only enable our people to enjoy these areas more fully, but would also materially assist our expanding tourist industry.

The full story of recent forestry development in the State is contained in the annual report of the Director of Forests, Mr. V. Grenning, through whose courtesy we are able to reproduce a series of pictures which illustrate to some extent the wealth of the timber lands of Queensland.

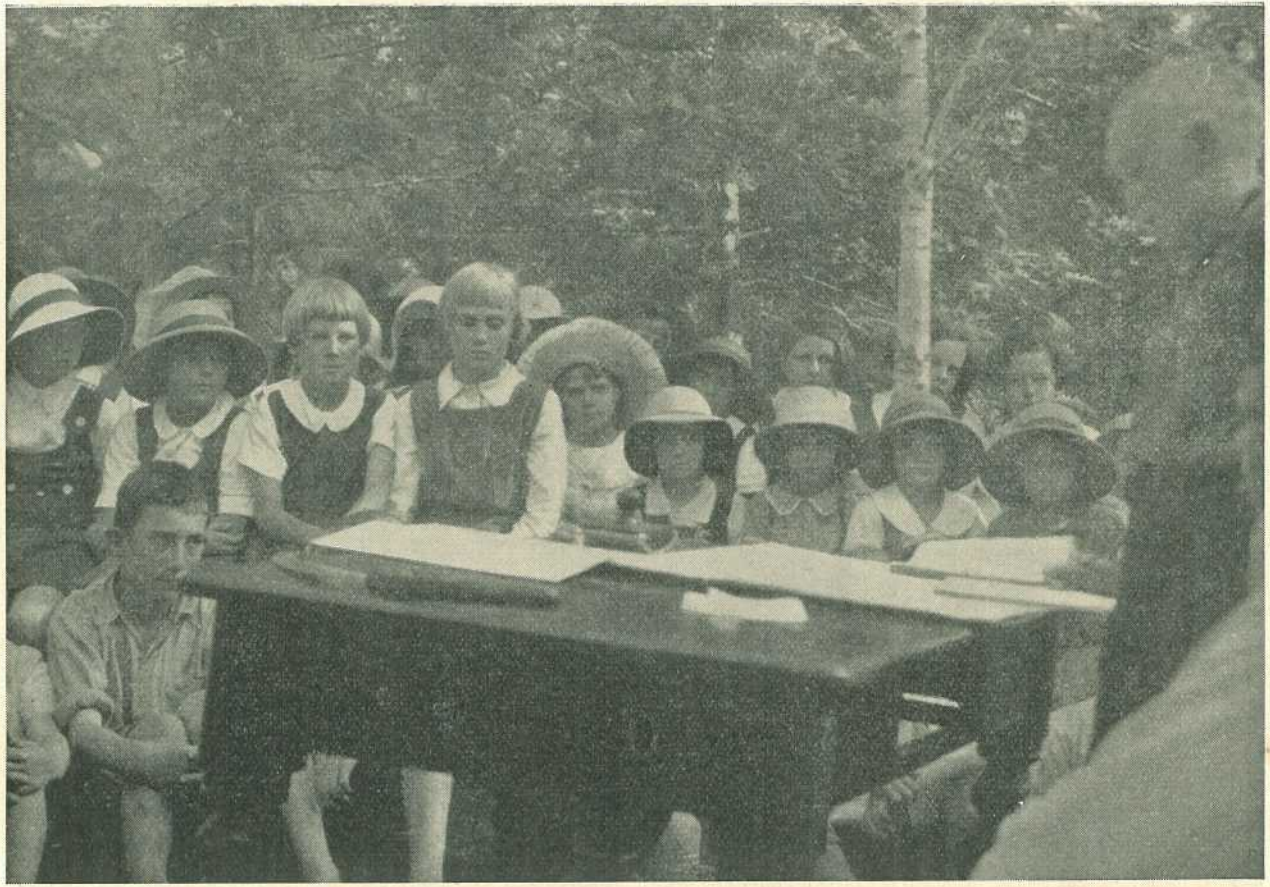


Plate 91. [*Photo. Education Dept.*

THE YOUNG PRESIDENT OF A FORESTRY CLUB ADDRESSING CHILDREN IN A SCHOOL FOREST PLOT.—During the year trees were supplied for fifteen new school plots. Seventy-four plots have now been established.

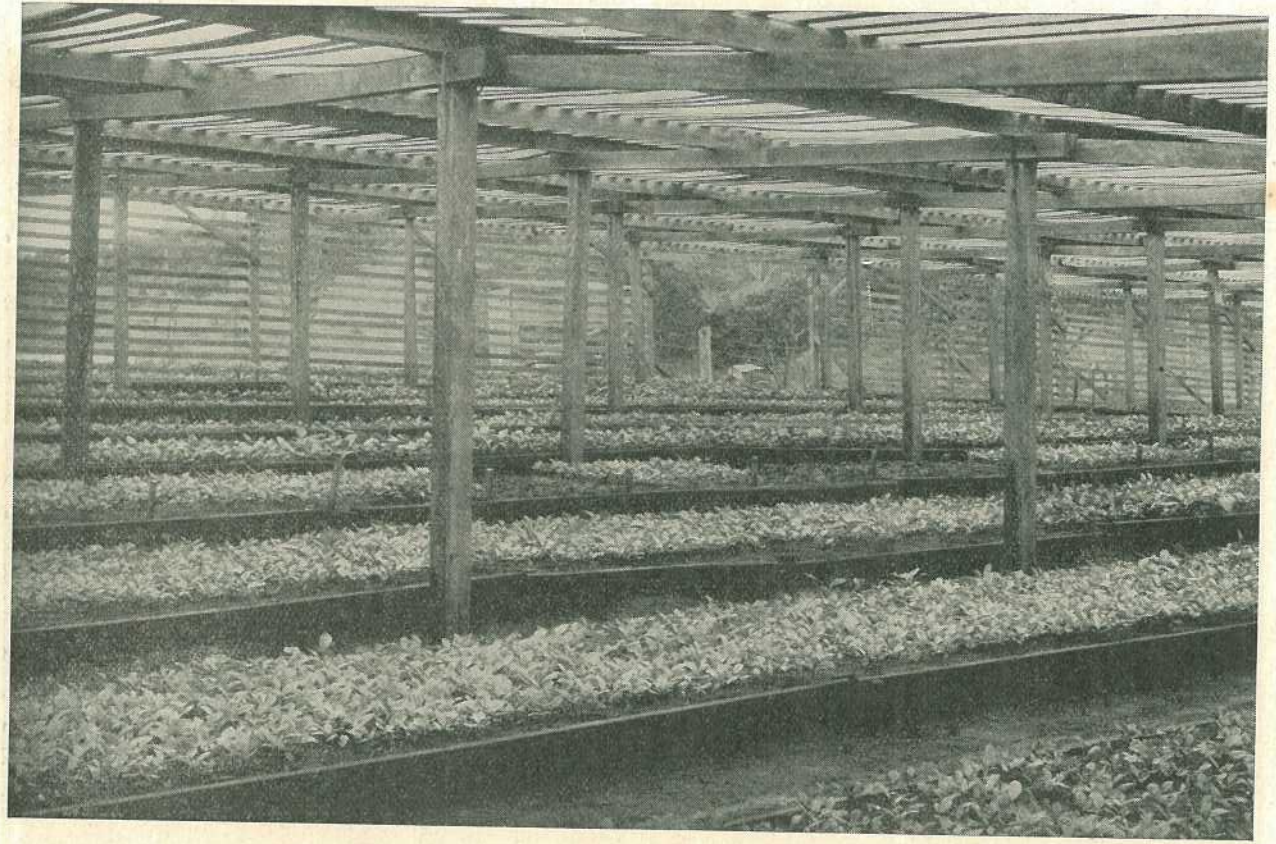


Plate 92. [*Photo. J. A. Lunn.*

QUEENSLAND MAPLE SEEDLINGS IN FOREST NURSERY.—1,300,000 trees were set out in plantations and 4,600,000 trees remained in nurseries at the end of June.

Plate 93. [*Photo. J. A. Lunn.*

Road to Kirrama State Forest under Construction.—The sum of £85,774 was expended during the year on Forestry Access Roads.

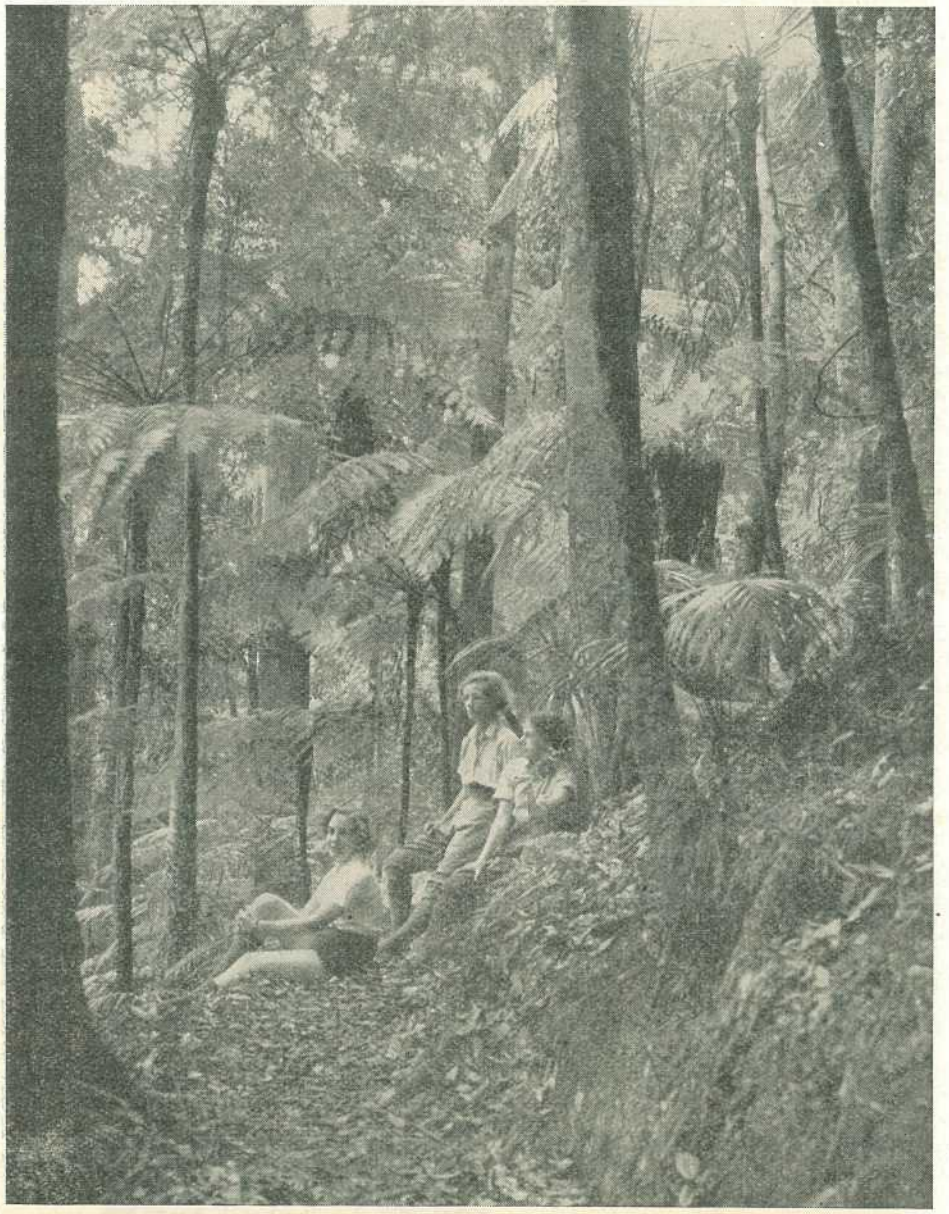


Plate 94. [*Photo. G. S. R. Gentry.*

GRADED WALKING TRACK, LAMINGTON NATIONAL PARK.—The past year marked the initiation of developmental work in national parks in Queensland.

Plate 95. [*Photo. S. G. Jennings.*

A Stand of Narrow Leaf Ironbark after Thinning.

Plate 96. [*Photo. J. A. Lunn.*

TREATED POLE STAND OF WESTERN CYPRESS PINE.—During 1936-37, 52,305 acres of natural hardwood and cypress pine forest were subjected to an improvement thinning and regeneration treatment.

Plate 97. [*Photo. J. A. Lunn.*

FIRELINE AND ACCESS TRACK IN A CYPRESS PINE FOREST.—932 miles of firelines were constructed and 951 miles maintained during the year.

Plate 98. [*Photo. S. G. Jennings.*

FIRE LOOKOUT.—Six Lookout Stations were established during the past year.

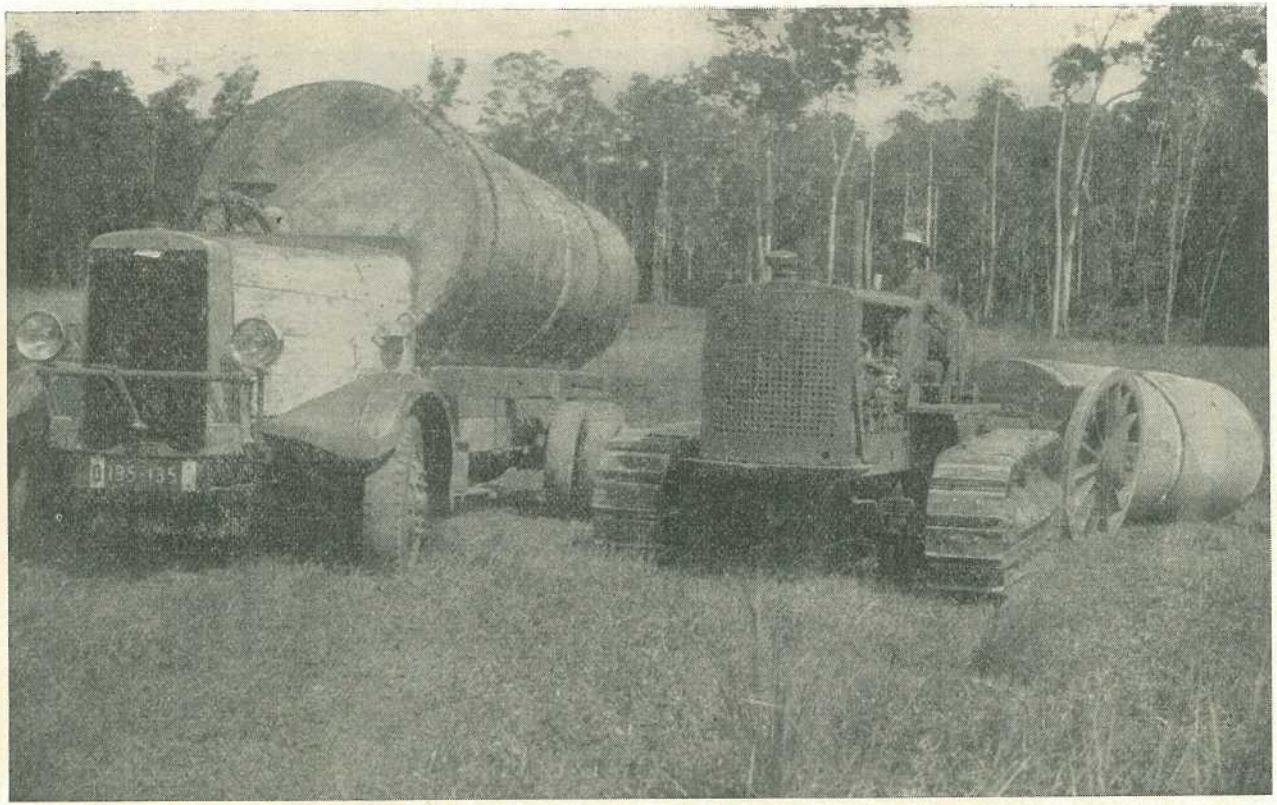


Plate 99. [*Photo. by J. Reis, Yungaburra.*

LOGGING KAURI PINE IN NORTH QUEENSLAND.—The record quantity of 161,900,000 superficial feet of logs was cut from Crown lands during the year.

Plate 100. [*Photo. J. A. Lunn.*

KAURI PINE LOGS AT A NORTH QUEENSLAND PLYWOOD MILL.—For 1936-37 season, 630 mills cut 260,000,000 superficial feet of logs.

A Good Type of Haystack.

LLOYD HODGE, Manager, Cotton Research Station, Biloela.

SECURE stacking of hay and its protection from the weather are matters of great importance in fodder conservation. In Queensland protection cannot be guaranteed by an ordinary straw thatch. A roof of galvanized iron, although initially more expensive, gives perfect security against the heaviest of rains, and is, all things considered, recommended as the most suitable material for the purpose.

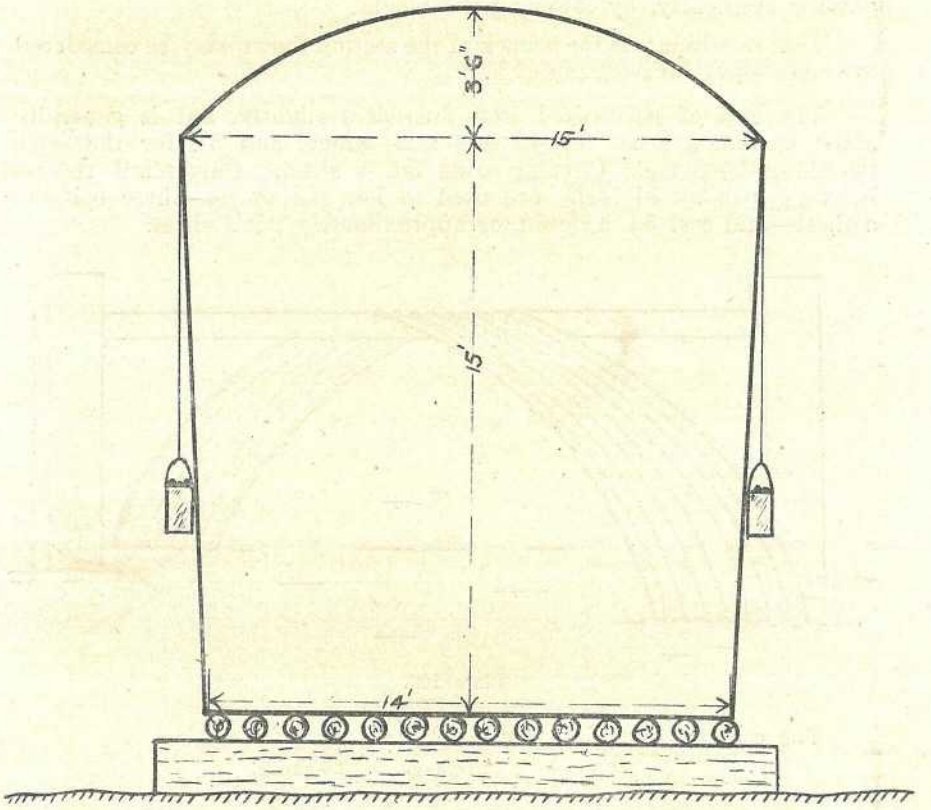


Plate 101.

Galvanized iron, curved to various degrees, and tried in several lengths, was brought into use at the Queensland Agricultural High School and College, near Gatton, some years ago, and was proved to be practical and convenient for roofing haystacks.

The Cotton Research Station at Biloela, after several trials, finally adopted a standard which has given very satisfactory results. This stack is shown in section in Plate 101. The floor is made of 12-inch diameter hardwood logs, laid crosswise at 5 feet apart; upon these, hardwood sapling poles at an average of 6 inches apart are placed lengthwise. The stack is roofed with curved, 24-gauge corrugated

galvanized iron. The curve is formed by bolting two 10-foot sheets, each machine-curved to a 12-inch spring, together end on end. This forms an arch with a span of approximately 15 feet, with a height of 3 feet 6 inches.

Capacity and Cost.

On the design shown in Plate 101, an estimate of 1 ton of hay to each foot in length will be found to be accurate enough for practical purposes, but because of fire risk it is not recommended to build single stacks of over 60 tons.

The same type of roof may be used to cover small cuts of hay quite conveniently, by lowering the height.

Iron requirements for a stack of the section shown may be considered to be one sheet for each ton of hay.

The cost of galvanized iron fluctuates slightly, but is generally about 6s. 6d. a sheet for 10 feet x 24-gauge, and 5s. for the same length in 26-gauge. Curving costs 5d. a sheet. Galvanized roofing bolts (¼ inch by 1¼ inch) are used to join the sheets—three bolts to a sheet—and cost 5d. a dozen, or approximately 2d. a sheet.

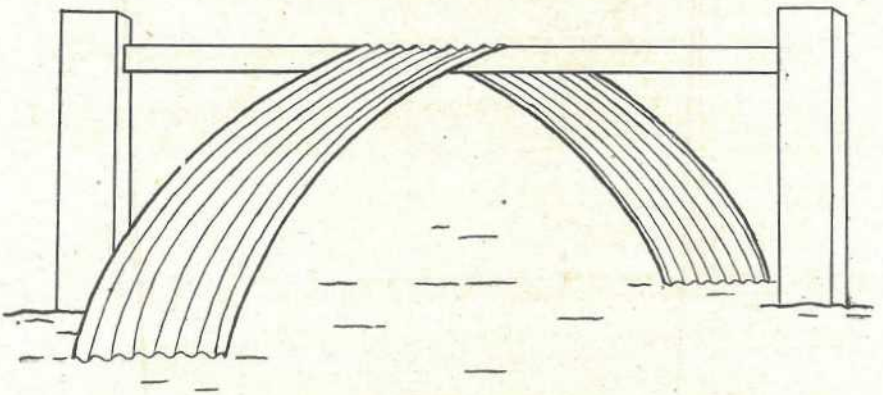


Plate 102.

The cost for material, therefore, is:—

	24-gauge.	26-gauge.
	s. d.	*s. d.*
10-foot Sheet	6 6	5 0
Curving	0 5	0 5
Bolts	0 2	0 2
	7 1	5 7 a ton of hay.

Freight, of course, is additional.

On a 50-ton stack a saving of £3 15s. could be made by using 26-gauge iron, but the 24-gauge is worth the extra cost, because of its extra strength and durability and the additional stability given by its weight. Allowing for freight and other incidentals, the cost of roofing a 50-ton stack in this way would be practically £20, or 8s. per ton.

From an insurance point of view, on a 50-ton stack opened up after five years, at a drought valuation of £10 per ton, the £20 spent on the roof amounts to an annual premium at the rate of 16s. per £100, the iron remaining as a permanent asset.

Construction.

When ordering the iron, it is better to have every sheet curved the one way, so that the edges are down, as it is easier to put on. It is necessary to punch the bolt holes and assemble the roof on the ground before it is built on to the stack.

