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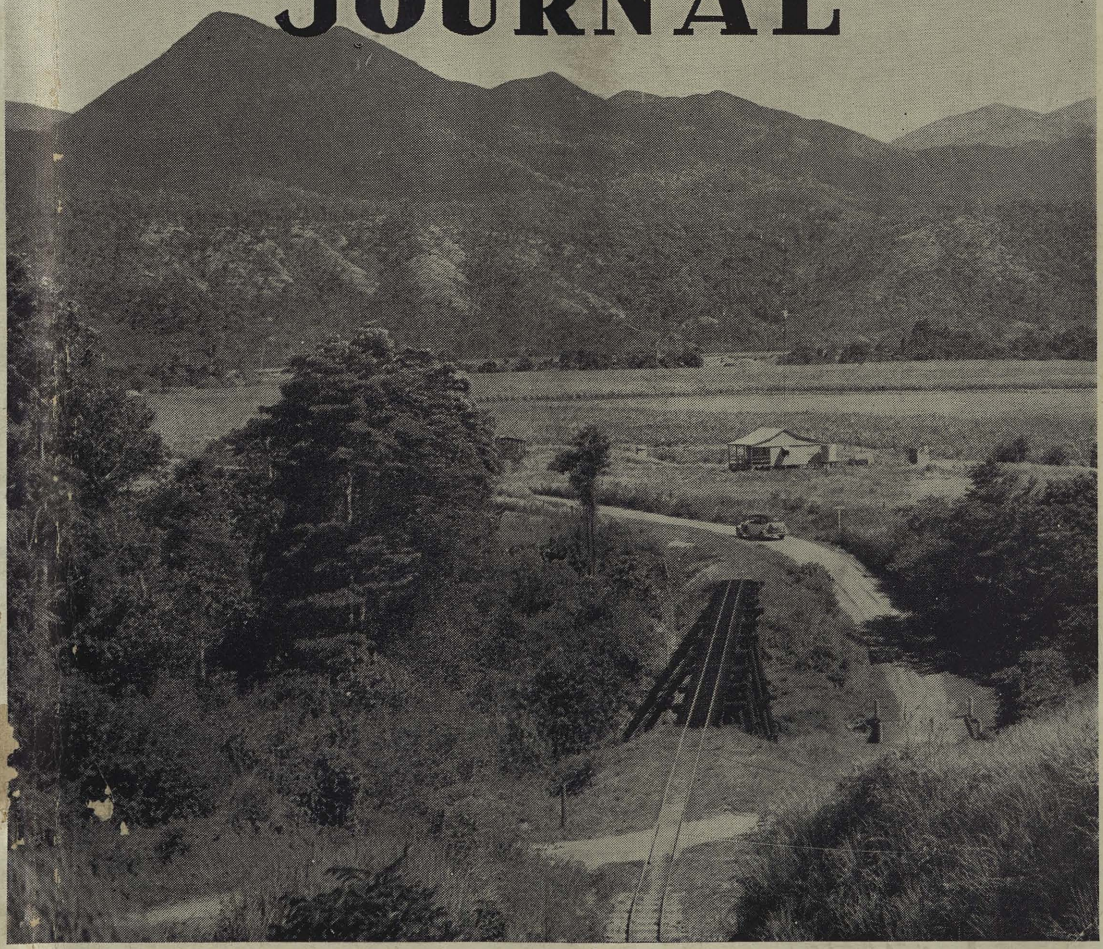
DEPARTMENT OF AGRICULTURE

QUEENSLAND AGRICULTURAL JOURNAL



Mowbray, Mossman Valley, Q.

LEADING FEATURES

Edited by J. F. F. REID

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Contents

ANNUAL RATES OF SUBSCRIPTION.—Farmers, Graziers, Horticulturists, and Schools of Arts, **One Shilling,** members of Agricultural Societies, **Five Shillings,** including postage. General Public, **Ten Shillings,** including postage.

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Event and Comment

Britain's Great Agricultural War Effort.

THE British farmer is patriotic in the best sense and so now, in the second year of the war, he is right on top of his job of food production. Evidence of that is the 2,000,000 extra acres ploughed up last year, and the plan for ploughing up another 2,000,000 acres of grassland this year. Furthermore, he has altered his entire system of farming, where necessary, to suit the changed conditions brought about by the war. Food stocks are now more abundant than in the days of peace. The British Ministry of Agriculture has stated that the first war-time harvest has made a substantial addition to the food supplies of the nation. More cereal, root and fodder crops have been grown, and this increase in arable acreage has not been obtained at the expense of Britain's flocks and herds. Dairy cows and other cattle have, in fact, increased, and sheep numbers have been maintained. Pig and poultry numbers have been reduced, but the reduction is less than was anticipated. Far from allowing the "cataract of calamity" which burst over Europe in the summer to depress him, the British farmer is finding that the uses of adversity are abundant.