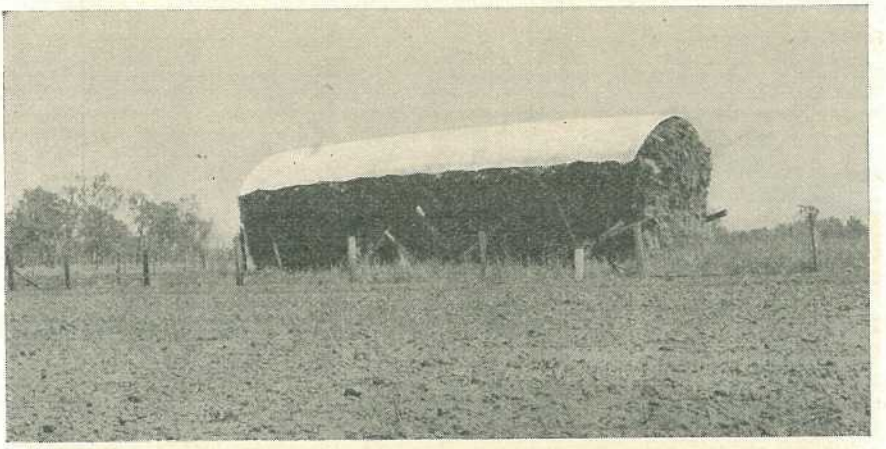


Plate 103.

A 50-TON HAYSTACK ROOFED WITH CURVED CORRUGATED IRON.—Note how snugly the roof has settled down, giving perfect security during the heaviest rains. When it is desired to open the stack, all that is necessary is to unbolt the last two, four, or as many sheets as cover the quantity of hay required, the remainder being secure and undisturbed.

A convenient stand for this may be made by fixing a stout rail (stout enough not to bend) parallel to a level piece of ground, at a height of 3 feet 6 inches, and long enough to carry three pairs of sheets bolted together, and to leave a few feet over at either end for working room—say, about 12 feet long. The pairs are then bolted together as shown in Plate 102.

When three pairs have been assembled the rear (or first) pair is unbolted, and the sheets are numbered 1 and 1A, care being taken that the lettered figure is always on the same side.

Another pair is then fitted to the working edge, and the same procedure gone through until the whole roof has been assembled, numbered, and taken apart ready for building on top of the stack.

When fitting, a 6-inch overlap is given at the top of the arch. Three bolts hold this join, the outside ones also holding the overlap of the neighbouring pairs. Two additional bolts are inserted down each side of each 10-foot sheet, so that each complete arch is joined to its neighbour by five bolts. It is wise to allow generous holes when

punching, for if they are too neat it is difficult to pass the bolts through the several thicknesses of iron when building upon the yielding hay.

The prepared sheets are hauled up singly in a suitable rope sling, and the builder bolts the first pair together with the outside and centre bolts at the top of the arch. He then joins the next pair by the centre bolt only, before joining the set to its neighbour.

Two men are able to do the work, but a third to assist the builder on the stack makes the work much easier—chiefly by holding the sheets in place as the bolts are inserted.

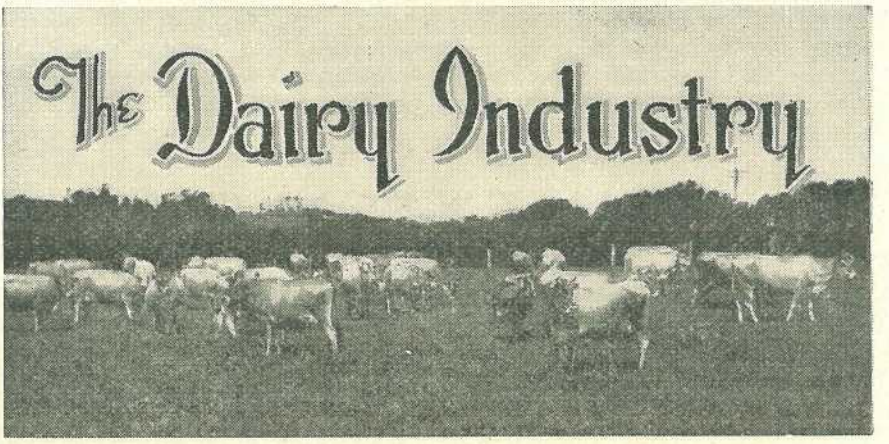
Plate 104.

A line of lucerne haystacks inadequately protected from the weather. A roof of iron on each stack, as described in the text, would have prevented deterioration, which has already set in.

Securing the Roof.

It is as well to secure the roof temporarily against wind as it is being built, for it is easily dislodged when simply lying upon the top of the stack. When completed, a permanent anchorage should be provided—a job calling for care and thoroughness.

Cables consisting of single stands of No. 8 galvanized fencing wire should be passed right over the roof in the middle of every alternate pair of sheets. On no account is it advisable to pierce the iron at the edges and attach the wire in that way, for it will tear out in a hard blow. Convenient weights—such as logs, or kerosene tin buckets filled with stones—are suspended from the ends of the wires, sufficiently high to allow for settlement of the stack. Additional rigidity may be necessary in windy localities, and is conveniently given by bolting a 3-inch by 1-inch hardwood batten 6 inches up, along the edges of the roof. It is an additional safeguard to pass an extra wire over the two end pairs of sheets and secure them to the bed logs; these should be kept tightened as the stack settles.



Variations in Cream Tests.

F. C. COLEMAN, Dairy Branch.

BUTTER factory staffs are often blamed unfairly for variations in cream tests. The efficiency and proper control of a factory depend upon the accuracy of cream weights and tests, careful and scientific control of moisture tests, exactness in weights of butter packed, &c. No certificated tester can afford to jeopardise his certificate by wrongfully testing a farmer's cream. These facts should always be carefully weighed before complaints are made against a factory management.

The cause of a drop in the cream test should first be looked for on the farm. The dairy farmer should ask himself if conditions in the herd and the dairy could have caused a change in the tests of his cows, or if the milk was separated as it should have been.

A misconception exists that if the cream screw of the separator is set to give a definite thickness of cream, the correct speed maintained, the temperature of the milk, the rate of inflow, and all other things being equal, then the test of the cream should not vary.

The setting of the cream screw was not meant to give a fixed percentage of fat in the cream. What it does do is to regulate and fix the ratio of cream to skim milk, and any alteration of the screw has a corresponding influence on the ratio.

Let us suppose that this ratio is 90 to 10, meaning that for every 100 lb. of milk separated 10 lb. is cream and 90 lb. is skim milk, and that the test of the bulk milk which is being separated is 4 per cent.; then the test of the cream will be 40 per cent.

Later on, a change may occur in the cream fat content of the herd milk. This may be due to several things, such as the lactation period or a change in the normal interval between milking. We will assume that it now tests 3·5 per cent. The cream screw has remained unaltered and the ratio is still 90 to 10, but the test of the cream will now be 35 per cent.

Providing that the conditions of separating remain always the same, and despite the fact that the richness of the milk is ever fluctuating, this ratio of skim milk to cream should remain constant.

If the milk is poor in fat the separator discharges 90 lb. skim milk and 10 lb. cream; should it be rich, this proportion still remains the same, but as the efficient modern separator allows practically all the butter fat to go into the cream, it should be obvious that cream from rich milk will test higher than that from poor milk.

CLEAN MILK IN HOT WEATHER.

At this season of the year, the problem of keeping milk from souring requires a little extra attention. Bacteria thrive at midsummer temperatures and cause milk to sour and lower the butter-making qualities of the cream. Chief among the measures of defence against the souring of milk are cleanliness and cooling—i.e., low temperature. It is not enough to draw the milk in a clean way; utensils must be clean to the point of being practically free from souring bacteria. In addition, milk must be cooled immediately if its quality is to be preserved long enough to permit its reaching the consumer in an acceptable condition.

Milk sours very quickly at high temperatures. This, however, is not the only cause of the souring of a lot of summer milk. Mudholes, manure heaps, swamps, and the muddy banks of streams in the grazing paddocks help to deposit a considerable number of bacteria on the teats, udders, and adjacent parts of the cows. The bacteria which gain entrance to the milk at the time it is drawn and in course of conveyance to the cans for temporary storage or for immediate delivery have a lot to do with the time required for souring.

If the customer should complain of sour milk in the warm weather, and should the cooling of the milk fail to remedy this defect, then all possible sources of contamination should be investigated. In some cases, this will be found coming from the filth of muddy places, or the dust of dry manure.

With sterile utensils and rapid cooling, a low bacterial count may reasonably be expected; likewise the complete elimination of rejected supplies, higher quality milk, and, consequently, greater profits.

—*L. W. B. Verney.*

THE VALUE OF ANIMAL MANURE.

The unused dung of farm animals in Queensland must represent a great loss of national wealth each year. On almost every dairy farm one can see this waste, from the freshly voided piles round the milking yards to last year's undisturbed cake lying bleached and useless in the field.

Idle dung is not only idle money; it is wasted money. About four-fifths of the food consumed by farm animals is excreted, and the fertilizing constituents of this manure are equal pound for pound to the best obtainable.

The urine soaks into the earth and soon makes its nutrients available to the plant roots, but the dung lies on the surface and if left unbroken may take years to decompose.

The direct results of this condition are readily observed. A definite area is temporarily spoiled for grazing, and when eventually grass grows around or through the heap it is completely ignored by stock until there is nothing else left. By this time it has aged, become harsh, and lost much of its nutritive value.

The indirect results are not usually recognised. Rats and other vehicles of disease revel in droppings and transfer any infection to feed bins, troughs, and stored foods.

These disadvantages can not only be eliminated, but, by using a proper system of conservation and distribution, be converted to profit.

The material which accumulates in sties and stalls or where animals congregate can be readily collected and tipped into a nearby excavation. The excavated earth can be banked to form a run-off. A covering of palings, old posts, sheets of iron or other suitable material should be used to avoid trouble to stock and inconvenience to farm workers. Manure stored and covered in this way loses little of its fertilizing value. Manure piled in the open and exposed to the weather loses much by fermentation and leaching.

When land is to be manured the pit can be opened and the material removed. Where the paddocks are large and the droppings widely distributed a system of conservation is not practicable. In such cases periodic visits should be made with a rake and the dung under shade trees, around watering places, or along "pads" broken up and scattered. This allows the material to dry quickly and continuous tramping by stock soon works it into the soil.

The benefits derived from farm manure are twofold. It supplies plant nutrients as well as an excellent medium for the production of humus—the organic water-conserving colloid of soil.

The daily production of dung per 1,000 lb. live weight is approximately:—

Cow	52 lb.
Horse	40 „
Pig	50 „

This means that on a farm running 35 cows, 4 horses, and 4 sows there would be a weekly production of 6 tons. If only one-third of this could be collected it represents at least 100 tons of good fertilizer each year.

THE IMPORTANCE OF THE SEPARATOR FLOAT.

Probably the most neglected part of the separator is the float, the function of which is to regulate the flow of milk into the bowl.

This means that it should be perfectly balanced, otherwise an irregular flow occurs and inefficient separation and fluctuation of tests result.

It has been frequently found that floats are badly dented or leaking. To this condition is added the danger of throwing the float out of balance by unskilful repairs. It has also been found that leaking floats have been repaired without first emptying them, which makes them heavier than designed.

Probably the most serious aspect of damaged floats is the fact that cracks and badly soldered joints provide just the right conditions for the growth of bacteria. Consequently, milk passing over them becomes contaminated, resulting in many cases of cream being graded down.

Dairymen would be well advised to give consideration to this matter, and when repairs are necessary to have them done by a competent tradesman, who should be advised of the importance of the work.

—*S. E. Pegg.*

BLIGHT IN CATTLE.

It is safe to assume that blight in cattle will again become prevalent in the coastal areas of the State during the wet season.

This is a highly contagious complaint, and, apart from losing condition, many animals become blind. Treatment should be applied as soon as the trouble is noticed.

The following solution is very useful in treating the complaint:—

Nitrate of silver	3 grains
Sulphate of morphia	1 grain
Soft water	1 ounce

An alternative and less expensive remedy is a mixture of 2 per cent. zinc sulphate and 2 per cent. boracic acid in water that has been boiled.

All eye discharges should be washed from the face of the beast and vaseline applied to the area covered. The discharges attract flies; while flies continue to irritate the animal a cure will be long delayed, if not prevented entirely.

The affected eyes should be syringed in the early morning and late afternoon. A small bulb syringe is quite suitable for applying the solution.

Marketing Pigs.

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

PORKERS should be marketed at an age and weight to suit export market conditions, as well as the local trade. Best trade weights, for prime-conditioned pigs, range between 60 lb. and 90 lb. dressed (approximately 95 lb. to 139 lb. live weight). For local markets, the best range is 60 lb. to 80 lb. dressed weight (95 lb. to 130 lb. live weight). Porkers should be in good condition, free from bruises, whip marks or other faults, and be protected from the effects of severe heat; otherwise, they will not dress out to advantage on slaughter. Lighter weights and very thin pigs are not profitable as porkers, and at factories and meatworks will only be paid for at valuation.

Bacon pigs for local markets should be 90 lb. to 130 lb. dressed weight (approximately 140 lb. to 185 lb. live weight), with added range to 160 lb. dressed weight (220 lb. live weight) at slightly lower rate per lb. dressed. For export, the range of weights varies from 120 lb. dressed weight (175 lb. live weight) to 160 lb. dressed weight (220 lb. live weight), but the heavier pigs should not carry too much fat; otherwise, they are subject to reduction in price or to rejection. For local markets also, there is a strict limitation to the percentage of fat, and factories prefer pigs in meaty condition with only a light covering of fat.

Sows for smallgoods trade should be in good condition, and should have weaned their litters two months or more before marketing; also, they should not be in pig any more than one month, if in pig at all. Sows close to farrowing and those farrowed recently are liable to condemnation at the factories. Poor brood sows and poor stags are useless and will not be accepted, while boar pigs are useless for meat purposes until castrated, and then well fed for approximately two months, the time depending on the progress made after the operation

In every instance the greatest care should be taken to avoid bruising and damaging the pigs in transit, especially when loading and unloading.

Pigs carted to country sidings for trucking or sale should not be fed immediately before despatch, as such feeding is conducive to heavier shrinkage and to digestive disorders in transit.

It is again emphasised that under the Queensland Pig Industry Act all pigs must be branded by the vendor before sale, barter, or exchange. Full information on any of these points is obtainable from the Department of Agriculture and Stock, Brisbane.

MAIZE AND PORK QUALITY.

Owing to its relatively high fat content and the low melting point of its fat, maize can be responsible for the production of soft fat in pork and bacon.

A sweeping statement is sometimes made that "maize-fed" pigs are soft as compared with pigs which have been fed on wheat or barley. The statement really needs some qualification so far as Queensland pigs are concerned. A large number could be classed as "maize-fed," but they rarely receive sufficient maize to cause soft pork or bacon.

Maize is the most widely grown grain in Queensland, but the pig industry is not dependent on this crop. It is very closely associated with dairying, the pigs being used primarily to consume the milk by-products—separated milk, buttermilk, and whey. Pasture, forage crops, and root crops also form a large part of the diet of pigs on some Queensland farms, and the grains—maize, wheat, and barley—are really only used as supplementary foods.

These points should be borne in mind when reading the advice of some overseas authorities, who state that maize should not constitute more than about 35 per cent. of the grain allowance of pigs. This may be sound advice under English conditions, where pigs frequently receive a diet which is about 90 per cent. grain and which usually does not contain milk products; but under Queensland conditions, where the feeding systems are as stated above, there appears to be little danger of pigs receiving sufficient maize to injure their carcase quality.

Most of the pigs produced in Queensland can be classed as "milk-fed."

SALT FOR PIGS.

Salt is harmful to pigs only when fed in excess. In tests to determine whether salt has any toxic effect, increasing amounts up to 2.5 oz. of salt a day were fed to pigs without any harmful result, and the animals gained normally in weight. This result was obtained under conditions in which the pigs had free access to water, for if pigs are fed increasing amounts of salt without water the result will be disastrous.

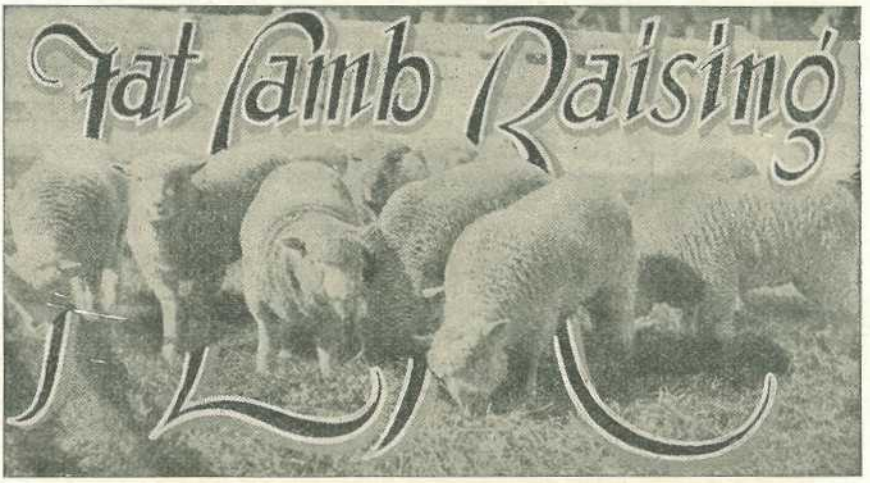
RADIO SERVICE FOR FARMERS.

From National Station 4QG (or 4QR) (Relayed to 4RK Central Regional and 4QN North Regional).

Arrangements have been made with the Australian Broadcasting Commission (Queensland) for the regular delivery, in interesting dialogue form, of talks to farmers by officers of the Department of Agriculture and Stock during the

COUNTRYMAN'S SESSION 4QG (or 4QR) EVERY SUNDAY MORNING,

Beginning at 9.40 a.m.



Right Type of Ewe for Fat Lamb Raising.

No matter what ram is fancied, if merino ewes form the mother flock, the fat lamb raiser is handicapped in the matter of profitable weights at an early age, or, in other words, early maturity.

The ewe most suitable for the production of early-maturing sucker lambs for export is got by the use of rams of one of the long-woolled breeds—such as the Romney Marsh, Border Leicester, or Lincoln—on the strongest, boldest type of merino ewe procurable. The ewe lambs from the resultant drop should be retained as the future breeding flock.

Pure-bred Corriedale ewes also are recommended as dams in a fat lamb raising flock.

On either type of ewe a Downs ram—such as the Southdown or Dorset Horn—should be used.

The ewe flock should be maintained in good strong store condition until lambing time. After lambing, no feed is too good for the ewe and lamb.

Under favourable conditions, fat lambs should be marketed at four months of age.

—*J. L. Hodge.*

FAULTY SKIRTING OF WOOL.

A visit to the wool stores should suffice to convince anyone of the seriousness of faulty work in the important matter of skirting the fleece. It is no uncommon thing to see half an offering consisting of brokens and pieces, and for no apparent reason.

Too often this work, which should be in the hands of trained men, is performed by casual shed hands, who may never have seen or handled a fleece before. Of course, the classer is blamed, but it should be remembered that he has a difficult job in a busy shed. How much easier would be his work if skirting were carried out by men trained to the job!

The worst of the fault is in overskirting. Much wool is taken off the fleece quite unnecessarily. The consequence is that the owner loses,

in the prices paid, the difference between the value given for the lower grades and his fleece prices.

Sheep owners should insist that men entrusted with the work on the tables should have had experience. The classer, too, should give clear instructions on the correct method of skirting the fleeces from each flock.

—*J. Carew.*

THE NEW ZEALAND CATTLE TICK.

In recent years, cattle owners in certain areas on the near North Coast have been perturbed by the presence on their stock of large numbers of a species of tick, which is quite different in appearance from the common cattle tick. The tick in question is the New Zealand cattle tick, a name given it on account of the frequency with which it occurs on cattle in New Zealand.

Like the common cattle tick, it is an introduced species, and is known to occur in Japan, India, Malay States, and East Africa, as well as in Australia and New Zealand. In Australia, the New Zealand cattle tick is present only in the North Coast areas of New South Wales and in South-eastern Queensland.

Details of its life cycle show that when engorged the female tick drops off the animal on which she has been feeding, crawls to some sheltered spot, and commences to lay her eggs. These hatch in the minimum time of about three weeks. The tiny larva then crawls on to a beast, becomes attached, and is full fed in four days. It then drops off, and after ten days on the ground develops into the nymph stage. The nymph in turn attaches itself to an animal, engorges with blood in four days, and again drops off to the ground. After another period of ten days it develops into an adult. The adult tick then seeks a host animal, becomes engorged in four days, and then, in a female, drops off and starts to lay her eggs.

In the case of the common cattle tick, the young larva, after hatching from the egg, crawls on to a beast, and there it remains until it becomes fully engorged; the female then drops off to lay eggs. Therefore, the larval stage is the only stage in the life cycle of the common cattle tick at which an animal can pick it up in the paddock. Control is a comparatively easy matter, and it may be obtained simply by regular dipping in an arsenical fluid, the period between dippings being such that any ticks on the animal are killed before they mature.

In the case of the New Zealand cattle tick, on the other hand, larvæ, nymphs, and young adults are all present in the grass, which means that no sooner is an animal cleansed of its infestation by dipping than it is again infested heavily by ticks just as large as the ticks with which it was infested before it was dipped. As during different stages in its life cycle it is present on an animal for at least four days, regular dippings at intervals of three days may be necessary. It may, however, be possible to utilise a dip which is more repellent than the usual arsenical solution, and thus secure a longer interval between dippings. Derris is known to have a repellent action against some species of ticks, and it may be worth while utilising an arsenical dip which contains

this ingredient. At least one such proprietary mixture is on the market, information concerning which may be obtained on application to the Animal Health Station, Yeerongpilly.

Experimental work has shown that the New Zealand cattle tick is not a vector of one of the organisms of tick fever in cattle, but its role as a possible carrier of the other two tick fever organisms is unknown.

—Dr. F. H. S. Roberts.

BROWN DOG TICK.

Of the many species of parasites infesting the dog, one of the most difficult to contend with is the brown dog tick. It is not an uncommon pest in Queensland, and on occasions may occur in such large numbers as to constitute a distinct menace to the health of the animals it infests. In such instances, the dog-owner finds that, no sooner has he cleansed his animals of all ticks by hand picking or washing, than the animals are infested just as heavily as before. A consideration of the life history of the tick shows why this is so.

The female tick, when fully engorged with blood, drops off the dog; and, crawling away to some sheltered spot on the ground, lays some thousands of eggs. These eggs hatch and give rise to tiny larval ticks which quickly attach themselves to any available dog. After feeding for a few days the larvæ drop off on to the ground and become nymphs. The nymphs then attach themselves to the dog and, on engorging themselves, drop off and develop into adults. The adults, in their turn, attach themselves to a dog; and, if females, drop off when engorged and lay many eggs. So the cycle goes on and the premises may become infested absolutely with larvæ, nymphs, and adults, all awaiting a chance to attach themselves to the dog. Moreover, these ticks, sheltering on the ground, may survive many months, should the opportunity of attaching themselves to a dog not present itself.

When the yards and surroundings are infested heavily it is of little benefit to attempt to control the pest simply by washing the dog in a dip mixture as so many owners do. The ticks naturally would be most numerous on those parts of the premises which are most frequented by the dog. The kennel should be cleansed thoroughly and sprayed with dip, the fluid being forced well into all cracks and crevices. The animal's blanket should be boiled frequently and the yards kept clean and tidy. In the case of house dogs the cracks in the flooring and walls should receive attention, and any other places in which the ticks may find shelter.

In addition, large numbers of ticks may be destroyed by washing the dog in a derris infusion. This wash is prepared by soaking 2 oz. of powdered derris in 1 gallon of water overnight. Next morning a sufficient quantity of soap is added to produce a good lather. This wash should be employed every six or seven days until no more ticks are seen.

If the ticks are at all numerous their control is largely a matter of patient effort, and it may be some time before any marked diminution in their numbers is apparent. All dog owners should be on the watch for this pest, and the measures advised here should be adopted so soon as any ticks, no matter how few in number, are seen.

—Dr. F. H. S. Roberts.

DERMATITIS.

A condition manifested by intense irritation, and development of dropsical swellings, and later death of unpigmented surfaces of the body, sometimes occurs during summer in country where trefoil and St. John's wort grow. It is only on white unpigmented patches of the animal's skin that the condition appears. Pigmented or coloured portions of the skin remain unaffected. Feeding experiments have proved that the ingestion of these plants together with exposure to strong sunlight bring about the condition. Cattle so affected show signs of much irritation, biting and licking themselves. Within a few days excoriation of the skin of unpigmented areas occurs. Animals become feverish and lose condition rapidly.

Sheep are affected similarly; the ears and face become thickened and dropsical, and the lips become hard and leathery. If shade is provided, animals seek it readily to obtain relief.

Staining of white patches on cattle with ordinary washing blue is protective. An application of a solution of permanganate of potash made with rain water to a deep pink colour gives relief.

—W. Dixon.

Registration of Hatcheries.

IN the last session of Parliament the Minister for Agriculture and Stock (Hon. Frank W. Bulcock) introduced legislation for the voluntary registration of hatcheries. The object of the new measure is to control the disease known as pullorum disease. This disease is highly contagious, and is transmitted to chickens—firstly by the parent stock, and subsequently through the droppings.

Registration under the Act is voluntary, but its value to breeders who aim to supply buyers with chickens free from this disease is obvious.

Regulations have now been gazetted and circulated to breeders who trade in day-old chickens. A list of breeders who have been registered in accordance with the Act will be published monthly.

The following clauses of Regulation 29 will indicate to prospective purchasers the action being taken to ensure the distribution of healthy stock:—

(i.) All poultry at or upon such hatchery or kept at or upon such hatchery by the owner thereof shall have been tested in such manner as shall have been required by the Chief Poultry Expert, and all poultry infected with or suspected by the Chief Poultry Expert or an inspector of being infected with pullorum disease shall have been removed from such hatchery, and the said owner shall have paid to the Minister the cost as certified in writing by the Chief Poultry Expert of any such test.

(ii.) He shall not have at or upon or keep at or upon such hatchery breeding stock of poultry unless such breeding stock shall consist of a pure standard breed or breeds.

(iii.) He shall keep at such hatchery not less than 300 head of poultry which the Chief Poultry Expert or an inspector has certified in writing to be suitable for breeding purposes.

(iv.) He shall have all poultry at or upon or kept at or upon such hatchery tested for pullorum disease at the times and in the manner from time to time required by the Chief Poultry Expert. He shall pay to the Minister the cost of every such test.

(v.) He shall not place, permit, suffer, or allow to be placed in any incubator at such hatchery for the purpose of incubation any egg which shall be less than 2 oz. in weight.

(vi.) He shall not sell or offer for sale any chickens other than chickens which are healthy and normal, and shall not sell or offer for sale any chickens which are deformed or injured in any way or which have weak navels.

(vii.) He shall at all reasonable times permit the Chief Poultry Expert, any inspector, or any officer to enter into or upon such hatchery and inspect the same.

QUEENSLAND SHOW DATES.

March.

Pittsworth	8th and 9th
Millmerran	11th
Oakey	15th and 16th
Goombungee	18th
Toowoomba	21st to 24th
Dalby	30th and 31st

April.

Chinchilla	5th and 6th
Yarraman	8th and 9th
Tara	13th and 14th
Miles	13th
Nanango	21st and 22nd
Wallumbilla	28th and 29th
Kingaroy	27th to 29th

May.

Longreach	2nd to 4th
Roma	3rd to 5th
Crow's Nest	4th and 5th
Monto	4th and 5th
Taroom	9th to 11th
Goondiwindi	6th and 7th
Wondai	5th and 6th
Blackall—	
Show	9th and 10th
Gymkhana	11th
Beaudesert—	
Show	11th and 12th
Campdraft	13th and 14th
Mundubbera	11th and 12th
Murgon	12th to 14th
Ipswich	17th to 20th
Barcaldine	17th and 18th
Goomeri	18th and 19th
Gayndah	18th and 19th
Mitchell	18th and 19th
Warrilview	21st
Biggenden	26th and 27th
Gympie	26th to 28th
Dirranbandi	27th and 28th
Kalbar	28th
Toogoolawah	27th and 28th
Maryborough	31st May to 2nd June

June.

Maryborough	31st May to 2nd June
Biloela	2nd to 4th
Lowood	3rd and 4th
Childers	6th and 7th
Boonah	8th and 9th
Bundaberg	9th to 11th
Wowan—	
Show	9th and 10th
Rodeo	11th
Gin Gin	13th and 14th
Gladstone	16th and 17th
Marburg	17th and 18th
Rockhampton	21st to 25th
Mackay	27th to 30th
Kilcoy	30th June and 1st July

July.

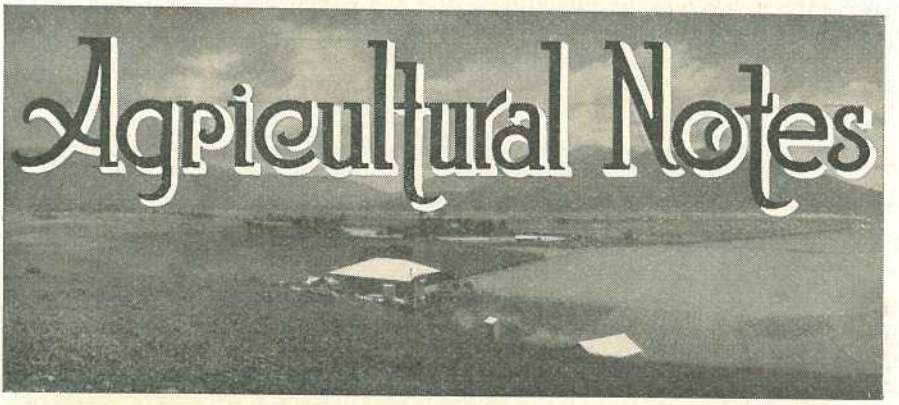
Kilcoy	30th June and 1st July
Proserpine	1st and 2nd
Nambour	7th to 9th
Cleveland	8th and 9th
Ayr	8th and 9th
Townsville	11th to 14th
Rosewood	15th and 16th
Esk	15th and 16th
Charters Towers—	
Show and Rodeo	19th to 21st
Laidley	20th and 21st
Maleny	21st and 22nd
Cairns	26th to 28th
Gatton	28th and 29th
Caboolture	29th and 30th

August.

Atherton	2nd and 3rd
Pine Rivers	5th and 6th
Home Hill	5th and 6th
Royal National, Brisbane	15th to 20th

September.

Imbil	2nd and 3rd
Ingham	2nd and 3rd
Pomona	9th and 10th
Tully	9th and 10th
Beenleigh	16th and 17th



Conditioning and Bulking of Tobacco Leaf.

R. C. CANNON, B.Sc., Instructor in Agriculture.

THE method employed in the handling of tobacco leaf after curing will appreciably affect the quality and value of the product. Consequently, just as much care should be exercised in the subsequent operations as in the curing itself. Before handling, the leaf should be brought into "condition" or "order" so that it may be handled without mechanical damage, and so that the chemical changes which tend to improve the colour, flavour, and aroma may proceed normally. Too much condition will tend to darken the colour, and may even result in the development of mould in the leaf. Where this is present there is a marked unpleasant "funky" odour, and in extreme cases the leaf will show definite signs of decay. Leaf in correct condition will be soft and pliable, with the exception of the butt ends of the midribs, which should be only slightly pliable. A little experience will soon make one adept at determining this requirement.

Conditioning.

Conditioning of leaf entails the addition of moisture to the whole body of the leaf tissue and not simply the outer layers. Rapid methods of attaining this objective usually result in a "false condition," which is rapidly lost during handling. To a very large extent the method to be employed will be determined by atmospheric conditions at the time. When moist nights are being experienced it will usually be quite sufficient to allow the leaf to hang in the barn overnight with the door and vents full open. Normally the leaf will be in good condition by morning, but under certain conditions of high atmospheric moisture this may be attained before daylight. In this case, it would be desirable to remove the leaf as soon as the correct condition has been attained, or else to allow it to become over-conditioned, and then to let it remain for some hours during the morning until the excess moisture has been lost.

When atmospheric conditions are so dry that leaf may not be conditioned by these means, recourse must be had to some way of artificially humidifying the air within the barn. This may be done by

closing the barn and spreading wet bags over the floor or else low-pressure steam may be introduced into the closed barn. In either case, the barn should remain closed for some considerable time in order that the moisture may penetrate the leaf. Of these two methods the former is the slower, but there is less risk of "false condition" than with the latter.

In certain circumstances, the crop in the field may be ripening very rapidly, thereby taxing barn accommodation, and growers may find it necessary to empty a barn with the least possible delay in order that it may be refilled. In such cases, it is often found advantageous to induce a "false condition" in the leaf for the sole purpose of transferring it from the barn to a building which may be used as a conditioning shed, where it can remain for a longer period under appropriate conditions to induce the requisite true condition before bulking down. Such a building should be provided with racks suitable for holding sticks of tobacco spaced so that the moist air has access to all parts. Some growers consider this to be a suitable procedure for normal working, and have made provision for a separate conditioning room adjoining the bulkshed.

The Bulkshed.

Where possible, the bulkshed should be located conveniently with respect to the curing barns so as to facilitate the transference of leaf after curing. The construction should be such as to render it comparatively unaffected by variations in atmospheric conditions, and should exclude as much strong light as possible.

The bulks may be of any size commensurate with the farmer's requirements, but should be wide enough to accommodate two sets of leaves with the tips slightly overlapping. The base of the bulk should be several inches above the floor level, so as to allow circulation of air, and should be made of boards spaced about 1 inch apart. The ends of the bulk should be similarly constructed to a height of 5 or 6 feet, and as they will be called upon to stand heavy weights they should be strongly constructed.

Bulking Down.

In bulking down, the usual procedure is to remove the leaf from the sticks before bulking, though at times it may be found more convenient to build temporary bulks of leaf on the sticks. A layer of bags or hessian should first be placed on the floor, and then the sticks of leaf placed so as to overlap all but a few inches of each other, so that the rather brittle butts of the leaves are not broken by the weight above them. For the sake of stability, it will be necessary to reverse the sticks at regular intervals in building the stack, so that the tips of one layer rest on the butts of the underlying layers.

The procedure for bulking down is the same whether or not the leaf has been temporarily bulked on the sticks. Several sticks are placed one on top of the other on a bench, and the string removed by gentle pulling so as not to unduly damage the butts of the leaves. Each bundle of leaf so obtained may then be removed and placed in position in the bulk. It has been found convenient to carry the bundle sandwiched between two pieces of light board. The leaf is then spread out in layers on the bulk with the butts facing outwards and the tips overlapping along the centre of the bulk. The second layer is placed

on the first with the butts a few inches further towards the centre and the tips overlapping to a greater extent. The third layer is placed to correspond with the first, and so on with alternate layers. When the day's operations are completed, planks should be placed on the top of the bulk and weights added to press down the leaf firmly. The weights used should be heavy enough to compact the bulk, but not so heavy as to break the tissues of the leaf and express the oils. The whole bulk should be covered with hessian or other suitable material to protect the tobacco from moisture changes in the surrounding air and to exclude strong light which is apt to bleach the leaf.

At regular intervals the bulks should be carefully examined for the presence of mould or for excessive development of heat, as a result of its having been bulked too moist. Should any suspicious symptoms be detected, the bulks should be taken down and the leaf shaken and aired before rebulking. In fact, it is desirable to make it a routine procedure to turn all bulks at least once. The leaf should be allowed to remain in bulk for five or six weeks before being removed for grading and sale.

HOME-MADE TOBACCO EXTRACTS.

Enquiries are received at the Department of Agriculture and Stock from time to time regarding methods of preparing home-made tobacco extracts, and this brief discussion may be of interest to others.

The nicotine content of the tobacco plant varies considerably, depending on the variety of the plant and the locality and type of soil in which it is grown. Therefore, no statement can be made as to the strength of a decoction that may be prepared by simple home or farm processes. The strength of the extract being uncertain, no guarantee can be given as to its effectiveness as an insect spray. The uncertainty of the qualities of the resultant product are further indicated by the wide variety of formulæ which are given in publications in which home-made tobacco washes are discussed. The proportions of the ingredients vary from 1 lb. of waste tobacco to 2½ gallons of water to 1 lb. of waste tobacco to 1 gallon of water. In general, it may be said that there is little danger of the resultant extract containing materials that will be injurious to living plant tissue, rather it may be the case that the solution is too weak for its particular purpose. The waste tobacco that is used may be stems and midribs, and it should preferably be of the dark varieties. The addition of washing soda at the rate of 1 oz. of washing soda to each 6 gallons of water has also been suggested.

The extract may be made either by cold soaking or by heating. For the former, the fluid should be stirred occasionally during a period of twenty-four to forty-eight hours. The fluid should then be drained from the tobacco and some further extract may be pressed from the plant material. The whole of the resultant fluid should then be strained and used direct as a spray liquid. Heating is quicker, but is somewhat more troublesome. The ingredients are added as before, the container being then placed over a fire and covered. The fire is retained until boiling point is just reached, when it should be raked out, or the vessel removed. The decoction is then allowed to cool and after straining is ready for

use. The extract obtained by this method has much the same properties as by the cold method. Actual boiling should be carefully avoided, as nicotine is very volatile, and it would be lost rapidly, were boiling to take place. The spray should be prepared as required and used immediately, as standing for a few days will result in fermentation, which will alter the chemical constituents and may reduce insecticidal properties.

Should it be desired to improve the wetting qualities of the spray, then soap may be added at the rate of 2 lb. of soap to each 50 gallons of spray. The soap should be shredded and dissolved by heating in a little of the water and then added to the bulk.

It must be emphasised that the use of standard nicotine preparations is recommended where a contact spray containing nicotine is required, but some farmers having a stock of waste tobacco may desire to try the effects of a home-made tobacco wash.

—J. A. Weddell.

CORN-EAR WORM IN THIS SEASON'S COTTON CROP.

W. J. S. SLOAN, B.Sc., Assistant Research Officer.

Corn-ear worm injury has already appeared in this season's crop. Good rains in November, 1937, resulted in heavy weed growth in and near cotton fields, while corn-ear worm moths emerged early in December.

By mid-December weeds were carrying large populations of the corn-ear worm caterpillar. Late in the month when the weeds dried up in the hot weather, the caterpillars migrated to the cotton. The damage was particularly severe in crops where inter-row cultivation had been insufficient to keep the cotton continuously free from weeds. Besides larval invasions from weeds, eggs were laid on the squaring cotton. In some areas the population of caterpillars which developed on the plants was large enough to cause considerable loss of squares, but, generally, square loss from caterpillars bred on the cotton was not heavy.

In view of the prevalence of the pest in December, the possible future trend of corn-ear worm activities can be indicated.

With good rains in January, a further attack may follow egg-laying on the plants in late January and early February. A dry hot spell in February followed by soaking rains will favour severe corn-ear worm outbreaks in late February and early March. If, however, the natural enemies which bred up during December prove effective, the corn-ear worm may not again be particularly prevalent for the rest of the season, but farmers should realise the risk of still further losses from the pest.

Should corn-ear worm invasions again occur, farmers are advised to use the swabbing method of control. This consists of flipping on to the cotton bushes already invaded or in danger of invasion, a mixture composed of the following ingredients:—1 lb. lead arsenate, 1 gallon molasses, and 6 gallons water.

Usually only one application of this treatment, at about 10 to 15 gallons per acre, is required to halt an invasion of corn-ear worm caterpillars. The solution can be conveniently applied with a whitewash brush.

Where the corn-ear worm population is bred up on cotton bushes within the field, there is some evidence to suggest that either swabbing or dusting may be beneficial. The swabbing should be done twice, with an interval of four to five days between each application. As an alternative, a calcium arsenate or a lead arsenate dust can be used at the rate of 5 to 7 lb. per acre, two dustings at an interval of four to five days being suggested.

Although corn-ear worm caterpillars migrating into a cotton field can be effectively controlled by swabbing, the Department of Agriculture and Stock cannot unreservedly recommend the large-scale insecticidal treatment of fields in which the pest is widely distributed as a result of heavy egg-laying in the cotton crop. Such treatment has not always proved profitable under Queensland conditions, but it is suggested that farmers use one of these methods on a small area for observational purposes, if a large population of the pest is bred on the crop.

THE LEAF-EATING PESTS OF COTTON.

From three weeks after the germination of the cotton this season there were few cotton fields in the Callide Valley and Upper Burnett which did not carry light populations of the cotton leaf-eating looper. During December and early January, the numbers of the leaf-eating looper increased, and the leaf perforator also began to appear in the fields.

From now on dry, hot weather periods interspersed with good rains may favour the increase of these insects to pest populations, and the following notes may be useful to cotton farmers faced with the necessity of applying control measures.

Both of these insects are primarily leaf-eaters, and in well-foliaged bushes their activities are not a matter of great concern. In lightly foliaged plants, however, the leaf injury may be harmful, and loss of squares may follow an attack on the tender tips of the bushes.

The first consideration is to maintain the health of the plants as far as possible by clean cultivation. Where direct control with insecticides is necessary, both swabbing with a poisoned molasses solution and dusting with calcium arsenate or lead arsenate at 5-7 lb. per acre will be found to be effective.

The swabbing solution for the leaf-eating insects is prepared according to the following formula:—1 lb. lead arsenate, 1 gallon of molasses, and 12 gallons of water. This mixture is flipped on to the cotton bushes with a whitewash brush at the rate of 10 to 20 gallons per acre, depending on the size of the bushes.

If the infestation of the leaf-eating looper is very heavy, a second application of the treatment may be required.

—W. J. S. Sloan.

AUTUMN PLANTING OF ENGLISH POTATOES IN CENTRAL QUEENSLAND.

In Central Queensland, the winter crop of potatoes is normally planted between mid-February and March, and, as the growing season is short, harvesting is usually in full swing by June. Climatic conditions are responsible for the comparatively short period between planting and maturity, and also the smaller yields in comparison with those obtained in more temperate regions.

Trials have disclosed that although the tubers attain normal size, the number per plant in this crop is comparatively low, which suggests that yields could be increased by closer planting. This opinion is confirmed by the successful crops obtained in areas where the seed tubers have been spaced 9 inches to 12 inches apart, instead of the wider 12 inches to 18 inches usually practised in the southern districts. As the yield per plant in the winter crop is apparently not reduced by the closer spacing, this method is valuable where small areas are under cultivation, particularly when irrigation facilities are available.

Fertilizer trials conducted on average soils have not shown any marked increase in yields, but further experimental work is necessary before a definite recommendation can be made. However, crops grown on the poorer soils, particularly of old cultivations, should benefit from substantial applications of phosphoric acid and potassic fertilizers.

As heavy rains are likely to be experienced at this period of the year, well-drained, free-working soils are to be preferred. Deep ploughing will be found to assist drainage, besides providing more favourable growing conditions.

If seed potatoes are purchased from outside sources, preplanting treatment with hot formalin or acid corrosive sublimate may be desirable.

Although cut tubers are permissible for spring planting, seed for the autumn crop should definitely comprise whole tubers only.

Attention is also directed to the control of Irish blight and other diseases by means of suitable sprays, full particulars of which may be obtained on application.

—W. R. Straughan.

FEEDING FARM HORSES.

It is not unusual to see a farm-hand pitchfork hay into a yard over which manure is thickly scattered. This is a source of loss and danger. Much of the hay is trampled into the dust or mud and rendered unusable. Even ensilage may be wasted in this way. A far greater, although more indirect, loss to the stocknower is caused by the contaminated feed. Many farm horses are infested with worms of various kinds, and dirty yards may teem with the parasites in their initial stages. These get into hay, or other feed tossed on to the ground, and are swallowed by stock, often with disastrous results. Heavy mortality among farm horses has been traced to worm infestation, and owners should exercise great care in feeding their working animals. A rack or a trough ensures greater cleanliness and saves waste of good feed.

—S. C. O. Jessop.

RHODES GRASS AS A HAY CROP.

While the value of Rhodes grass as pasture is well recognised in Queensland, its usefulness as a hay crop is little appreciated. Not only could fodder reserves be built up on the farm or station by conserving surplus Rhodes grass pasturage as hay, but, in some circumstances, sowing down of special areas to Rhodes grass for hay would be sound agricultural practice.

The cutting of hay from grassed country will be restricted, necessarily, to cleared land with a fairly even surface, and is practicable only in seasons of abundant growth. When seasonal conditions are such that a surplus of grass is indicated at an early date, the paddocks which can be mown should be closed to all stock and permitted to develop to the hay stage, when the crop may be harvested. In normal seasons, if the cutting is made during summer, the grass will recover quickly.

Apart from lucerne, the main summer-grown hay crops (e.g., Sudan grass and millets) are annuals. Cropping with annuals has the very obvious disadvantages of high cost of production and of exposing soils to erosive influences, particularly storm waters. A perennial or long-lived hay grass costs little to maintain, prevents erosion, improves the texture of the soil, and adds materially to its organic content. Although it is not suggested that Sudan grass and millets should be abandoned as hay crops in favour of Rhodes grass, farmers and pastoralists might well give consideration to the testing of Rhodes grass for hay purposes.

Because of its susceptibility to injury by heavy frosts, Rhodes grass is, however, not likely to prove more useful than a rotation of annuals in the colder regions of the State, such as parts of the Darling Downs.

In the drier localities in which Rhodes grass is grown largely, the hay is easily cured. In most cases it should be in the stack within forty-eight hours of cutting. The yield varies, of course, with seasonal and soil conditions, but on fertile soils young stands should provide at least two cuttings a year, each of 1½ to 2 tons of hay to the acre. The quality of the hay, particularly its palatability, is somewhat variable, but all classes of stock will eat it without much waste.

—C. W. Winders.

STORAGE OF SEED WHEAT.

A liability to weevil infestation is anticipated as a result of the wet conditions under which the last of the 1937 wheat crop was harvested. Even the grain harvested before the wet weather set in is open to attack if stored in barns, bins, or other receptacles which have been used previously for the purpose. It is recommended, therefore, that growers who have next season's seed on hand should treat it for the prevention of smut by applying 2 oz. of copper carbonate to each bushel. This treatment also acts as a deterrent to grain-destroying insects. The work should be done as soon as possible, for the copper acts more as a preventive than a curative agent of weevil infestation, and storage does not affect the efficacy of the treatment for smut or the viability of the seed in the least.

Clarendon, Pacific, Pusa, Warren 3004 (Warput), Seafoam, and Three Seas are among the varieties most suspectible to insect attack.

—R. E. Soutter.

HOME-MADE STOCK LICKS.

Graziers and farmers situated at long distances from manufacturing or distributing centres are often inclined to do without certain aids to progress, or use an inferior article on the score of cost. This is well exemplified in the case of licks for stock. Most producers know that salt, lime, and phosphates are the main ingredients of a lick. This has led to a growing tendency to reduce costs by mixing licks on the property, but there still remain some stockowners who use nothing, or perhaps salt alone, when a more complete supplement is required. Where it is possible to obtain wood ash it should be incorporated in the lick. It is not the complete solution of the problem, but its use is a decided help—particularly to breeders.

In general, the poorer the country the greater the lime content of the ash and the lower the phosphate. There are a few plants which give an ash rich in both lime and phosphate and correspondingly poor in potash. For example, the well-known "stinking rodger" gives an ash containing about 16 per cent. phosphoric anhydride and 27 per cent. lime; while the ash from the blue gum contains 14 per cent. phosphoric anhydride and 19 per cent. lime. These ashes may represent the greater proportion of a lick. The obvious drawback is the limited quantities obtainable and the difficulty of collection. Grey gum, crow's foot elm, bloodwood, cane tops, and iron bark come next in that order.

Belah, bottle-tree, apple-tree, box, and tallowwood are very low in phosphate. Belah contains about one-fiftieth of 1 per cent. and must rank as the lowest. This is readily understood when it is remembered that belah will flourish on a soil poor in phosphate. In striking contrast is its 50 per cent. lime content. Ash from tallowwood and gidgee also show a 50 per cent. lime. Their phosphate content ranges from ·5 per cent. to 1 per cent. Most of the unlisted trees give ashes with a phosphate content of from 1 per cent. to 2 per cent.

Collection.—Ashes from the home fires should be collected and stored throughout the year. When practicable, material from burning off should be collected. It should be gathered as soon after burning as possible, because rain soon damages it. The ashes from the burnt sawdust of timber mills are a useful source of cheap material. In short, all available ashes should be kept, for it takes a lot to make a ton and it is a hopeless task trying to get enough ashes just when needed.

Preparation.—Fresh ashes are caustic in nature, but if allowed to age under cover they gradually lose this distasteful quality, and after a few weeks they may be fed to stock with safety. See that the material is as free as possible from dirt and antbed. Screen out the coarse charcoal. This may be done easily by setting an old spring mattress at an angle against a wall and shovelling the ashes on to it. The fine ash is collected, and the charcoal returned to the fire or thrown into the pig sty.

Mixing.—No set rule for mixing can be given. The proportions required vary with the composition of the ash. The phosphate-rich ashes may represent as much as two-thirds of the mixture. In the case of low-phosphate high-lime ashes, this proportion usually limits the intake markedly and consequently must be altered. Here again a definite figure cannot be given, but 30 per cent. to 40 per cent. may be used, unless experience or supplies indicate to the contrary.

THE CARE OF PASTURES.

Many of the pastoral areas in Queensland are now well covered with grass and herbage, as a result of recent heavy rains. If further widely distributed summer rains fall, a good autumn crop of long grass will be assured. The effect of this autumn long grass is to supplement the organic constituents of the soil. This augumented organic content will tend to maintain the fertility of the pastures. In ordinary circumstances, pastures should not be burnt off. This applies especially to sown pastures, such as paspalum and Rhodes grasses. The effect of a severe grass fire is to reduce greatly the potential supply of the organic constituents of the soil. If persisted in, the practice of burning off may result in sterility of the soil. It is possible that bush fires recurring annually form one of the principal factors in the reduction of the fertility of much open forest country to far below that of rain-forest country.

In burnt-over areas, an invasion of non-nutritious grasses may always be looked for. In particular, the farmer with paspalum pastures can watch for the entrance of carpet grasses and rat's-tail grass. The prompt eradication of these almost worthless intruders may mean the saving of many weeks of labour in two or three years' time, when, otherwise, these invading grasses shall have spread and seeded.

In paspalum pastures, ordinary white clover should be fostered. A good pasture of this kind can often be established by broadcasting a few ounces of white clover seed to the acre in a paspalum paddock. This can be done during autumn. Generally, white clover prefers a sandy soil.

—*W. D. Francis.*

CEMENTED BAGS FOR LIGHT FARM BUILDINGS.

The ubiquitous chaff and cement bag can be turned to good account in the building of fowlhouses or similar farm buildings of light construction, according to the following plan, which has proved successful in practice:—

A framework of timber is first of all built up, after which wheat or cement bags are opened out and stretched very tightly over it, being nailed down with §-inch clout tacks. Next, a mixture is made up as follows:—

Water, 1¼ gallons,
Cement, 12 lb.,
Lime, 2 lb.,
Salt, 1 lb.,
Alum, ½ lb.

(In damp wet weather use 1 pint of water.)

Sieve the salt and lime together through a fine sieve—to thoroughly mix the materials and get rid of any big lumps—add the water and then the cement—stirring while adding—and finally the alum. Wet the stretched bags with water and apply the mixture without delay, using a fairly stiff brush, first on the outside, and then on the inside. Before the mixture sets, but after the initial wetness disappears, apply a second coat to the outside. When this sets, the bags will be quite hard and stiff, somewhat like plaster board. Subsequent coatings will, of course, make a stronger board.

The cost of the process, including bags for the foundations, works out at about 8d. a square yard. From this it will be seen that it is a very cheap and easy method of construction. Sheds built according to this plan three years ago show no signs of disintegration.

—*H. W. Ball.*

Colouring Citrus Fruit.

THE Director of Fruit Culture (Mr. H. Barnes) advises that an experiment of particular interest to citrus growers who adopt the practice of artificially colouring their citrus fruit has been completed by the Instructor in Fruit Packing (Mr. J. H. Gregory) and the Instructor in Fruit Culture (Mr. R. Prest).

In their report these officers state that in order to make the experiment as practicable as possible from the fruitgrower's point of view, it was carried out in as nearly as possible under ordinary orchard conditions. For this reason, although daily recordings were kept, no attempt was made at temperature or humidity control as most growers do not take these matters into account.

Three common colouring agents were used—ethylene gas, acetylene gas, and a kerosene lamp. The reaction of the fruit after treatment was carefully observed to determine the amount of visible skin damage. Three properly-insulated cabinets were used, and fruit in varying stages of ripeness was treated. The joppa orange and emperor mandarin were the varieties chosen for the tests.

Three charges of gas were given daily during the first three days, after which two charges were given. Before each charge, each chamber was thoroughly ventilated.

The trial with the oranges was started on 15th May, and that with the mandarins on 22nd May (1937). The fruit when picked was placed in the cabinets without delay.

Before being gassed, the oranges were sorted into three colour grades:—(*a*) coloured; (*b*) half-coloured; and (*c*) green. Each cabinet contained a case of each colour grade, enabling a comparison to be made of the effects of immaturity on the colouring of the fruit.

Gas was supplied as follows:—

Chamber 1.—Acetylene gas at the rate of 1 oz. carbide to each charge.

Chamber 2—Ethylene gas at the rate of 1 cubic foot to 1,000 cubic feet of air, twice daily.

Chamber 3.—Carbon dioxide, kerosene lamp filled and lit twice daily.

The fruit was sorted into three colour grades and placed in the colouring cabinets as follows:—

(*a*) *Coloured.*—Fruit full coloured and practically ready for market.

(*b*) *Half Coloured.*—Fruit matured, but not fully coloured.

(*c*) *Green.*—Fruit apparently matured, but lacking in orange colour.

Daily examination showed the following colouring developments with the various treatments.

Cabinet No.		(1)	(2)	(3)
Date.		Acetylene Gas.	Ethylene Gas.	Kerosene Lamp, Carbon Dioxide.
15th to 17th May	Coloured .. Half-coloured .. Green ..	No noticeable change in colour.		
18th May ..	Coloured ..	Ready for market. Bright appearance	Ready for market. Bright appearance	Practically ready for market. Dullest colour; 2 mouldy
	Half-coloured ..	Increased colour	Increased colour	Colour increasing, but fruit dull in appearance; 1 mouldy
	Green ..	Colouring satisfactorily	Colouring satisfactorily	Commencing to colour but not as forward as chambers 1 and 2
	Coloured ..	Ready for market; 1 mouldy.	Ready for market; 2 mouldy	Ready for market. Dull coloured and slightly wilted in appearance.
19th May ..	Half-coloured ..	Colouring evenly; bright appearance; no signs of wilting	Colouring evenly; bright appearance; no wilting	Colouring evenly; fruit dull in appearance; 1 mouldy
	Green ..	Colouring increasing; bright appearance maintained	No noticeable difference in comparison with acetylene-treated fruit.	Fruit colouring, but dull in appearance
NOTE.—Coloured fruit removed for marketing.				
22nd May ..	Half-coloured ..	Fruit colouring; 60 per cent. coloured; no wilting noticeable	Fruit as in acetylene; 1 mouldy	Fruit dull in colour; some fruit uneven in appearance
	Green ..	Fruit half coloured; bright, but yellowish	Fruit as in acetylene	Colour of fruit uneven; dullish yellow; unattractive in appearance
25th May ..	Fruit removed through breakdown with mould:—	1 mouldy	1 mouldy	2 mouldy
26th May ..	Half-coloured ..	Fruit nearly ready for market; bright	As in acetylene	Fruit backward in appearance compared with 1 and 2; dull in colour
	Green ..	Fruit apparently at full limit of colouring; skin yellow; not satisfactory	As in acetylene chambers	Poor, dull colour; some fruit uneven, and, in some cases, not suitable for market
All oranges removed and sent to market.		12 mouldy	9 mouldy	15 mouldy

All oranges were taken to what was considered the absolute limit of ripeness obtainable, so that an observation of their carrying quality might be observed. This to some extent is the reason of the number of the specimens, as follows, rejected for mould:—

1. Ethylene treated 11
2. Acetylene treated 14
3. Kerosene lamp-cambon dioxide treated .. 21

The effect on colour by gases was of extreme interest.

Acetylene and Ethylene Gases.—Fruit treated by these gases was similar in appearance; some fruit was not fully matured, colouring little better than a canary yellow.

Kerosene Lamp.—Fruit generally was dull and lustreless, with poor colour; a few specimens were very poor in colour.

From observations during the experiment the following facts were noted:—

(1) Immature fruit will not colour satisfactorily, being of a dull, lifeless greenish-yellow colour when the process is finished.

(2) The use of a kerosene lamp is almost valuless as its effects do not enhance the colouring, the fruit showing a higher percentage of wilt.

(3) There is not much apparent difference in efficiency between acetylene and ethylene gas in colouring, although ethylene appeared to have a slight advantage over acetylene.

TEMPERATURE AND HUMIDITY CHART.

Chamber	1			2			3		
Date.	Wet.	Dry.	Hum.	Wet.	Dry.	Hum.	Wet.	Dry.	Hum.
May 15, 9 a.m. ..	60	70	55	59	66	66	59	66	66
May 17, 9 a.m. ..	58	65	66	59	63	79	60	65	75
p.m. ..	60	62	89	61	65	80	68	72	82
May 18, 9 a.m. ..	54	60	68	54	60	68	55	62	64
p.m. ..	59	66	66	58	65	66	60	69	59
May, 19, 9 a.m. ..	57	62	74	56	60	78	58	64	66
p.m. ..	59	64	74	59	63	79	67	72	77
May 20, 9 a.m. ..	60	64	79	58	63	74	61	62	94
p.m. ..	62	68	71	62	66	80	72	79	71
May 21, 9 a.m. ..	65	69	81	65	69	81	64	69	76
p.m. ..	67	72	77	66	70	72	68	74	74
May 22, 9 a.m. ..	61	64	84	61	64	84	61	64	84
			Saturday, one reading only.						
May 24, 9 a.m. ..	63	67	80	63	67	80	65	69	81
p.m. ..	64	68	80	64	68	80	71	74	86
May 25, 9 a.m. ..	61	65	80	61	65	80	65	68	85
p.m. ..	66	69	85	66	69	85	70	73	86
May 26, 9 a.m. ..	61	64	84	61	64	84	64	67	85
May 27, 9 a.m. ..	61	64	84	61	64	84	62	65	85
May 28, 9 a.m. ..	60	63	84	60	62	89	61	64	84

Mandarin Experiment.

The mandarins were placed in the chambers on 22nd May. Unfortunately, because of dry weather, the fruit was forward in both colour and maturity. It was, however, considered that helpful observations on keeping qualities of the fruit in various gases might be made with

the fruit available. A count of the waste fruit during the experiment revealed the following results in order of merit:—

Ethylene gas	9-6·5 per cent.
Acetylene gas	12-8·6 per cent.
Kerosene lamp-carbon dioxide ..	15-10·3 per cent.

A difference in colour was noticeable, the ethylene and acetylene gassed fruit both being brighter in appearance than the kerosene lamp treated fruit. Summarised, the results with mandarins appear to be similar to those obtained with the oranges. It is interesting to note that both fruits have the smallest amount of waste in the ethlyene chamber, with the acetylene and kerosene lamp chambers, in that order, containing the higher percentages. In years of normal rainfall, it is anticipated that a higher percentage of waste would occur than with a dry season.

Queensland Woodwool.

The following progress report by Mr. J. H. Gregory, Instructor in Fruit Packing, on experiments in the use of Queensland woodwool in pineapple-packing has been transmitted to the Minister for Agriculture and Stock (Hon. Frank W. Bulcock, M.L.A.) by the Director of Fruit Culture (Mr. H. Barnes).

AT the request of the Forestry Department, experiments were made as to various methods of using waste timbers in the fruit trade. It was suggested that fruit cases, sawdust, and woodwool were among the products to be derived from the use of timbers, such as *Pinus tæda* and *Pinus caribea,* obtainable from five to seven-year-old thinnings from the forestry plantations at Beerwah. *P. tæda* proved most suitable as a case timber, the cases being made from the butt logs of the thinned trees. This still left the tops of the trees as waste. It was then suggested that the tops might possibly be used to make woodwool for packing pineapples, papaws and similar fruits. In addition to this, it was proposed the woodwool could be tried as a cover for pineapples in the field for protection from sun and wind. Hitherto, all woodwool used in the fruit industry has been imported, but the woodwool used was of local manufacture; so it can readily be seen that considerable advantage would accrue to the State by the development of this industry. It is estimated that from 200 to 300 tons per annum of this material could be used, and, with the further expansion of pineapple production, possibly more. The value of this woodwool is estimated at from £2,000 to £3,000 in the pineapple industry alone. In addition to *P. tæda* (coarse and fine), hoop pine was tried. A check also was made with imported material. A strictly commercial test was made on the basis of growers' application, checked, and counted. In addition, a small check was carried out in both packing and covering. The results were interesting and, to some extent, unforeseen in the actual difference between the woodwools used.

The qualities that go to make good woodwool for packing are softness of texture, good teasing qualities, freedom from dust and short ends, springiness, and colour. Both coarse and fine woodwool are obtainable. Only the finer woodwools are suitable for packing fruit, the very coarse grades being used for packing crockery, ironware, and similar goods. *P. tæda* and hoop pine can be made into a woodwool that will answer to all the requirements of fruit-packing. The tests of the fine types of these varieties compared more than

favourably with other kinds, as the fine cuts from these two pines proved in every way superior to all other types tried out. The following were the results obtained in the tests for packing quality:—

TABLE I.

Number.	Type of Woodwool.	Weight used in Test.	No. of Cases Packed.	Counts and Total Fruit.	Growers' Remarks.
1. Palmwoods	Hoop pine (fine)	2 lb.	3¾	12, 14, 18, 15 (21) —Total 59	Good; teasing not as easy as some imported lines, but equal to most; colour yellowish, no drawback in practice.
	P. tæda (fine)	2 lb.	3	12, 14, 18—Total 44	Looks good; a bit slow in teasing; quite as good as imported woodwools.
	P. tæda (coarse)	5 lb.	6	11, 18, 21, 12, 21, 27—Total 110	Wasteful, but easy to tease and pack.
Check ..	Imported ..	2 lb.	2	15, 18—Total 33	In operation no better than coarse *P. tæda*, showing about the same drop in waste; texture not as good as hoop pine or fine *P. tæda*, but better than coarse *P. tæda*; colour not as good as either of above, but whiter than hoop pine
Ditto ..	Hoop pine	2 lb.	2	18, 21, (7)—Total 46	Enough woodwool over to cover bottom of case and layer of pines; everything but colour perfect; do not think colour is any great handicap.
Ditto ..	*P. tæda* (fine)	2 lb.	2	18, 21—total 39	Better colour than hoop pine, but not so fine in texture or so holding in teasing quality.
Ditto ..	*P. tæda* (coarse)	2 lb.	2	15, 18—total 33	Equal to imported as packing, but has large drop of loose ends; too brittle; teases only fair; would suggest it be made wider in cut but thinner in depth.
2. Palmwoods	Hoop pine (fine)	5 lb.	5	18, 18, 18, 21, 15 —total 90	Best woodwool ever used; soft, springy, excellent packing.
Ditto ..	*P. tæda* (fine)	5 lb.	4	18, 24, 21, 18— total 81	Good; teases well; little waste; fine colour and texture.
Ditto ..	*P. tæda* (coarse)	5 lb.	3¾	18, 24, 21 18 (less 7)—total 74	Only fair; teases fair; too coarse and hard; heavy drop.
3. Palmwoods	*P. tæda* (fine)	5 lb.	4 (+ 2 layers)	12, 14, 15, 18 (+ 14)—total 73	Best woodwool yet used, better than imported; teases well; springy and soft; fine colour; no dust; good texture.
Ditto ..	*P. tæda* (coarse)	5 lb.	3 (+ 2 layers)	12, 14, 15 (+ 14) —total 55	Not so good; too brittle; not comparable with fine-cut; not as good as imported.
Ditto ..	No hoop pine available.				
4. Palmwoods	*P. tæda* (fine)	5 lb	4 (+ 5 pines)	18, 18, 21, 12, 5 —total 74	Teases well; compares favourably with imported; cut a bit short.
Ditto ..	*P. tæda* (coarse)	5 lb.	4	18, 18, 21, 12— total 69	Too woody; cut too thick; more waste than in fine.
Ditto ..	No hoop pine available.				
5. Montville ..	Hoop pine	5 lb.	6	18, 18, 18, 18, 21, 21—total 114	Excellent in every way; soft, springy and tough.
Ditto ..	*P. tæda* (fine)	5 lb.	5	18, 21, 18, 21, 18 total 96	Better than "Willow" brand, but not as good as hoop, which packs more.
Ditto ..	*P. tæda* (coarse)	5 lb.	4	21, 21, 21, 18— total 81	Does not tease too well; not as good as "Willow" brand; heavy drop when using; too hard.
6. Montville ..	*P. tæda* (coarse)	6 lb.	4	18's—total 72 ..	..
	Imported ..	6 lb.	4	18's—total 72 ..	Small amount left over.

The average number of pineapples packed per lb. of woodwool by all growers through the whole of the test was as follows:—

Hoop pine	22·07 pines
Fine *P. tæda*	16·96 ,,
Imported	16·5 ,,
Coarse *P. tæda*	16·0 ,,

The average number per lb. packed by only those growers who used all types was—

Hoop pine	22·07 pines
Fine *P. tæda*	18·57 ,,
Coarse *P. tæda*	17·53 ,,
Imported	16·5 ,,

Tests for covering pines in the field as a protection against sun and weather conditions proved no less interesting. The coarse types of woodwool were totally unsuited for this work, so only the fine types were used. A small check test showed that imported woodwool had no advantages over *P. tæda* and hoop pine, so to save time only the two woodwools mentioned were used. The following table shows the results obtained:—

Number.	Type of Woodwool.	Weight Used.	No. of Fruit Covered.	Total Time Taken.	Approximate Time per Fruit.	Growers' Remarks.
1. Palmwoods	P. *tæda* (fine)	2 lb.	84	6 min. 5 sec.	4½ sec.	Hoop pine much preferred; wraps round fruit more easily, and appears to hold better.
	Hoop pine	2 lb.	131	9 min. 40 sec.	4½ sec.	
2. Palmwoods	P. *tæda* (fine)	2 lb.	49	9 min. 35 sec.	7½ sec.	Hoop pine superior; would like to see it after weather.
	Hoop pine	2 lb.	77	12 min. 10 sec.	9½ sec.	
3. Montville ..	*P. tæda* (fine)	2 lb.	116	7 min. 52 sec.	4 sec.	Hoop pine stands alone; has tried all woodwools, and the recovery of hoop pine is more than with other kinds.
	Hoop pine	2 lb.	144	11 min. 30 sec.	4¾ sec.	
4. Montville	*P. tæda* (coarse)	2 lb.	84	No times taken.		
	Imported ..	2 lb.	89	No times taken.		

A small test of imported *P. tæda* and hoop pine woodwools showed the various types in the following order of merit—Hoop pine, *P. tæda* (imported).

For field use it would be most unsatisfactory to attempt to us any woodwool which would not tease and which drops. It is exceptionally hard to get woodwool to remain on the covered pines through wind and rain storms. The actual recovery of woodwool from covered pines is small. It is estimated that hoop pine gives up to 40 per cent. for use again, while imported woodwool gives not more than 10 per cent., the weather causing the loss. This is an advantage in favour of the hoop pine. It is not considered that the fine type of *P. tæda* is at the present time as good as the hoop pine, whilst the present type of coarse *P. tæda* is not even suitable for use in covering. There has been no opportunity, of course, of checking *P. tæda* under weathering conditions. Some new types have been suggested and it is hoped they will be stronger without sacrificing covering quality.

From the experiments of grading the woodwools in their order of merit with regard to both packing and covering, they would be placed as follows:—

1. Hoop pine;
2. *P. tæda* (fine);
3. Imported;
4. *P. tæda* (coarse).

Criticism is offered with regard to each of the Queensland types of woodwool used—

Hoop pine (fine)—

This is an excellent woodwool for all purposes, conforming to all standards for fruit-packing except colour. It is soft, springy, and pliable, free from dust, and does not drop many short ends when in use. It would be an advantage if the timber were white instead of yellow, but personally this is not considered any great detriment to its use. With use on the markets, it would soon become acceptable. For covering fruit in the field a coarser type would possibly be of advantage. Types of coarse hoop pine woodwool inspected were unsuited to the fruit trade, being brittle and too much like elongated match-sticks. Other types of hoop pine woodwool are being manufactured for future trials.

Pinus tæda (fine)—

An excellent woodwool, but not quite on a par with hoop pine excepting in colour, in which respect it is definitely superior to hoop pine and quite equal to any woodwool handled, including the best Swedish brands. Other types are being manufactured for further trials.

Pinus tæda (coarse)—

In comparison with the fine woodwools, it is not a success.

Imported Woodwool—

An examination of a number of bales of this showed quite a difference in qualities, some being soft and some brittle. The sample used was only slightly better than *P. tæda* (coarse). Better samples of imported woodwools than this have been seen in the past, but, whilst being better than the coarser Queensland woodwools, they would not be as good as the fine hoop pine or fine *P. tæda*.

The tests to date have been of a satisfactory nature as shown in these results. A further investigation of woodwools made on different lines is to be carried out, when it is hoped that even better results will be obtained.

PINEAPPLE MARKETING.

As the summer smooth leaf pineapple crop in South Queensland will soon be on the market, the necessity of packing only good class, matured fruit calls for emphasis.

There is always the tendency with some growers to pick the first shipments of pineapples too closely, with the result that these consignments lag on the Southern markets, waiting for the necessary colour to develop. Subsequent consignments arrive on top of an already loaded market, and have the effect of reducing prices. Complaints that pineapples are arriving far too green and are consequently very hard to move off the market are very common. Such fruit never ripens into an attractive condition.

Pineapples for the Southern markets should not be picked until there is a distinct sign of colour at the base of the fruit. Only fruit left until this stage will develop into a good eatable commodity.

None but good quality fruits free from sunburn, mechanical injury, or insect damage, and which are reasonably assured of being free from water blister, should be packed. Packing with woodwool is much preferable to grass; the pack always opens up cleaner and drier when the former is used.

Packing fruit to a nice grade is also a further factor in favour of a consignment. Any malformed fruit, or that which may have had the tops destroyed by frost, should not be packed. Cleanliness in the packing shed will keep the fruit free from most of the troubles which influence market values.

—E. F. Duffy.

RESOILING RAIN-WASHED ORCHARD LAND.

Repairing the damage caused by the recent heavy rains scouring gutters through the orchard is an operation requiring considerable thought, if the work is to be permanent. A repetition of the occurrence is inevitable where the work has been done haphazardly.

Land denuded of the surface soil presents a hard surface with which the replaced soil will not readily combine. Realisation of this important fact is one of the essentials of a successful job.

Whatever method is employed to repair the damage by replacing soil, it is of the greatest importance that the exposed hard areas should be treated first. Where practicable, the subsoil plough is the best implement to use, but any strong-toothed implement which will break up the surface will serve the purpose. Besides assisting in drainage, this will allow the overburden of replaced soil to incorporate with the subsoil.

If, however, repairing the damaged area entails very much labour, it may be advisable to commence resoiling at the higher levels first. If this is not done, and heavy rain interrupts the work, the undiverted water may again flow down the gutters and carry away the replaced soil on the lower portions.

For general purposes, and where soil can be taken from land adjacent to the orchard, a scoop should be used. Unless it is very soft, the ground should be ploughed before scooping, and careful ploughing to an even depth will greatly facilitate scooping.

—A. M. Richardson.

THE AFTER CARE OF GRAFTS.

Any deciduous fruit trees that have been grafted this season should be examined from time to time, and when the growth is about 8 inches long the wax cloth and string should be cut through with a sharp knife to allow for expansion, otherwise the string will cut into the bark and ruin the graft. Many grafts are ruined each year on account of growers omitting to do this necessary work.

When cutting, first cut through the wax cloth and string only; do not remove the wax cloth. The scion will push it off, and until then it serves a very useful purpose in protecting the cut surface of the limb from the sun and spores of fungus diseases.

Many fungus diseases are what might be called wound parasites, and an unprotected cut surface is an easy place of entry for them.

Do not allow shoot growth from the stock to overcrowd or rob the scions, and when checking any such growth, note whether any grafts have failed; if so, thin out the shoot growth so as to allow two or three shoots to develop sufficiently and in the right place, so that they can be budded to take the place of the dead graft.

The best time for the budding of these shoots will be from the end of January to the middle of February. The shoots to be budded must be making growth, or else there will be no sap flow to form the union.

The buds should also be taken from the current season's growth and from shoots that are still making growth. The buds should be cut from about the centre of the shoot, as they will prove more satisfactory than those taken from near the base or tip.

—H. St. J. Pratt.

MARKING TREES IN THE ORCHARD.

Because it is found impracticable to apply corrective methods immediately to drone fruit trees, or to trees known to require some specialised treatment for disease at some more opportune time, it is wise not to leave future identification of the tree to guesswork. The simplest way of marking such trees is by tying a narrow strip of cloth—preferably white—to a conspicuous limb.

In the case of individual trees giving light annual crops, pruning may be at fault. It is possible, too, that an individual tree may be a host of some serious pest that has not yet established itself throughout the orchard. The white rag indicator will serve as a reminder at a time later on when the necessary control can be conveniently applied. By marking the tree, the observant orchardist also will be able to note from time to time the efficiency of the control applied.

Unsuitable varieties and poor fruit types observed during harvesting and marked are not likely to be overlooked when reworking is being done in the proper season if they can be easily identified.

—A. M. Richardson.

The Fruit Market.

JAS. H. GREGORY, Instructor in Fruit Packing.

DRY weather in February succeeded excessive rain in January. Rain is again needed for the coming fruit crops to ensure size and colour. Queensland's stone fruit season is nearly finished. Prices during the second half of February were disappointing. Some excellent quality stone fruits were marketed during the season. Good quality Jonathan and Gravenstein apples found a ready sale, but small sizes were hard to quit. Growers of these varieties would find it an advantage to thin out when a heavy crop has been set. Granny Smith and Delicious prices were forced down to low levels through immature fruit being marketed. Prices for these two varieties should improve as better quality fruit is marketed. Grapes have been in full supply, quality fruit realising good prices. An experimental consignment of 407 cases was despatched in February to Hong Kong. The varieties sent were Black Muscats, Red Malaga, and Chaouck. Lemons have eased slightly in price, but are still maintaining very high values for first quality fruit. Oranges also have been realising high prices, and have reached levels that bring back memories of "the good old days." Palestine grapefruit has made its appearance for the first time in Queensland, selling at up to 38s. per large citrus case. This fruit of the Marsh Seedless is packed in an attractive wrapper. The quality appears to be quite good, and the coming of this type should assist in developing a taste for the first quality grapefruit now being produced in Queensland. Pineapples have maintained firm values for choice lines of Ripleys. Supplies of Smooths have been on the heavy side, consequently values have been easier.

The banana market leaves room for price increases, values in Sydney and Melbourne being particularly low. It is expected that values will rise as stone fruit supplies decrease. Some excellent fruit has been marketed. Prices during February were:—

TROPICAL FRUITS.

Bananas (Cavendish).

Brisbane.—Nines, 8s. to 10s. per case; eights, 5s. to 12s. 6d.; sevens, 4s. to 11s.; sixes, 4s. to 9s.

Sydney.—Nines and eights, 9s. to 12s. per case; sevens, 7s. to 9s.; sixes, 5s. to 6s.

Melbourne.—Nines, 8s. to 10s. per case; eights, 7s. to 10s.; sevens, 6s. to 8s.; sixes, 6s. to 7s.

Lady's Finger.

2d. to 8d. per dozen.

Sugars.

1½d. to 6½d. per dozen.

Papaws.

Sydney.—16s. to 18s. per case.

Melbourne.—To 14s. per case.

Pineapples (Smoothleaf).

Brisbane.—4s. to 6s. 6d. per case, 1s. 6d. to 5s. 6d. per dozen. Ripleys, 6s. to 9s. per case, 1s. 6d. to 6s. per dozen.

Sydney.—7s. to 10s. per case.

Melbourne.—7s. to 12s. per case.

Water blister prevalent. Extra care in handling is necessary during the warm humid weather being experienced.

Custard Apples.

Prospects are good for the coming season. Early consignments should not be marketed until fully matured.

Monstera Deliciosa.

Brisbane.—3s. to 4s. per dozen. Specials higher.

Melbourne.—6s. to 8s. per half-case.

Mangoes.

Brisbane.—Special types to 8s.; common mangoes slow of sale.

Melbourne.—Market slow, 3s. to 4s. per half bushel.

With cooler weather developing in the South, the popularity of this fruit is on the wane.

Avocados.

This fruit will soon be making its appearance on the market. Packers are advised to wrap and pad well with woodwool when sending long distances.

CITRUS FRUITS.

Oranges.

Brisbane.—5s. to 15s. per bushel.

Sydney.—Valencias, 4s. to 10s. per bushel.

Grapefruit.

Brisbane.—Palestine, 38s. per large citrus case.

Melbourne.—6s. to 15s. per bushel.

Lemons.

Brisbane.—Local, 7s. to 10s. per bushel case; Gayndah, 10s. to 15s.

DECIDUOUS FRUITS.

Apples.

Brisbane.—Jonathan, 4s. to 7s. per bushel; Granny Smith, 3s. to 7s. per bushel; Delicious, 4s. to 6s. per bushel. Hail-marked and inferior quality lower.

Sydney.—Jonathan, 3s. to 8s. per bushel; Granny Smith, 3s. to 6s. per bushel.

Pears.

Brisbane.—Gansell's Bergamont, 7s. to 9s.; W.B.C., 9s. to 11s.; Howell's, 6s. to 8s.; B. de Caps, 6s. to 8s. 6d.

Peaches.

Brisbane.—1s. 6d. to 3s. Sales slow.

Plums.

Brisbane.—Ponds, 5s. to 7s.; Grand Duke, 5s. to 6s.; President, 5s. to 6s.

OTHER FRUITS.

Grapes.

Brisbane.—Stanthorpe Black Muscats, 3s. 6d. to 5s.; Ascots, 3s. to to 3s. 6d.; Colemans, 3s. 6d. to 4s.

Tomatoes.

Brisbane.—Coloured, 2s. 6d. to 5s. 6d. per half bushel; ripe, 2s. to 4s. per half bushel; green, 2s. to 3s. per half bushel.

Sydney.—Queensland, 5s. to 7s. Few specials higher.

Melbourne.—2s. to 6s. per bushel.

Green fruit in Brisbane slow of sale.

Passion Fruit.

Brisbane.—8s. to 11s. per half bushel; seconds, 4s. to 6s.

Sydney.—6s. to 12s.

Melbourne.—3s. to 7s.

Figs.

Brisbane.—1s. 6d. to 2s. per tray, 4s. to 6s. per dozen boxes.

Quinces.

Brisbane.—5s. to 6s. a bushel.

VEGETABLES.

Brisbane.—Rosellas, 1s. 6d. to 2s. 6d. sugar bag. Rockmelons, Stanthorpe, 4s. to 5s. a bushel. Cucumbers, 7s. to 10s. bushel, 1s. to 2s. dozen. Pumpkins, 3s. 6d. to 5s. 6d. bag. Marrows, 2s. to 4s. 6d. dozen. Lettuce, 1s. 6d. to 3s. dozen. Cabbages, 6s. to 10s. dozen; inferior grades hard of sale to 3s. Beans, 4s. to 6s. sugar bag. Peas, 8s. to 10s. sugar bag; discoloured lines hard of sale.

CONVENIENT FARM GATE.

A wagon wheel with the rim and alternate spokes removed mounted as a turnstile makes a gate that is always open to people and always closed to horses and cows.

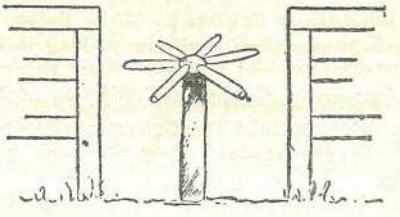


Plate 105.

In Memoriam.

E. H. RAINFORD.

Mr. E. H. Rainford, who died in Brisbane on 2nd February, was a very keen and able amateur naturalist. Those who have seen and admired the beautiful natural-colour collection of Queensland corals in the Museum will be interested to know that it was to Mr. Rainford that they were indebted for that presentation of a glimpse of one of the great natural wonders of the marine world, for it was his conception and the work of his skilled hands which gave it to them. Some of his corals also were sent to England and America.

In addition to this fine exhibit, the late Mr. Rainford also made a number of discoveries of new varieties of marine animals, some of them remarkable specimens, including new types of fishes and crabs which also are on view at the Museum. Mr. Rainford's name has happily been associated with some of these finds, thus permanently linking him with the work to which he gave so freely and so capably of his leisure.

The late Mr. Rainford was viticulturist in the Department of Agriculture and Stock from January, 1898, to December, 1903. He subsequently held other positions in the Department, and was for a number of years inspector under the Diseases in Plants Acts at Bowen. He retired from the Service in 1918.

Mr. Rainford was born in England in 1853. Before coming to Queensland he was engaged in viticulture and wine-making in Southern Italy for upwards of twenty-five years, and for seven years was manager of a large estate in Sicily belonging to Baring Bros. and Co., of London.

Amongst those who attended the funeral at Toowong Cemetery were representatives of the Department of Agriculture and Stock and the Queensland Museum.

PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock which have qualified for entry into the advanced register of the herd books of the Australian Illawarra Shorthorn Society and the Jersey Cattle Society, production charts for which were compiled during the month of January, 1938 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
Mature Cow (Standard 350 lb.).				
Villa Maria Broady 5th (365 days)	W. Hinricksen, Ardilea, Clifton	12,362·75	624·597	Villa Maria Sir Charles
Duchess 10th of Oakvilla	E. O. Jeynes, Raceview	13,906·16	597·407	Victory of Greyleigh
Primrose of Trevor Hill	Geo. Gwynne, Umbiram	11,439·49	480·044	Prince of Braemar
Corunna Queen	J. H. Anderson, Southbrook	9,851·56	436·316	Viceroy of Wilga Vale
Corunna Dainty	J. H. Anderson, Southbrook	10,984·92	413·453	Gambol of Wilga Vale
Senior, 3 Years (Standard 290 lb.).				
Morden Sadie 8th	W. Hinricksen, Ardilea, Clifton	9,942·0	404·145	Jupiter of Morden
Senior, 2 Years (Standard 250 lb.).				
Laguna Melba	F. G. Lamkin, Moola, Dalby	8,619·27	368·107	Morden Marcus
Yuruga Greta	F. Hansen, Goodyer	10,212·65	366·564	Werona Vale, Tango
Valera Sheila 2nd	M. C. and A. M. Sullivan, Pittsworth	7,063·63	303·193	Blackland's Daphne's Boy
Junior, 2 Years (Standard, 230 lb.).				
Sunny View Nancy IV.	J. Phillips, Wondai	11,229·45	461·853	Burradale Byron
JERSEY.				
Mature Cow (Standard, 350 lb.).				
Linwood Blossom	F. W. Kath, Malakoff, *via* Dalby	7,873·88	412·369	Aerofoil of Banyule
Kelvinside Sparkling Eyes	L. J. Comiskey, Warra	7,128·86	376·869	Kelvinside Benedictine Nobility
Sun Jewel of Rosedale	J. Schull, Oakey	6,842·6	359·966	Oxford Prince Palatine
Junior, 2 Years (Standard, 230 lb.).				
Kathleigh Royalette	F. W. Kath, Malakoff, Dalby	6,560·79	349·027	Retford Royal Atavist
Lermont Duchess	J. Schull, Oakey	4,668·4	275·227	Woodside Golden Volunteer
Lermont Myrtle	J. Schull, Oakey	5,403·25	272·96	Woodside Golden Volunteer
Bellgarth Babette	D. R. Hutton, Bellgarth, Cunningham	4,764·5	267·077	Trecarne Renown II.
Bellefaire Pride's Exhaltation	J. T. Richardson, Oakwood, Bundaberg	4,314·75	259·651	
Lermont Golden Bell (Twin), (268 days)	J. Schull, Oakey	4,363·05	249·192	Woodside Golden Volunteer
Bellgarth Birthday IV.	D. R. Hutton, Bellgarth, Cunningham	4,521·25	248·522	Trecarne Renown II.

The Tropics and Man

General Health.

Second Series: No. 8.

DOUGLAS H. K. LEE, M.Sc., M.B., B.S., D.T.M., Professor of Physiology, University of Queensland.

A few years ago the term "general health" would often have aroused a feeling of mild and genial yet real contempt in a large number of conscientious scientists. The idea of thinking about such a vague thing as "general" health was not quite according to the rules. One could think scientifically perhaps about digestion, about heart-action, or even about pain, but to speak of "general" health was to hide one's ignorance of *real* bodily matters under a smoke-screen of words.

There were always, however, a few people who still considered themselves true scientists, but who thought and talked quite unashamedly about "general" health. They felt that the human body—in fact, life itself—is something more than a number of simple activities simply added together. They admitted, nay, even insisted, that to understand Nature you had to take her apart, as it were, to see what went on; but they also insisted that you were then only half-way to understanding her; that you had to put the parts back again and see, not only how they worked, but how they worked *together*.

In the previous articles of this series I have tried to take the human body to bits and to show you how the working of these bits was affected by hot climates. To complete this series I must put these parts back and say something about the working of the whole body—that is, "general health."

Tropical Detriments to Health.

The greatest danger to health in the tropics is undoubtedly that of transmissible disease, produced by virus, bacterium, or parasite. The climate and living conditions conspire not only to favour the spread of diseases occurring in temperate climates, but also to introduce diseases peculiar to the tropics. Transmissible disease is always, in the last analysis, preventable, but only too often economic, social, or even political issues prevent us from applying our full knowledge. The fact that it is preventable, and that as active measures as are humanly possible are being taken by authorities all over the world, is the bright spot in this aspect. For the reason that administration rather than scientific enquiry is the chief need in this field, I have not stressed this aspect in these articles.

Climate is usually considered to be the second chief danger to human health in the tropics. This idea largely dates from the scientifically dark ages when the cause and transmission of infective diseases was not understood. Inasmuch as a hot climate helps the spread of disease from one case to another, climate is, of course, a danger to health in the tropics. This charge is very often extended, however, to climate acting

directly upon the body. It is usually felt amongst British colonists (as distinct from Britishers in the Dominions) that even if infective diseases were abolished hot climates would still have a very bad effect upon the tropical dweller. To a certain extent that is true. In previous articles you will find references to the following ill-effects of hot climates:—Lassitude, irritability, loss of appetite, constipation, fatigue, muscle cramps, neurasthenia, heat exhaustion, reduction of work capacity, and reduction of mental productiveness. These occur, and they are due, in large part, to the direct effect of climate. They need not occur, however, to anything like the extent or with anything like the severity that they do. An understanding of their causes and the application of that knowledge along common-sense lines could go a long way towards reducing them to tolerable limits. One must realise that life in a tropical climate is different from life in a colder country. There is a limit upon activity; there is a reduced margin of safety over which one can maltreat the body with impunity. There is every necessity to enforce a reasonable adjustment of living conditions and habits to the new surroundings. So long as we preserve an attitude of mind which demands an unreasoning imitation of English Yuletide customs at the height of a Queensland summer, so long will we pay the consequences.

Economic and social disabilities must be ranked amongst the greatest dangers to human health and happiness in the tropics. Where worry and disappointment are continual companions, health can maintain but a precarious footing. Whether we like it or not, whether we agree with the system or no, the economic factor is the ruling consideration in continued life under the existing social system. Man can continue to live in a certain area only so long as he maintains a balance of assets over liabilities. No area of our tropical country can be populated unless the very large majority of the desired population can be assured of a reasonable chance of doing this. If the "natural" opportunities are insufficient to do this, then the question must be decided as to which is the least harmful—foregoing the settlement or providing artificial economic protection.

Isolation may mean little to the pioneer; he is made that way. Isolation may mean little to the grazier thoroughly interested in his work. Isolation, however, means a lot to the ordinary run of people whom we ask to settle on the land. Isolation may mean everything to the grazier's wife, cut off from her friends, social pleasures, and intellectual intercourse. How many people, having become used to the pleasures and comforts of city life, will willingly forego these to obey the urge to settle on the land unless reasonable amenities are provided? There has been far too great a tendency to think that anything is good enough for the country cousin. The feeling of frustration, of disappointment, and even of disillusion that is so frequently found in isolated communities is a definite, real, and constant danger to health. The psychological danger is reinforced by the material danger of dietary deficiencies in such areas.

Health Advantages in the Tropics.

While many diseases are more common in the tropics, there are others which are reduced in incidence or severity. Rheumatic fever and scarlet fever are cases in point. Tuberculosis cases often do well in hot, dry climates; a hot, humid atmosphere is not so beneficial.

Tuberculosis of the "bovine" type, which attacks the skin, bones, and glands is much less common in Queensland than in the Southern States. True childhood rickets is uncommon owing to the high incidence of sunshine. The free, open life is of the greatest assistance to children, permitting, as it does, of good exercise for the whole developing body. The beneficial effects of tropical residence show to their greatest advantage in the growing children; its burdens fall on the adult.

Getting the best out of the Tropics.

Take all that is good; avoid or minimise that which is bad! The first essential is a sensible attitude towards the tropics. In these articles I have tried to set out for you simple rules for life in the tropics, rules which are only common-sense deductions once the effects of hot climates are understood. The next essential is to see that you make the greatest possible use of every advantage. Do not aim at getting merely satisfactory conditions, make sure you get the best possible. The bank-balance of health can never be too high; you never know when the most serious demand may be made upon your reserves, and tropical circumstances are always placing a strain upon them. A third essential is to do everything in your power to see that your life is a full, happy and contented one. Contentment should not, however, be confused with complacency. You cannot get contentment until you have strived and won. Complacency is only another name for mental and moral laziness, a fatally easy habit to acquire in the tropics!

BALANCE OF NATURE.

A United States contemporary, *The American Cattle Producer*, publishes an editorial on the dire consequences that may follow ill-advised action in the wholesale destruction of animals and insects indigenous to the country. The particular trouble described started with coyotes, a species of wolf peculiar to and native of North America. These, it appears, have developed a habit of killing sheep, and at times even calves, so the Federal Government employs hunters to keep them down. It now transpires that in areas where the hunters have been particularly successful in their coyote elimination campaign, there has been a sudden increase in the rodent population. Rodents eat grass and are reported in such numbers as seriously to impair natural feed in certain districts—so much so that stockowners have sought Government assistance to relieve them of a new pest. At time of writing plans were being prepared for the carrying out of an extensive rodent poisoning campaign. *The Producer* asks, what will happen next? "If," it writes, "the poison is too profusely distributed by inexpert hands, is there not danger that useful birds will be destroyed in large numbers? If so, once the rodents are destroyed there may be a fresh host of enemies to combat." Our experiences in Australia certainly justify the sounding of the note of warning. The grasshopper plague that has afflicted large areas of pasture land during the past year or so can be attributed in part, at least, to the indiscriminate destruction of bird life. The same also applies to the blowfly pest. Nowadays, with the Council for Scientific and Industrial Research available to weigh and test pest elimination projects, there is not the same risk of nature balances being disturbed. Australia's task to-day is rather to readjust balances that have been upset by the introduction of rodents, plants, &c., which have multiplied beyond all expectations. It is on such work that the Council for Scientific and Industrial Research is now engaged. Government, for its part, is trying to guard us against the importation of new potential pests, and in that connection should receive the whole-hearted support of every individual in the Commonweal[illegible] *The Pastoral Review* for February, 1938.

Answers to Correspondents

BOTANY.

Replies selected from the outgoing mail of the Government Botanist, Mr. C. T. White, F.L.S.

Barnyard Millet.

J.H.J. (Tamaree)—

The specimen is the barnyard millet (*Echinochloa crus-galli*). It has nothing to do with Sudan grass, and it is not a hybrid. It mostly grows in fairly damp situations and has a good reputation as a fodder grass. No poisonous properties have been attributed to it.

Stink Grass.

G.McC. (Millmerran)—

The specimen is the stink grass (*Eragrostis cilianensis*). Although cattle often avoid this grass, once they take to it they become fond of it. The best means of eradication would be hoeing before the seed sets. It is an introduced grass, native of India, Ceylon, and tropical Asia.

Portuguese Elm. Emu Grass. Carob Bean.

W.J.B. (Warra)—

Both tree specimens belong to the Portuguese elm (*Celtis sinensis*). This tree is extensively planted as a shade and fodder tree. The other specimen is a weed, *Psoralea tenax*, or emu grass. This is regarded as a fairly good native fodder plant. The carob bean does well on the Darling Downs. The young trees could be protected from frost if planted on low-lying land. We had not heard before that this tree is very susceptible to frost injury.

"Shepherd's Purse."

S. (Killarney)—

Your specimen has been identified as shepherd's purse (*Capsella Bursa-pastoris*). This plant is a weed in cultivation. It is not poisonous to stock and probably has a certain fodder value, but it may cause a taint in milk if eaten in large quantities.

Saffron Thistle, a Noxious Weed.

R.M. (Mundubbera)—

Your specimen has been identified as saffron thistle (*Carthamus lanatus*). This plant has been declared a noxious weed.

Gall Weed or Twin Leaf.

W.D. (Goondiwindi)—

The specimen of a weed from brigalow and belah country has been determined as gall weed or twin leaf, *Zygophyllum apiculatum*. We have no information as to whether this plant is poisonous, although it has come under suspicion recently as a possibly poisonous plant. As stock rarely touch it, it would seem to be at least unpalatable.

Wild Sorghum.

W. A. McD. (Mackay)—

The specimen is the wild sorghum (*Sorghum verticilliflorum*), a native of Africa, but now very common in many parts of Queensland, particularly along railway embankments, cultivation headlands, and similar places where the ground has been disturbed. A test by the Agricultural Chemist showed this to be one of the worst prussic-acid-yielding sorghums, and care should therefore be exercised in feeding it off. It is very similar to Johnson grass, but is somewhat bigger and coarser. We have seen both this and Johnson grass used on various occasions without any ill-effects following. The danger, of course, is always present.

White Cedar.

B. (Ayr)—

The specimens have been identified as the berries of the white cedar (*Melia dubia*). White cedar berries are well known to be very poisonous to pigs, and may be poisonous to fowls.

Button Grass.

M. Mc. (Wallangarra)—

The specimen is button grass (*Dactyloctenium radulans*), a native grass, very widely spread in Western Queensland, particularly in the sheep areas, and generally regarded as an excellent fodder. Like Flinders grass, it is quite palatable in the dry stage. It often grows with great abundance during the summer months, dying out with the approach of winter. It is very easily carried in the wool of sheep from one place to another.

Sour or Yellow Grass.

E.B. (Pomona)—

The specimen is *Paspalum conjugatum*, commonly known in Queensland as sour grass or yellow grass. In Hawaii it is known as hilo grass and also as mission grass. It is a native of tropical America, but is now widely spread throughout most tropical and sub-tropical countries. It has been established in Queensland for many years, particularly in the North, and during the past few years has established itself in Southern Queensland and parts of the Northern Rivers district of New South Wales. It is generally regarded as a poor fodder, and has given some cause for alarm in the wetter parts of the Atherton Tableland from its overrunning some country and reducing the carrying capacity of the paddocks in somewhat the same way as carpet or mat grass has in parts of the near North Coast. Wherever it grows, this grass has a poor reputation, although we have seen working mules fed on it very largely in New Guinea and work fairly well on it. It is a very common grass in the rubber and coconut plantations.

Needle Burr. Red Ash.

J.D. (Moggill)—

The weed is *Amarantsus spinosus*, needle burr. This is a very common tropical weed in North Queensland, and has spread as far south as the New South Wales border, but it does not seem as aggressive in the South as it is in North Queensland. Apart from its spiny nature, the plant is not known to possess any harmful properties. In India and tropical Asia, the green parts are generally used as a substitute for ordinary spinach.

The tree with the white under-surface of the leaves is *Alphitonia excelsa*, red ash, also known as silver ash or silver leaf, and sometimes as silver wattle, but should not be confused with the true silver wattle. This tree has a very wide distribution in Queensland, and is generally regarded as an excellent fodder. We have information, however, that stock in the Brisbane Valley will not take to it in the dry season when it is most required, although they will eat it in an ordinary season.

Evergreen Chloris.

T.H.C. (Gympie)—

Your specimen has been determined as evergreen chloris (*Chloris distichophylla*). This grass it a native of South America and it is cultivated in several parts of the State. It is palatable and nutritous, but tests made by the Agricultural Chemist show that it contains a prussic-acid-forming substance. Because of this, it would be advisable to exercise care in feeding the grass to stock.

" Devil's Claw."

C.E. (Stanthorpe)—

Your specimen is *Martynia proboscidea*, a native of Mexico, now naturalised in parts of Queensland and New South Wales. It is commonly called unicorn plant or devil's claw. When ripe, the green flesh of the fruit or seed capsule is split and the interior part bursts open in two long, strong claws. These sometimes get into the wool of sheep, particularly the heavy wool round the neck, causing breakages in shearing machines. An allied species with yellow flowers is common on parts of the Western Downs, and is sometimes known as pumpkin plant.

"Dog Burr."

W.D. (Goondiwindi)—

Your specimen is *Bassia tricuspis*, a species of roly-poly, a very common weed in parts of the Western Downs and Maranoa districts. It is closely related to the galvanised burr. We have not heard any distinctive local name applied to it, although we have heard it called "dog burr."

"Goathead."

W.A.K. (Clermont)—

There are two plants known as "goathead" in North Queensland, one *Bassia bicornis*—a somewhat upright plant—and the other *Tribulus terrestris*—a procumbent plant with yellow flowers followed by a mass of burrs, which break up into one-seeded pieces.

The former is not known to possess any poisonous or harmful properties. It is only found in Australia.

The latter has a very wide distribution over the world, and in South Africa is the cause of the trouble known as yellow pighead or tribulosis. It is one of those troubles that come under the heading of photosensitisation, and only the unpigmented or unprotected or little protected portions of the body are affected. The first symptoms noticeable are:—The animals rub the ears, face, and nose against stones, trees, or stumps, or scratch these parts with the hind legs. Within one or two days the animals appear depressed, and the eyelids, face, lips, and intermandibular organs are markedly swollen; the ears are about four times thicker than normally, and are drooping. After about the fourth to the eighth day, the swellings may extend down the ventral aspect of the neck and down to the throat organs, and are accompanied by discharges from the nose, eyes, and lips. Later the swellings almost disappear, and mummification of the skin of the affected parts sets in, causing the face to be hidebound and rendering movement of the jaws impossible. The disease may last from a few days to three weeks, or even longer.

Plants from Rockhampton District named.

M.R.I. (Rockhampton)—

(1) *Passiflora alba*, wild passion vine, a very common vine in Queensland, proved by Dodd to be poisonous to stock. The trouble is of an accumulative nature, and stock have to eat fairly large quantities of the vine over a considerable period before trouble is experienced. Most of the trouble occurs in dry seasons.

(2) *Abutilon auritum*, a very common shrub in some of the coastal parts of Queensland. It is not known to possess any poisonous or harmful qualities.

(3) *Solanum seaforthianum*, a native of tropical America, now naturalised in many parts of coastal Queensland. It is frequently known as "deadly nightshade." No feeding tests have been carried out with it, but we think it is safe to assume that the green tree is poisonous to stock. The burrs are reported to have been carried in by stock on various occasions. Fowls have been poisoned by them. Native birds, however, seem to eat the ripe fruits with impunity, because it is spread very widely by them.

(4) *Wikstræmia indica*, tie bush, a very common shrub in coastal Queensland, and always regarded as very poisonous. Some time ago, feeding tests were carried out at Yeerongpilly by Pound. These gave negative results. The animals showed scours with traces of blood, but recovered when put on to ordinary feed. Later on Stewart carried out tests with the berries alone at Yeerongpilly on guinea pigs, and this showed them to be very poisonous. This latter test followed a report from Nambour that a child had eaten the berries with fatal results.

(5) *Alstonia constricta*, native cinchona or quinine, not known to possess any poisonous or harmful properties.

(6) *Cassia lævigata*, arsenic bush, a very common weed in Queensland. The local name is rather misleading. Like most species of cassia, however, it would probably cause scouring if eaten in any quantity.

(7) *Trema aspera*, poison peach. At times it develops a prussic-acid-yielding glucoside, but the presence of the glucoside in the plant is very transitory. We have known stock reported to eat this plant in very large quantities with impunity.

(8) *Tagetes glandulifera*, stinking rodger, a very common weed not known to possess any poisonous or harmful properties.

General Notes

This Month's Cover.

The block for this month's cover was made from a photograph by Mr. R. W. Lahey of a typical stand of Kauri pine in the Kirrima State Forest, North Queensland.

Staff Changes and Appointments.

Mr. E. J. Shelton, Senior Instructor in Pig Raising, has been appointed also an honorary protector under the Fauna Protection Act.

Mr. M. Moffat (Stapylton) has been appointed an honorary ranger under the Native Plants Protection Act.

Constable W. K. Fraser (Calen) has been appointed also an inspector under the Slaughtering Act.

Messrs. H. L. McDonald (Ormiston), G. King (Thorneside), W. Langdon (Cleveland), M. Bloomer (Wellington Point), and E. S. M. Attridge (Cleveland) have been appointed honorary protectors under "*The Fauna Protection Act of* 1937."

Diseases in Poultry.

Regulations have been issued under the Diseases in Poultry Acts relative to the registration of hatcheries and the conditions to be observed and performed by the owners of registered hatcheries.

Pure Seed Supplies.

The Department of Agriculture and Stock continues to receive numerous inquiries from farmers desirous of purchasing general seed supplies, who are apparently under the impression that the Department acts in the capacity of general seedsman. This is not in accordance with fact, as the Department does not enter into competition with established seedsmen.

Attention is given, however, to the pure seed supplies of tobacco and maize, both of which are produced on privately-owned farms in pure-seed propagation plots under departmental supervision. The control of tobacco seed supplies is essential in order to maintain purity and freedom from disease; and a somewhat similar position exists in regard to maize, as it is often difficult to procure pure high-yielding strains of approved varieties. An endeavour is made, therefore, to supply, in season, a small quantity of pure-seed maize to growers desirous of raising and selecting their own bulk seed for succeeding sowings. Farmers may rest assured that whenever seed of any description becomes available for sale or general distribution by the Department full particulars will be given by advertisement in the *Queensland Agricultural Journal* or by notification otherwise.

Farmers who require general farm seeds are advised to communicate direct with the nearest reliable seedsman from whom tested seed can be obtained.

Operation of the Seeds Act.

A Proclamation has been issued under "*The Seeds Act of* 1937" bringing that Act into operation as from the 20th January, 1938.

Regulations to give effect to the provisions of the Act have also been issued.

Mr. F. B. Coleman, Officer in Charge of the Seeds, Fertilizers, Veterinary Medicines, Pest Destroyers, and Stock Foods Investigation Branch, has been appointed Seed Specialist, Seed Analyst, and Inspector under the Seeds Act. Mr. R. A. Taylor, Inspector and Examiner under the Pure Seeds, Fertilisers, Veterinary Medicines, Pest Destroyers, and Stock Foods Acts, has been appointed a seed specialist during the absence at any time of the seed specialist, also seed analyst and inspector under the Seeds Act. Messrs. F. P. C. Bell and R. J. Holdsworth, inspectors under the Pure Seeds, Fertilisers, Veterinary Medicines, Pest Destroyers, and Stock Foods Acts, have been appointed seed analysts and inspectors under the Seeds Act.

Honey Board.

Orders in Council have been issued under the Primary Producers' Organisation and Marketing Acts giving notice of intention to extend the operations of the Honey Board from 9th March, 1939, to 8th March, 1944, and also providing that, from the election held about March of this year and thereafter, elections of growers' representatives shall be held triennially, and such representatives shall hold office for a period of three years.

Fruit and Vegetable Levies.

Executive approval has been given to the extension for a further twelve months, in each case, of the Stanthorpe Fruit and Vegetables General Levy Regulation and the Papaw Levy Regulations. These Regulations were issued in April, 1936, and were extended in December and January last, respectively.

Close Season for Mammals and Birds.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937" repealing an Order in Council issued in November, 1935, under "*The Animals and Birds Acts,* 1921 *to* 1924," declaring all mammals (other than native bears) and all birds to be fauna to which the above firstmentioned Act shall extend and apply, and declaring the periods of close season throughout the State for the mammals and birds appearing in the schedule to the Order in Council. These are similar to those enforced under the Animals and Birds Acts.

The Fauna Protection Act.

"*The Fauna Protection Act of* 1937," which was passed during the last session of Parliament, is now in operation (as from the 1st January, 1938). This measure repeals "*The Animals and Birds Acts,* 1921 *to* 1924."

Dairy Inspectors' Examination.

An amendment of a Regulation under the Dairy Produce Acts provides that 70 per cent. of the marks allotted shall be sufficient to secure a pass in the practical portion of the examination for appointment as inspector under the abovementioned Acts instead of 80 per cent. as at present. A 60 per cent. pass in the theoretical section, as at present required, will remain in force.

Apples and Pears for Export.

At the recent annual conference of the Australian Apple and Pear Export Council, held at Sydney, it was decided that the following varieties of pears be placed on the recommended export list:—Beurre Hardy, Beurre D. Anjou, Beurre Bosc, Doyenne du Comice, Josephine, Packham's Triumph, Winter Cole, Winter Nelis, Madam Cole, Glou Morceau, Easter Beurre, Duchesse de Angouleme.

It was also decided that the following varieties be permitted export in 1938 only, and then to come up for review:—Black Achan, Howell, Marie Louise, Doyenne Bossuch, Lemon Bergamot, Vicar of Winkfield, Williams Bon Chretien, Winter Bartlett, Giblins Seedlings, Beurre Britton, Middleton, Kieffer.

All other varieties have been excluded from export.

Growers are asked to note the foregoing, so that the necessary re-working can be proceeded with.

In respect of varieties of apples for export, growers are advised to re-work with early red varieties.

Control of Banana Weevil Borer—Reward Rescinded.

The Regulation under the Fruit Marketing Organisation Acts authorising the Committee of Direction of Fruit Marketing to offer a reward of £5,000 for an effective scheme of treatment for the control of the banana weevil borer has been rescinded.

Registration of Hatcheries.

Regulations governing the voluntary registration of hatcheries have been prescribed. The object of registration is to combat pullorum disease (more familiar to many poultry raisers as bacillary white diarrhœa), and to maintain the standard of stock in respect of type and size of egg.

Before any hatchery is registered, it is necessary for the owner to submit the poultry on his premises to a blood test for pullorum disease, to undertake to eventually dispose of all birds which are carriers of the disease, and to maintain strictly his premises in a sanitary condition.

The registration of hatcheries is voluntary, but it is anticipated that owners of hatcheries will submit to the conditions governing registration in order that the purchaser of day-old chickens will have some reasonable guarantee as to their quality. As under the regulations blood-testing of the stock must be conducted by officers of the Department of Agriculture and Stock, breeders desiring to register should make early application in order that the staff of the Poultry Branch may be enabled to cope with the work entailed.

Boronga a Crossing Place for Stock.

An Order in Council has been issued under the Diseases in Stock Acts appointing Boronga to be a crossing place for stock from New South Wales. Mr. J. W. Carrigan (Brooklyn, Toobeah) has been appointed an honorary inspector of stock in connection with the duties at this crossing place.

Provisional Maize Board.

An Order in Council has been issued under the Primary Producers' Organisation and Marketing Acts, extending the operations of the Provisional Maize Board until October, 1938

Milk Board.

The Executive Council has approved, in pursuance of an indenture entered into on the 20th January last between certain producers and vendors of milk and the Secretary for Agriculture and Stock, that the following shall constitute the Milk Board provided for in that indenture, for the period as from the 17th February, 1938, to the 16th February, 1939:—

Mr. E. H. Lindsey (chairman).

Producers' Representatives.—Messrs. J. W. Latimer (Hill View, Yatala), J. A. McKnoulty (Jimboomba), and A. Clark (Loganholme).

Vendors' Representatives.—Messrs. R. H. Bentley (Metropolitan Milk Supply (G.B.) Ltd., Glenelg street, South Brisbane), W. E. Bell (Mayne View street, Milton), and G. Andrew (Chappel street, Petrie terrace).

Wild Life Protection.

Regulations have been issued under "*The Fauna Protection Act of* 1937" dealing with the issue of permits for trappers of fauna, the licensing of dealers in fauna and in opossum skins, and the registration of their premises.

The sale of any fauna or skins by an unlicensed person is prohibited, and penalties are provided for any breaches.

In addition to the payment of royalty on opossum skins, as was provided in previous legislation, a royalty at the rate of 10 per cent. on a prescribed valuation is now payable on all fauna taken within the State, either for the purpose of export beyond the boundary of the State or for sale within the State. This also applies to the sale or exchange of birds from aviaries.

Fees have been fixed for the issue of permits to bird trappers and opossum trappers, and for licenses for fauna dealers, skin dealers, and retail skin dealers.

The registration of aviaries is now provided for, and every person who is the owner of an aviary must make annual application for registration. No fee will be charged for this registration.

Generally, these Regulations are designed to provide more effective control measures for the protection of fauna in the State.

All-Australian Export Baconer and Porker Competitions.

Entry forms in connection with the second series of these competitions are required to be lodged with meatworks managements on or before the 15th April next, and entries should be forwarded to meatworks in time for them to be treated and shipped so as to arrive in London for judging on 15th July.

Pig producers are reminded that such competitions provide important publicity for Australian pig meats in the United Kingdom, and that the reports of the judges on individual entries are a valuable index to the producers concerned of their achievement and a guide to the type required in the United Kingdom market. Each entry should comprise three pig carcases, including heads, bred and fattened by the entrant. Only one entry of each particular breed or cross will be allowed from each entrant. The sire of the entry must be purebred and from a litter recorded by the Australian Stud Pig Breeders' Society. Weights for baconer carcasses should be not less than 120 lb. nor more than 160 lb. dressed and including heads. Weights for porker carcasses should be not less than 60 lb., nor more than 90 lb. dressed and including heads.

Prize money totalling £25 is awarded by the Australian Meat Board to successful entrants, and in addition, a trophy valued at £10 10s. is competed for. No entry fee is charged.

Entry forms are obtainable from the usual trade channels, also on application to the veterinary officers of the Department of Commerce in each State, and from the office of the board at 419 Collins street, Melbourne.

Rural Topics

The Flying Doctor Service.

This great work is increasing in value each year, a new "Flying Doctor" base having been established at Broken Hill by the New South Wales section of the Australian Aerial Medical Service in co-operation with the South Australian section. This is to provide medical facilities for settlers living within a radius of from 200 to 400 miles. By arrangement with Australian National Airways a suitable plane has been operating since June, and the station is now equipped, or will be shortly, with a powerful wireless installation.

Australian Aerial Medical Service is performing a national work without any attempt at profit, and has helped to revolutionise life in the outback country. Bases under its control have been set up at Port Hedland, Wyndham, Kalgoorlie (Western Australia), and Broken Hill, and it has a friendly interest in the station at Cloncurry (Queensland) conducted by the Australian Inland Mission. That one was the first in the Commonwealth and has been a great success. Should the project to equip a sixth station at Alice Springs eventuate, the sparsely populated areas of Australia will be brought within easy range of a flying doctor and hospital.—*The Pastoral Review.*

Buying "Chiller" Stores.

The chilled beef export trade calls for superior carcases, and buyers of stores for fattening are recommended to give attention to the following guiding principles:—

Body.—

1. The beast should be low-set. The short-legged beast always sells before and at a higher price than the "kangaroo dog" type. Leg beef is not wanted.

2. The body should be both deep and wide. Such bodies have the meat where it is wanted—i.e., in the region of the most expensive cuts.

3. Both top and underline should be straight, giving the body a box-like appearance. Roach-backed, slant-bellied beasts are not good "chillers."

4. The floor of the chest should be wide.

5. The ribs should be well sprung—i.e., more of the conventional heart than barrel-shape.

Head.—The short, broad head that usually goes with the well-bred animal is a good guide. The eye should be clear and prominent. Horns are not wanted.

General Appearance.—Uniformity in breed, size, colour, and quality are those selling features which constitute an even line and make for ready sale and top prices.

Every effort should be made to exclude from top lots cattle with unsightly brands, signs of disease—i.e., lumpy jaw, blind or suppurating eyes, limp, &c. The irregular feature in a few tends to mark down the value of the pen.

English Farm Boys.

Mr. Cyril Bavin, general secretary in charge of community services of the English National Council of the Y.M.C.A., stated recently at the Millions Club, Sydney, "that of more than 1,100 boys who were working on English farms, after being trained by his association, only 100 were willing to migrate to the Dominion. The reason was that wages and conditions of living in the farming industry of Britain were as good, if not better, than those obtained in Australia or Canada."

Mr. Bavin said that when migration ceased at the time of the depression, the scheme of training boys for farming in England was adopted, the intention being to build up a reserve of 1,000 youths who would be willing to go to the Dominions when migration began again.

"It seems," he said, "that the success of the scheme has defeated its objective. One boy asked me what wages were paid in Australia, and when I said he could get about 25s. a week with keep, his employer, who was standing by, said, 'Make up your own mind, Bill, but I am prepared to pay you 30s.'"

Of 1,300 boys trained and placed on farms by the association, Mr. Bavin said, 80 per cent. were still working on the land.—*The Pastoral Review.*

Horse Botflies.

At this time of the year horses may be greatly troubled by botflies. These flies are bee-like in appearance and possess two wings and a slender pointed abdomen. When laying eggs, the female fly hovers around the horse with the abdomen curved beneath the body. This has given the erroneous impression that the botfly stings, but its abdomen is held in this position merely to facilitate the deposition of its eggs. The eggs are laid on the hairs of the chest, throat, mane, shoulders, and legs of the horse, but more frequently on the hairs of the throat and the inside of the forelegs.

In time, the larvæ develop within the eggs and hatching occurs when the horse licks or rubs the spot on which the eggs are present. In some way or other, the hatched larvæ reach the mouth of the horse and then burrow into the flesh of the tongue and cheeks. Here they remain for a little while, but eventually make their way into the stomach. When fully grown they are passed out of the animal with the dung, burrow into the ground and pupate. In the pupæ the adult botflies are formed and they emerge after a period of a few weeks.

Botflies are harmful to horses in two ways. Firstly, the horse instinctively recognises them as enemies and makes desperate efforts to prevent the female botflies approaching and laying eggs. During the botfly season, horses thus become very difficult to manage in harness, and may also hurt themselves in their attempts to avoid the flies. Secondly, the bots in the stomach may cause serious trouble. Each bot has a pair of stout hooks in its mouth, and also rows of hooks around its body. These hooks irritate the lining of the animal's stomach, and may cause ulcers and other ill-effects.

Various methods have been devised to prevent the botflies from approaching horses and laying eggs. One of the simplest and most successful is a piece of canvas attached to the horse's noseband and headstaff, so that it covers the throat completely. Deep sheds or brush shelters also will give protection, as the botflies will not follow the horse out of the sunlight.

For the removal of the bots from the horse's stomach, carbon bisulphide is advised. This is given in a capsule after twenty-four hours' starvation at the rate of 6 cubic centimetres—about one ordinary teaspoonful—for every 250 lb. weight. The best time to treat a horse for bots is about May or June, for at this time of the year all eggs on the body will have hatched and, as no flies are about, the horse cannot become reinfested immediately after treatment.

—Dr. F. H. S. Roberts.

Dipping Sheep.

Dipping is the only successful method of freeing the flocks from lice and ked. For dipping a recognised proprietary material should be chosen and the directions for mixing followed implicitly.

Ordinarily, dipping should be done up to one month off shears or even earlier, but all shearing cuts should have time to heal before the sheep goes through the bath. A fine day should be chosen for the operation. Extremes of heat or cold should be avoided.

Sheep should never be dipped when in a heated state. Yard them, if possible, the night before.

Immerse the sheep completely. Allow them to drain and, if possible, dry in the shade. Avoid driving them long distances to paddocks after dipping.

Dipping pays, and, in addition, gives some protection against the blowfly.

—J. L. Hodge.

To Check a Bad Habit in Calves.

Skim milk-fed calves are often seen sucking each other after the buckets have been emptied. This bad habit should be stopped. Septic conditions, malformed teats, distorted udders, and early lactation in heifers may be traced to the habit of calf sucking calf. Either keep the calves away from one another by leg-roping until the taste of milk has dissipated, or feed them with meal—e.g., crushed or ground grain, pollard, bran, &c.—immediately after they have finished the milk.

Grooming of Dairy Cattle.

Grooming of dairy cattle is a refinement in farm management which calls for comment. High-producing animals are usually kept on high-priced farms, where natural scratching (or rubbing) posts—trees or stumps—have been removed. Frequent milking and stall feeding prevents during much of the day the natural function of self-licking. Both these small inhibitions have a marked effect on milk production, and it has been observed that, under these conditions, some grooming is decidedly beneficial.

Some Points for Poultry Farmers.

In poultry farming, culling serves two important purposes. By getting rid of the culls, all of the feed goes to the laying hens; and only the best hens remain in the flock to serve as future breeding stock.

Other sound points in poultry farming include care in the handling and marketing of eggs. Eggs are considered to be one of the most perfect foods for human consumption, yet in spite of that fact the quantity consumed by Queenslanders per head is extraordinarily low. Why more eggs are not eaten is probably because their regular dietary value is not more widely appreciated. There are other reasons, too; for instance, the delivery of eggs with dirt on the shells and the production of fertile eggs in hot weather. Clean nests, clean floors, and clean containers will soon overcome the dirt difficulty; while selling off all the male birds at the close of the hatching season is the answer to the other problem. Eggs should be gathered two or three times a day, and marketed at least twice a week in hot weather.

In looking after poultry, even with the best of care, we often overlook a very common source of trouble, and that is the house fly. Flies can go a long distance and carry germs and contamination from a diseased flock, or from microbe-infested filth. The industrious pullet will chase and catch flies just for the fun of it, and, at the same time, take in all sorts of germs or worms. So it would be wise to clean up every attraction for flies and spray the fowl houses just before cleaning them out. For general health reasons, apart from the requirements of the fowl run, it pays handsomely to swat the fly.

Risk of Feeding Raw Offal to Pigs.

On many farms a fat beast is killed occasionally for domestic use. Portions of the carcase and viscera are sometimes fed raw to pigs. These form a valuable pig food, if cooked; but, if fed raw, the health of animals may be endangered. For instance, when an animal is affected with tuberculosis, the primary lesions in the organs, being small, may escape detection. Although the carcase may not be grossly affected, there is a real danger to pigs—especially young ones—if fed with uncooked material from a diseased beast.

It is a serious offence under the Cattle Slaughtering Act, the Diseases in Stock Acts, and the Pig Industry Act to feed any meat, offal, or blood unless it has been completely cooked.

Shade for Pigs.

During the summer adequate shade for pigs should be provided. The ordinary sty, especially if it has an iron roof, is very hot, and some other shade is necessary in the heat of the day. If there are no trees near by, a wooden shed will answer the purpose. Another important aid to the health and comfort of pigs is a bath in which they can lie in hot weather. To wallow in the mud is the pig's natural method of cooling itself. Unfortunately, the wallow sometimes seen on the pig farm is a filthy puddle-hole. If there is infection of any kind in the yard, it is to be found in just such a place. Dirty wallows should be drained and filled in, and a concrete or similar bath provided. This can then be kept clean, and the liability to infection will be diminished. Comfortable and hygienic conditions are most important in maintaining the health and wellbeing of pigs.

Treatment of Cream.

In the present season of hot weather and thunderstorms dairy farmers are again advised to give close attention to the cooling, aerating, and stirring of cream. The flush growth of grass in the wet season often causes a gassiness in cream, as well as a "feedy" flavour. Aeration and cooling will do much to offset the development of these defects.

Variety in Livestock Feeding.

The flesh-forming materials in foods (proteins) are composed of units termed amino acids. These amino acids are synthesised by plants, but it is very doubtful whether they can be "manufactured" by vertibrates.

The most useful proteins are those which contain the greatest variety of amino acids. For this reason, animal by-products—milk, eggs, flesh, &c.—stand alone. If a vegetarian diet is to be persisted with, it must be selected from a wide range of foods so that the missing amino acids in one material way may be made up from another. This explains the benefits from variety in live stock feeding.

Rotational Grazing.

The practice of grazing paddocks throughout the year according to a prearranged plan of rotation—although highly successful in countries with a reliable rainfall—cannot be applied to the vast majority of Queensland dairy farms and pastoral holdings. The main object of rotational grazing—the regular provision of short, young grass—can, however, be achieved as far as weather conditions will permit by submitting each paddock to short and intermittent grazings, rather than to continuous stocking. In order that this practice of intermittent grazing may be applied in an efficient way, it is necessary to subdivide to provide a fairly large number of paddocks, each of which may be grazed down by the available stock within a short period and then rested.

Broadly speaking, the system of management recommended for dairy pastures is to concentrate the producing stock on a paddock of young, leafy pasture for a few days and when it has been eaten down fairly closely, transfer the stock to another paddock of young grass; and so on, coming back to the first paddock some weeks later, when good feed is again available on it.

Since the pasture in different paddocks will vary in its rate of growth, no definite orderly rotation will be possible, but each paddock will be grazed and spelled intermittently.

—*C. W. Winders.*

Crutching and Jetting for Fly Strike.

There is often controversy as to whether crutching or jetting is the better method of combating blowfly attack. There should be no argument on this score, for, with the increasing severity of fly invasion, both methods have their place in the protection of the flocks.

There is a school of thought which insists that the wool should be left on the crutch of the sheep and jetting alone resorted to. Other graziers pin their faith to crutching and will not consider jetting.

It is thought that, singly, both these methods are wrong to some extent, inasmuch as both methods should be used in conjunction. To get the greatest immunity from fly strikes, the grazier is advised to carefully crutch when—or before if practicable—the first fly invasion takes place. This should give the flocks immunity for about two months. Should further treatment be necessary, jetting the previously crutched sheep is advised. Thus with the intelligent combination of the two methods reasonable protection should be assured.

—*J. L. Hodge.*

Good Litter from Champion Sow.

The Tamworth sow Wattledale Lydia Pet, owned by Mr. J. Barkle, Sunnybank, winner of the championship in her section at the last Brisbane Exhibition, has since reared a litter which was inspected and check weighed under the supervision of the Department of Agriculture and Stock.

The litter was farrowed on the 25th August and numbered eleven pigs, three of which were lost during the first two days. The remaining pigs, which consisted of one boar and seven sows, were check weighed at fifty-six days old, when the following weights were recorded:—

Lb.: 55, 54, 57, 52, 51, 51, 44, 49. Total: 413 lb. Average: 51·6 lb.

WRENCH EXTENSION HANDLE.

A very useful tool for giving added leverage to double-end wrenches can be very easily made, as shown in the sketches. A piece of flat stock (A) is cut and

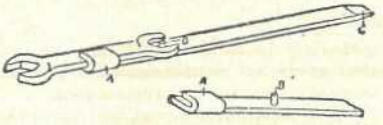


Plate 106.

bent over at the end to hook on the wrench, and a pin (B) is rivetted into it to bear against the jaw of the wrench, as shown. The other end of the tool (C), if made wedge or chisel-shaped, is handy for prising.

Orchard Notes

APRIL.

THE COASTAL DISTRICTS.

IN the Orchard Notes for March, the attention of citrus-growers was called to the necessity of their taking the greatest possible care in the gathering, handling, sweating, grading, and packing of the coming crop of fruit, as the returns for the labour expended in the upkeep of their orchards will depend entirely on the condition in which the fruit reaches the market. Many growers fail to realise the very important fact that the success of fruitgrowing does not depend merely on the proper working and management of the orchard, so essential for the production of a good crop of high-class fruit, but also upon the manner in which the fruit is handled and placed on the market. In no branch of fruit culture is this more evident than in the case of citrus, as no fruit pays better for the extra care and attention, necessary to enable it to be marketed in the best possible condition. Every season there is a degree of loss in the consignments sent to the local and Southern markets, the percentage depending mainly on the weather conditions, the loss in a wet year being much heavier than that in a dry year.

A large percentage of the loss is due to what is known as blue mould—a rotting of the fruit caused by a mould fungus—and this loss can be prevented, provided necessary precautions are taken. Although this matter was dealt with last month, it is of such vital importance to our citrus-growers that it is necessary to again refer to it.

In the first place, growers must clearly understand that the fungus causing blue mould can only obtain an entry into the fruit through an injury to the skin; it will thus be seen that the remedy is to take every possible care not to injure the skin of the fruit in any way.

Few growers realise how easily the skin of citrus fruits can be injured, especially that of fruit grown under moist and humid conditions, when the skin is full of moisture and so tender that the least sign of rough handling causes serious injury. The cells of the skin are so brittle that they are easily broken, and when so broken a ready means of entry for the mould fungus is provided, and blue mould follows in due course.

The remedy for blue mould is in the hands of the grower, who must learn to gather, handle, and transport the fruit from the orchard to the packing-shed so that it does not receive the slightest injury, and, further, that when it has reached the packing-shed it must be carefully placed in shallow bins or on trays and be exposed to the air for at least seven days, so that the surplus moisture in the skin may be removed, and the skin thus become toughened and less easily injured. This drying of the skin is known as "sweating," and during the time the fruit is being sweated it should be kept under observation, and all fruit showing signs of blue mould or injury from fruit flies, sucking or boring insects, mechanical injury or bruising, should be removed.

In order to prevent injuring the skin when gathering, all fruit must be cut and not pulled. Gloves should be used to handle the fruit, and when cut it should be placed in padded baskets or other suitable receptacles. Any fruit that falls or is injured in any way should be rejected, as it is not fit to send to market.

For overseas or interstate markets only perfect fruit should be selected, and, further, it must be graded for size, colour, and quality, and properly packed, only one grade of fruit being packed in a case. The cost of cases, freight, and marketing is now so high that only the best fruit will pay to export, and even the best fruit must be properly graded and packed in order to produce the best returns.

All orchards, vineyards, and plantations not thoroughly clean should receive immediate attention, for from now until the next rainy season the ground must be kept in a thorough state of tilth and free from weeds in order, firstly, to retain moisture in the soil, and, secondly, to enable birds, ants, and predacious insects to get at and destroy the pupæ of fruit flies and other pests harbouring in the soil.

Banana and pineapple plantations must be put into good order, and kept free from weed growth.

Land to be planted with trees should be got ready, as, if possible, it is always advisable to allow newly-cleared land time to sweeten before planting.

Farm Notes

APRIL.

FIELD.—Those areas already lying in fallow for subsequent sowing with wheat should be kept in good tilth, using field implements that have a stirring effect in preference to those which tend to reverse the surface soil. The surface should never be allowed to cake; consequently all showers must be followed by cultivation, as soon as conditions will permit of teams and implements working freely.

Early fodder crops, such as barley (skinless or Cape) and certain varieties of wheat may be sown during April. Growers of winter fodders will be well advised to study the article dealing with dairy fodder plots which appeared in February, 1922, Journal.

Potatoes should now be showing good growth, and must be kept free from all weed growths by means of the scuffler. If sufficiently advanced, and any doubt exists as to the prevalence of blight, advantage should be taken of fine weather to give a second spraying of Bordeaux mixture, a calm and somewhat cloudy day being chosen if possible for the spraying.

Where land has been previously well prepared, lucerne-sowing should be carried out this month, and intending growers of this fodder will be well advised to ascertain the germinating qualities of seed submitted to them for purchase. The difference between a good and bad "strike" is often traceable to the poor class of seed sown.

Maize and cotton crops should now be in the harvesting stage, and, once matured, are better in the barn than the open paddock, where weevils and other insects are usually prevalent at this season of the year.

Root crops sown last month should now be making fair growth, and during the early period of such should be kept free from weeds, and where necessary thinned out. Sowings of mangels, swedes, field carrots, sugar-beet, and rape may still be made where conditions of moisture will permit.

As the sowing season is close at hand for certain varieties of wheat—i.e., those which require a fairly long period to develop in—every effort should be made to bring the seed-bed into the best possible tilth and to free it from foreign growths of all kinds. The grading of all seed-wheat is strongly recommended, and growers who favour certain varieties should adopt a system of seed selection from prolific strains with a view to the raising of larger quantities of pure typical grain for ultimately sowing in their larger fields.

Pickling of wheat to prevent smut (bunt) is necessary. Germination tests should be carried out prior to commencing seeding operations.

Sorghums which have matured and are not immediately required as green fodder should, wherever possible, be conserved as ensilage to provide for a reserve, to tide over the period when grasses and herbage are dry. Succulent fodder of this description is the best possible form of insurance against drought, and for maintaining dairy and other stock in thrifty condition.

PROPAGATION OF GRASSES.

Frequently enquiries are received by the Department of Agriculture and Stock as to where seed of blue couch, Kikuyu, *Panicum muticum* (Para), and Guinea grass can be obtained. Kikuyu grass fails to set seed in Queensland, and little or no seed of commercial value is collected from stands of the other grasses.

Propagation is usually carried out with roots, runners, or plants, except in the case of Guinea grass, which is reproduced from roots or plants only, as it does not send out runners.

Supplies of the roots can best be obtained direct from the grower.

It is sometimes the practice to pass the runners of Kikuyu grass or Para grass through a chaffcutter set wide so that the resultant "chaff" can be broadcasted and harrowed in.

Blue couch should not be confused with the ordinary couch of Queensland, which can be grown from seed.

Plate 107.

Group of pupils from the Ashgrove State School on the occasion of an instructional visit to the laboratories of the Department of Agriculture and Stock.

Balancing the Diet.

(Contributed by the Queensland Nutrition Council.)

A GREAT authority on nutrition after investigating the diets of all types of people—rich and poor—was convinced that the majority of mankind lives on a diet which is defective in some respect. That does not necessarily mean that the majority of people are starving. Many people may and do eat more than enough food of a "kind," yet their diet may be defective in some one type of food constituent, i.e., their diet is not well-balanced. For example, in Australia, the people as a whole eat too much sugar and white flour and not enough fruit and vegetables, milk, and dairy products such as eggs and cheese. How then are we to balance our diets? Before we can do this intelligently we must know something of the different types of food constituents.

Foodstuffs, as commonly used, may contain all or some of the six essentials of any diet, viz.: water, carbohydrates, fats, proteins, minerals, and vitamins.

(1) *Water* is contained in most foods, even in solids, such as vegetables and fruit, bread, and meat, while good milk contains about 87 per cent. of water. Water is very essential to a well-balanced diet, and may be taken as "Adam's Ale," when at least six glasses daily would be needed, or as milk, tea, coffee, cocoa, or soups.

(2) The next essential is *carbohydrate*. These, together with the fats provide the body with energy and heat when digested. The carbohydrates should form about two-third of our daily food supply and include such substances as potatoes, fruit, vegetables, cereals, rice, sago, flour, and sugar. *Bread* consisting largely of flour is one of the most commonly used carbohydrate foods; indeed, according to modern knowledge, it is often too commonly used. Wholemeal or cerevite bread should always be used in preference to white—for they are both much richer in the sixth essential—vitamins.

(3) *The Fats.*—The third essential of a balanced diet mentioned above includes such substances as butter, fat of meats, cream, oils, and nuts, and here in Queensland should form about one-sixth of the total

quantity of the daily food supply. In cold countries, as in Northern Canada, the Esquimaux live almost entirely on seal and blubber of whale, which consist largely of fat. In tropical and temperate climates, during summer less fat is perhaps needed than during the winter.

(4) *Proteins* are the fourth essential of a well-balanced diet. These are usually known as body builders or strength-producing foods. Meat, fish, eggs, cheese, peas, and beans are foods rich in protein and these should form about one-sixth of the daily food supply. They are especially necessary for growing children. Men doing hard manual labour also require a good deal of protein, but our habits in Queensland already ensure a more than amply supply for working men.

(5) The *Mineral substances* come next among the essentials. Four important members of these are often deficient in the diet. These are —iron, lime, phosphates, and iodine. Iron is very necessary to keep the blood in a healthy state. Some of the foods which should be taken for their iron content are egg yolk, liver, whole-grain cereals, green vegetables, and dried fruits. Lime and phosphates are very necessary for the proper development of the bones and teeth, and also help in the formation of muscles and nerves. A lack of lime and phosphates and foods leads to many very serious conditions, especially in children. Milk, cheese, oatmeal, carrots, and potatoes are all rich in lime and should be included in the daily dietary. Of these, milk and cheese are especially valuable. For phosphates, foods such as milk, liver, brains, cheese, eggs, fish-roes, should have a place in a well-balanced diet. *Iodine*, too, is very essential in order to keep the body healthy. In districts where the food contains insufficient iodine, e.g., in certain parts of the Alps and in certain districts of New Zealand, a large percentage of the population develops goitre, a form of swelling in the neck. Oysters, cod-liver oil, eggs, potatoes (with skins on), and leafy vegetables, all contain sufficisnt iodine for the bodily needs.

(6) Now, the sixth and last essential of a well-balanced diet are *vitamins*, of which there are many. The most important of these are known as A, B, C, D.

From what has been said, it will be very obvious that milk, meat, eggs, and cheese, fruit and green vegetables, along with wholemeal or cerevite bread make a well-balanced diet. Attached you will find a table which will guide you in your choice of foods which, if followed, will provide both variety and balance in the diet.

BREAKFAST.

BALANCE YOUR MEAL BY HAVING ONE FOOD FROM EACH OF THE FOUR GROUPS.

(1) Fruit.	(2) Milk.	(3) Cereals and Breads.	(4) Proteins.
Orange Pineapple Apple Papaw Bananas Grapefruit Tomato Apricot Peaches Cherries Pears Grapes (Fresh fruit is best, but stewed can be used for a change)	Certified milk Pasteurised milk (Lower grade milks should be boiled before being given to children)	Wheat Germ Breakfast meal (*e.g.*, Cerevite) Stoneground wheaten porridge meal Firstbreak wheaten meal Cerevite bread Wholemeal bread Oatmeal (occasionally) ("prepared" breakfast foods are not economical)	Egg— Poached Scrambled Omelette Fried Boiled Lamb's fry Kidneys Fish Chops Steak Bacon Ham

LUNCHEON OR LIGHT EVENING MEAL.

BALANCE YOUR MEAL BY HAVING ONE FOOD FROM EACH OF THE FOUR GROUPS.

(1)	(2)	(3)	(4)
Protein Foods.	Salad, Vegetables and Fruit.	Starchy Foods.	Milk.
Mutton Lamb Beef Cheese Fish Ham Tongue Pork Veal Poultry Rabbit Pea soup Nuts	Lettuce Tomato Celery Apple and cheese Beetroot Pineapple and cheese Onion Shredded raw carrot Radishes Fresh fruit (as for breakfast)	Potato (boiled in jackets) Cauliflower Cerevite bread Wholemeal bread Macaroni	As for breakfast Milk soup

DINNER.

BALANCE YOUR MEAL BY HAVING ONE FOOD FROM EACH OF THE FOUR GROUPS.

(1) Protein Foods.	(2) Starchy Foods.	(3) Vegetables.	(4) Dessert.
As for lunch	Potatoes— Boiled in jackets Baked Mashed Other starchy foods as for lunch	Cabbage Lettuce Spinach Silverbeet Onions Carrot Cauliflower Tomatoes Parsnips Turnips Pumpkin	Fruit salad Pineapple Stewed fruits Custard made with milk and eggs

Australia, in fact the whole civilized world, is becoming nutrition-minded. Let us here in Queensland keep abreast in the forward march and introduce into our own homes a well-balanced diet. In this way, we may help materially in the building up of a strong and stalwart race, surpassing even our present high standard.

IN THE FARM KITCHEN.

MILK IN THE MENU.

To people of all ages, milk brings essential food constituents. The following recipes suggest attractive ways of introducing milk to the menu:—

Cod Steaks in Milk.

Take 1½ lb. cod steaks, 1 teaspoonful salt, 1 cupful milk, 2 tablespoonfuls flour, 1 small onion, 6 rashers bacon, sprig of parsley, pepper.

Wash the fish, dry it, and dredge with flour mixed with salt and pepper.

Place in a buttered baking dish. Sprinkle with chopped onion, then pour milk over. Bake in a moderate oven for fifty minutes. Fifteen minutes before fish is done, remove from the oven, place pieces of bacon curled up on top, and return for fifteen minutes. Serve sprinkled with parsley, in the dish in which fish was cooked. Thicken milk and serve in separate sauceboat.

Milk Coconut Puddings.

Take 1 pint milk, 3 eggs, 1 teaspoonful vanilla, 2 oz. castor sugar, 2 oz. coconut.

Beat eggs, sugar, and vanilla together for two minutes, then add the milk, and beat another two minutes before adding coconut. Mix slightly, then turn into four small pudding moulds, well buttered. Place in a pan with hot water coming half-way up the moulds, then cook in a slow oven. When set, turn out and top each with a small spoonful of jam.

Cream of Potato Soup.

Take 1 lb. potatoes, 1 small onion, 1 quart milk, 2 tablespoonfuls fat, 1 teaspoonful salt, 2½ tablespoonfuls flour, pepper to taste.

Pare potatoes very thinly and cook in enough water to cover until soft. Drain off the water and save it. Mash potatoes till free from lumps. Melt fat. Add onion cut into thin slices. Cook without browning until tender, then stir in the flour. When this bubbles all over add half a pint of milk and cook till it thickens, stirring constantly. Add mashed potatoes and stir till smooth. Stir in remainder of milk and one cupful of potato water. Season with salt and pepper and serve hot. If not quite free from lumps, the soup should be strained before serving.

Timbales of Pork.

Take ¾ cupful milk, 1 cupful cooked pork, ½ cupful stale breadcrumbs, 2 eggs, 2 tablespoonfuls margarine, 2 teaspoonfuls minced parsley, salt, pepper, and paprika to taste, white or mushroom sauce to serve.

Melt margarine in a saucepan. Add crumbs and milk and simmer for five minutes, stirring constantly. Stir in pork, parsley, and lightly-beaten eggs. Season to taste. Pile in buttered individual dariole moulds. Place moulds in a baking tin of hot water. Cover with a sheet of buttered paper, and bake for twenty minutes in a moderate oven. Serve with white or mushroom sauce.

Creamed Salmon.

Take 1 lb. tin salmon, 2 boiled and chopped egg-whites, 1 tablespoonful butter, 1 cupful chopped peanuts, 2 tablespoonfuls flour, 1 pint hot milk, salt and cayenne pepper, buttered toast.

Melt the butter and flour together, and season it with salt and cayenne to taste. Add hot milk. Cook until smooth. Add salmon, flaked and free from skin and bones, peanuts, and chopped, hard-boiled egg-white. Make very hot and serve on rounds of buttered toast.

Semolina Sunflower.

Take 1½ pints milk, 4 oz. semolina, ½ oz. butter, 2 good tablespoonfuls sugar, vanilla flavouring, tin sliced peaches, chocolate hundreds and thousands.

Bring the milk to the boil, sprinkle in the semolina and cook until it is tender and the mixture quite stiff, keeping it stirred frequently. Draw aside, add the butter, and sugar, and vanilla to taste, and stir until dissolved. Turn into two small sandwich tins—the latter rinsed with cold water—and leave until set. Then turn out and arrange sliced peaches on each to resemble sunflowers. Put some chopped-up peaches in the centre and sprinkle it with chocolate hundreds and thousands. Serve with some of the peach, syrup and cream if liked.

Primrose Cream.

Take 1 pint milk, 2 egg-yolks, ¾ oz. gelatine, 1 dessertspoonful custard powder, ¾ gill cream, ½ gill water, 3 dessertspoonfuls sugar, crystallised flower for decoration.

Put the custard powder into a jug, and mix it to a smooth paste with a small quantity of the milk. Boil the remainder of the milk and stir on to it. Let it cool slightly, and add the egg-yolks (beaten). Stand it in a saucepan of hot water until it thickens, keeping it stirred occasionally. When ready remove jug from the hot water and leave until cold. Whisk the cream until it stiffens, gradually stir in the custard, and add sugar and vanilla. Dissolve gelatine in a saucepan with the water, strain it in, and mix together lightly. Turn into a wet mould, and, when set, unmould carefully and serve. Decorate the centre with a piece of crystallised flower or fruit.

Lemon Rice Shape.

Take 1 quart milk, ½ teaspoonful salt, 1 teaspoonful lemon essence, 2 cupfuls rice, 3 tablespoonfuls castor sugar, berries to garnish.

Cook the rice, milk, salt, and sugar in the top of a double boiler till rice is tender. Flavour and turn into a border mould, dipped in cold water. Stand in a refrigerator till chilled, then turn on to a pretty glass dish. Fill centre with sweetened berries and serve.

Vegetable Soup.

Take 1 pint milk, 2 carrots, 2 onions, 1½ oz. margarine, 3 dessertspoonfuls flour, 1 turnip, ½ small stick celery, a few mixed herbs, pepper, and salt, 2½ pints white stock or water.

Prepare the vegetables in the usual way and wash them. Mince the onions and cut the other vegetables into fine strips. Melt the margarine in a saucepan, add the prepared vegetables, and cook them in it for a few minutes without browning. Draw aside, add the stock, a few herbs (tied in muslin), and seasoning to taste. Cook gently until vegetables are tender—do not leave the herbs in too long, or they will discolour the soup—then add the milk and thicken with the flour mixed to a smooth paste with water.

Creamed Tongue.

Take ¾ pint milk, 8 oz. cold diced tongue, 2 teaspoonfuls minced onion, 3 tablespoonfuls flour, 1½ teaspoonfuls minced pimento, 1½ oz. butter, 1 pint green peas, 1½ teaspoonfuls minced parsley, pepper and salt.

Melt the butter in a saucepan. Add flour, and, when the mixture froths, stir in the milk. Bring to the boil. Boil for five minutes, stirring constantly. Add onion and pepper and salt to taste. Boil two minutes, stirring all the time. Add tongue and pimento. Heat till piping hot, then stir in parsley. Serve on a hot dish in a border of green peas, boiled, drained, seasoned, and moistened with a little butter.

BIRDS IN THE GARDEN.

Thus "Waratah" in the *Sydney Morning Herald*:—

"In laying out my garden, I had in mind the need of a sanctuary for birds, and the necessity for providing some food for them. My garden was built half for the birds and half for my own pleasure," said an old bird-lover, a man of strong personality, who led an active and busy life, but whose thoughts invariably turned to Nature when the cares of business were past. His words have been indelibly imprinted on my mind.

They have been an inspiration in garden-planning, making the work so much simpler. They should also influence others in laying out their home plots, large or small, for it will be found, strangely enough, that what the birds require is identical with our own needs in a garden of our very own—privacy, shelter, shade, windbreaks, flowers for honey, berries which serve the dual purpose of food and decoration, fruits, and pleasant company. Are not these requirements between the birds and our own, in a garden, identical?

In return for these considerations, surely the presence of the little, swift-moving bodies somewhat tentatively returning our advances, and gradually gaining in confidence, is sufficient compensation—even it it entails a change of our original plans! Later, complete friendship may be gained, but it takes long and tactful overtures without mental reservations. Birds know their friends instinctively, and their confidence once obtained is a wonderful possession.

Quite apart from that, the wholehearted songs of the birds as spring approaches give us a rich feeling of comradeship. Who can resist the sweet warbling of the busy little blue wrens as they go around gathering insects; the virile song of the willy-wagtails; or the glorious love song of Jacky Winter, as he pours forth his call to a distant mate? No songster of older lands can surpass this humble little grey bird when he is in form.

Perhaps the most joyous note of all in the garden, and one which gives us the closest feeling of friendship, is the clear and vibrant call of the Eastern Thornbills. They live in a happy world, where food is abundant, and their gay and rippling song is infectious; like a clarion call, but mellifluous and softened, it greets us in all weather, whilst the quick-darting movements—now fluttering a-wing in the air; now upside-down as they gather in honey from the flower-cups of heaths, grevilleas, bottlebrushes, and correas—make us glad to have such company in the garden. It seems to have made a garden worth while.

PREVENTS GATE SAG.

Farm gates built without diagonal bracing never will sag if equipped with a turn-buckle as shown in the sketch. A longer bolt in the upper hinge serves to

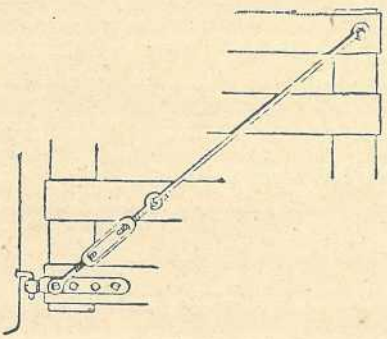


Plate 108.

fasten one end of the buckle. From the other end of the buckle a light rod or flat iron or No. 6 wire runs to the lower corner of the gate. Any tendency of the gate to sag is easily and quickly remedied by a few turns of the turn-buckle.

FOR THE WIRE GATE.

Instead of wire loops to fasten the free end of a wire gate, sections of an old auto casing can be used, according to directions in *Popular Mechanics*. These

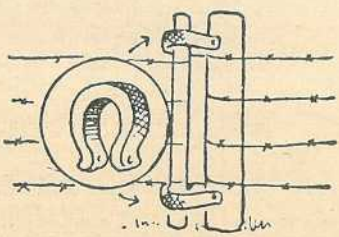


Plate 109.

are said to be flexible, easier on the hands, and quite resistant to wear.

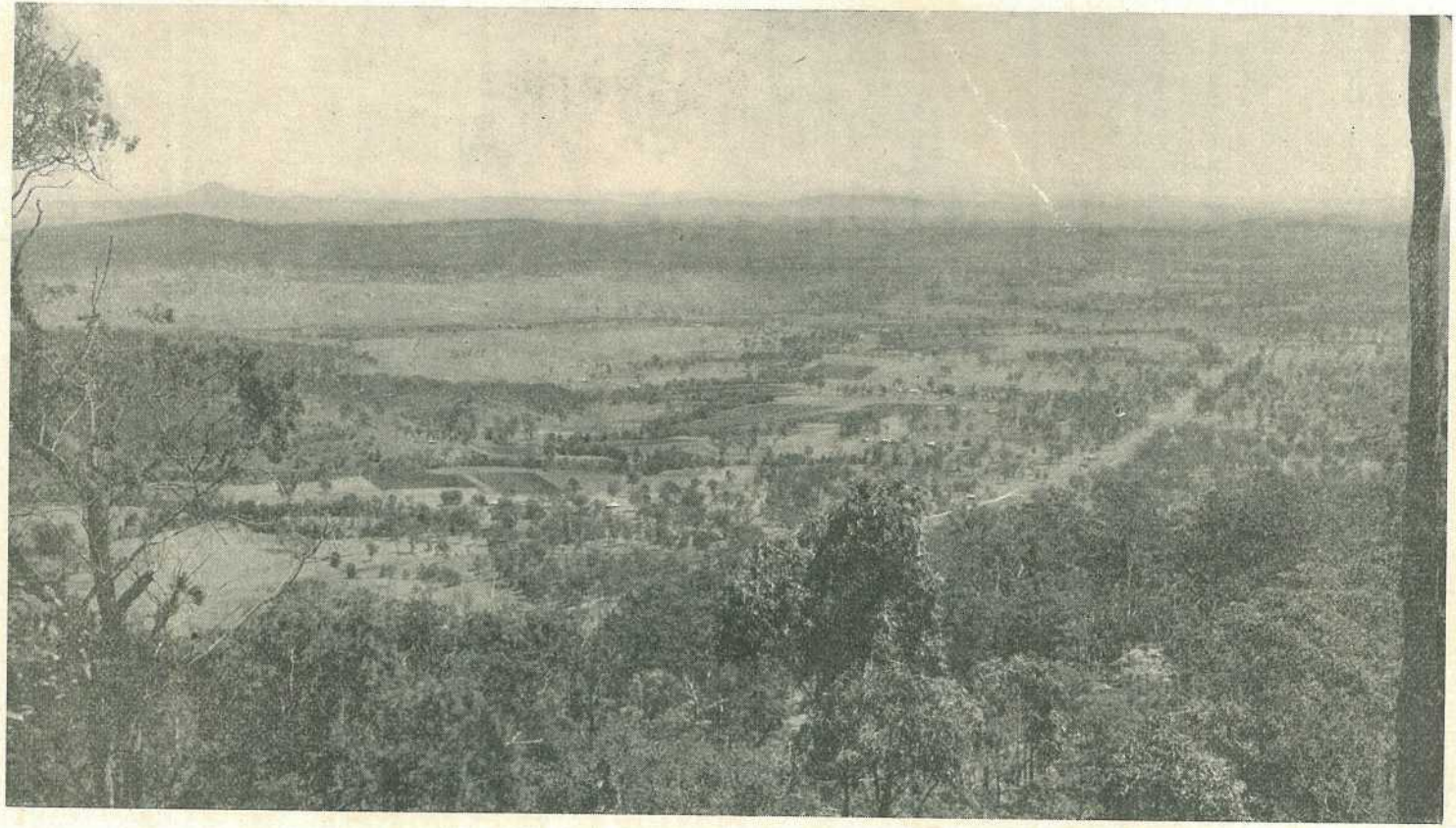


Plate 110.

FERTILE FIELDS AND PASTURES.—Looking down the Canungra Valley from a spur of Tamborine Mountain, South Queensland.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1937 AND 1936, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of years' records.	Jan., 1938	Jan., 1937.		Jan.	No. of years' records.	Jan., 1938.	Jan., 1937.
North Coast.	In.		In.	In.	*Central Highlands.*	In.		In.	In.
Atherton	11·83	37	10·81	5·87	Clermont ..	5·09	67	2·47	4·25
Cairns	16·56	56	15·77	8·92	Gindie	3·63	39	..	0·64
Cardwell	16·89	66	25·94	14·49	Springsure ..	4·18	69	3·01	1·09
Cooktown ..	14·41	62	9·75	12·66					
Herberton ..	9·56	52	7·75	4·32					
Ingham	15·56	46	34 51	11·18					
Innisfail	20·04	57	29·12	7·72					
Mossman Mill ..	17·72	25	20·96	12·47	*Darling Downs.*				
Townsville ..	10·89	67	15·19	5·52	Dalby	3·31	68	4·69	2·94
Central Coast.					Emu Vale ..	3·20	42	3·74	2·01
					Hermitage ..	3·15	32	..	0·79
Ayr	10·92	51	12·82	7·78	Jimbour ..	3·45	50	4·56	2·33
Bowen	9·88	67	2·83	1·57	Miles	3·62	53	3·5	2·50
Charters Towers ..	5·41	56	5·69	5·35	Stanthorpe ..	3·64	65	3	7·58
Mackay	13·93	67	4·70	2·81	Toowoomba ..	4·99	66	5	2·06
Proserpine ..	15·52	35	6·89	5·06	Warwick ..	3·54	73	4·8	2·57
St. Lawrence ..	9·23	67	0·91	5·20					
South Coast.									
					Maranoa.				
Biggenden ..	5·08	39	7·11	0·85					
Bundaberg ..	8·55	55	9·73	3·61					
Brisbane	6·38	86	7·70	1·57	Roma	3·06	64	4·47	1·86
Caboolture ..	7·46	51	11·17	2·10					
Childers	7·27	43	7·48	2·73					
Crohamhurst ..	12·04	45	19·95	2·11					
Esk	5·65	51	8·21	1·17					
Gayndah	4·57	67	4·30	1·89					
Gympie	6·54	68	9·63	1·29	*State Farms, &c.*				
Kilkivan	5·46	59	3·79	0·62					
Maryborough ..	7·02	67	8·44	1·45	Bungeworgorai ..	1·89	24	..	3·30
Nambour	9·45	42	18·83	2·54	Gatton College ..	4·24	39	4·11	..
Nanango	4·57	56	6·89	1·43	Kairi	..	..	..	..
Rockhampton ..	7·60	67	3·25	3·85	Mackay Sugar Experiment Station	13·77	41	5·17	5·11
Woodford ..	7·64	51	13·74	1·33					

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—JANUARY, 1938.

COMPILED FROM TELEGRAPHIC REPORTS.

Districts and Stations.	Mean Atmospheric Pressure, 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	29·73	89	76	94	19	68	19	981	15
Herberton	..	84	65	92	3	59	18, 19	775	14
Rockhampton	29·82	92	74	102	7	68	19	325	14
Brisbane	29·90	84	70	95	21	66	27	770	16
Darling Downs.									
Dalby	29·87	90	67	101	2	61	8, 18, 26	469	8
Stanthorpe	..	81	61	93	3	49	8	306	9
Toowoomba	..	82	62	94	7	57	8	940	14
Mid-Interior.									
Georgetown	29·76	94	74	103	4	68	19	1,356	16
Longreach	29·74	102	76	111	1	70	24	122	5
Mitchell	29·82	94	70	110	2	56	9	426	5
Western.									
Burketown	29·73	94	79	105	8	70	20	591	11
Boulia	29·70	104	79	116	1	69	9	20	3
Thargomindah	29·76	98	75	114	2	61	9	93	2

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

MOONRISE.

	March. 1938.		April. 1938.		March. 1938.	April. 1938.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	5 45	6·24	6·2	5·50	4·32	6 8
2	5·46	6·23	6·3	5·49	5·28	7·11
3	5·47	6·22	6·3	5·48	6·25	8·13
4	5·47	6 21	6·4	5·46	7·22	9·18
5	5·48	6·20	6·4	5·45	8·21	10 22
6	5 48	6·19	6·5	5·44	9·22	11·22
						p.m.
7	5·49	6 18	6·5	5·43	10·24	12·18
8	5 50	6·17	6·6	5·42	11·28	1·7
					p.m.	
9	5·50	6·16	6·6	5·41	12·28	1·51
10	5 51	6·15	6·7	5·40	1·27	2·33
11	5·51	6·13	6·7	5 39	2 20	3·13
12	5·52	6·12	6·8	5·38	3·10	3·51
13	5·52	6 11	6 8	5·37	3 55	4 26
14	5·53	6·10	6·9	5·36	4 36	5·4
15	5·53	6 9	6·9	5·35	5·15	5·44
16	5 54	6·8	6·10	5·34	5·52	6·25
17	5·54	6·7	6·10	5·34	6·31	7·8
18	5·55	6 6	6 11	5·33	7 8	7·53
19	5·55	6·4	6 11	5·32	7·48	8·41
20	5·56	6·3	6·12	5 31	8·29	9·32
21	5 56	6·2	6·12	5 30	9·13	10·24
22	5·57	6·1	6·13	5 29	10·0	11·15
23	5 57	6·0	6·13	5 28	10 49	..
						a.m.
24	5·58	5·59	6 14	5·26	11·41	12·9
25	5·58	5·58	6 14	5·25	..	1·5
					a.m.	
26	5 59	5 57	6·15	5·24	12·34	1·59
27	5·59	5·56	6·15	5·24	1·27	2·55
28	5·60	5·55	6·16	5·23	2·20	3 53
29	5·60	5·54	6·16	5·22	3·16	4·53
30	5·61	5·53	6·17	5·21	4·9	5·57
31	5 61	5·52			5·9	

Phases of the Moon, Occultations, &c.

2nd Mar.	●	New Moon	3 40	p.m.
9th „	☽	First Quarter	6 35	p.m.
16th „	○	Full Moon	3 15	p.m.
24th „	☾	Last Quarter	11 6	a.m.

Perigee, 11th March, at 6.0 p.m.
Apogee, 24th March, at 7.0 a.m.

From the 18th to the 20th the three planets —Venus, Mercury, and Saturn—will be remarkably close together in Pisces; but when this rare grouping might have been observed, Mercury and Saturn will be too near the horizon to be seen with the naked eye. Venus, in its wonderful lustre, setting later, cannot be missed. Indeed, the reappearance of the beautiful planet is the most fascinating event of the month.

On the 21st of March, at 5 p.m., the Sun will pass from south to north of the equator, and our Autumnal Equinox will occur. The Earth's axis will be neither turned towards nor away from the Sun, and both hemispheres will receive the same amount of light and, as the Earth rotates on its axis in twenty-four hours to bring it alternately into light and darkness, day and night will then be of equal length all over the world.

Mercury rises at 5.5 a.m., 40 min. before the Sun, and sets at 6.12 p.m., 12 min. before it on the 1st; on the 15th it rises at 6.20 a.m., 27 min. after the Sun, and sets at 6.30 p.m., 21 min. after it.

Venus rises at 6.12 a.m., 27 min. after the Sun, and sets at 6.47 p.m., 23 min. after it on the 1st; on the 15th it rises at 6.35 a.m., 42 min. after the Sun, and sets at 6.41 p.m., 32 min. after it.

Mars rises at 8.56 a.m. and sets at 8.25 p.m., on the 1st; on the 15th it rises at 8.46 a.m. and sets at 8.0 p.m.

Jupiter rises at 3.58 a.m. and sets at 5.13 p.m. on the 1st; on the 15th it rises at 3.17 a.m. and sets at 4.29 p.m.

Saturn rises at 7.36 a.m. and sets at 7.43 p.m. on the 1st; on the 15th it rises at 6.48 a.m. and sets at 6.52 p.m.

During this month, from about 9 o'clock at the beginning and two hours earlier at the end, the finest of the southern and northern constellations are seen to greatest advantage in and near the Milky Way. With a good field-glass beautiful star groups may be found, especially near Argo, above the Southern Cross, where the Milky Way is most luminous.

1st April	●	New Moon	4 52	a.m.
8th „	☽	First Quarter	1 10	a.m.
15th „	○	Full Moon	4 21	a.m.
23rd „	☾	Last Quarter	5 14	a.m.
30th „	●	New Moon	3 28	p.m.

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

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

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