What will interest the producers of Australia, as well as the producers of other Dominions, is that agricultural products valued at over £77 millions are no longer reaching Britain from continental Europe. Included in that total are several items of interest to Queensland producers particularly. From countries now in enemy occupation, Britain imported annually nearly £23 millions worth of pig and poultry pro-

ducts and over £34 millions worth of butter and cheese. Supplies of these commodities have to be made up from other sources, and this broadened market may be regarded as something in the nature of a German gift to the producers of the Homeland and the Dominions.

The British Government has expressed a determination that agriculture shall not a second time be allowed to collapse after the present war like it was after the last war. That determination is based on the conviction held by the Government that a prosperous agriculture is just as important to Britain—as it is to Australia—as a prosperous secondary industry.

Incidentally, the idea is spreading in the Old Country that while the hazards of war are around its shores, no amount of cash or credit can guarantee an uninterrupted food supply for both the people and the farm animals. Ensilage of suitable crops is, therefore, regarded as riches banked against any misfortune and, further, every silo filled helps "to cheat the torpedo of a target."

In this war, farmers of the British Commonwealth are shouldering a heavy responsibility. The nation has to be fed and they are doing the feeding. In a truly literal sense, then, British farmers are ploughing for victory.

Queensland Bacon on the British Breakfast Table.

IT is said that people in the Old Country are now eating Australian bacon because they have no choice. That may be so, but, it is confidently believed that by our continuing to improve the quality of pig products in every respect the people of Britain will, when present trade restrictions are removed, eat Australian bacon because they prefer it.

Because of the war, Australia has now an expanding market at good prices for frozen pig carcases at baconer weights. The present, therefore, is a favourable time to plan for an extension of our export pork industry on an efficient and sound basis. The market requirements are known. Suitable stock and abundant feed are available or can be conserved on our farms, and necessary improvement in the quality of our pig products can be made. Of course, it is obvious that no single type of pig will suit all the weight classes required by the porker and baconer markets. Although the needs of both have been met by various breeds, Berkshires (in general) and Middle Whites are typically pork, and Tamworths and Large Whites are typically bacon pigs.

Until recently, the pig was regarded as a means of converting the by-products of the dairy industry into ready money. Now, however, pig husbandry is rapidly becoming a major industry, and cereals, plus animal and vegetable protein-rich concentrates, are used in feeding pigs, bringing about a remarkable development in the industry, especially in relation to our export frozen pork and bacon trade.

Fat Lamb Quality.

THE findings of the Commonwealth Committee on Animal Production contain some useful information for sheep men, and which is of especial interest to fat lamb raisers on the Darling Downs. The cutting out of discriminating competition on the British market might have the effect of inducing a few short-sighted producers to relax their efforts to maintain and improve export quality, but it needs very little thought to realise how disastrous that would be to the whole fat lamb industry. The competition after the war may be even more intense

than it was before the war, and it is easier and cheaper to maintain quality and purity of breed—especially in respect of pure-bred sires—than to have to build up again under what will probably be far less favourable marketing conditions. The suggestions of the Committee on the technical side are worthy of earnest study in the light of the varying conditions in different districts, and the need for pasture improvement and the growing of suitable fodder crops when changing from wool producing to fat lamb raising should not be overlooked. The use of suitable ewes and the careful selection and rearing of sires are other sides of the industry which demand more thought in relation to the factors of district and climate than they usually receive. Sheep men generally should, it is suggested, give consideration to the report of the Committee, which is now in circulation. In that way they will be doing a valuable service to the Commonwealth as well as to themselves, insofar as it leads to efficiency in management and in everything else that will improve still further the quality of their production.

Planning for Post-war Production.

IF the development of Empire resources is a vital responsibility during the war, it will be an equally urgent responsibility when the war is over. When peace is restored the world will be faced with very serious problems of adjustment and readjustment. If the last war taught anything, it was that the pressure of war demands and the artificial values placed on the raw materials of war leave a bitter aftermath in the dislocations and readjustments which accompany the reversion of conditions to peaceful trade. The first becomes last and the last first. What is of primary importance during a war in quantity or quality or both, drops back into secondary importance. On the other hand, the demands of peaceful trade show shortages which have to be be made up. That means increased production, and, in turn, over-production. When the present war started, we were only beginning to appreciate conditions in which the primary producer was winning slowly back to the stage of profitable production after the last upheaval. Now we are in another war, it is plain that we shall have to look and plan well ahead for future development. The success of these plans will depend upon the use we make of scientific methods. All economic development, if it is to succeed, must take careful account of the natural conditions of production, processing, transport, and marketing.

Britain as well as Australia is thinking out a national plan of action to safeguard agriculture as soon as the war is over.

A long-term policy is essential, and it is suggested that all the ingenuity and resourcefulness of our statesmen will be needed to keep the ship on an even keel through the first critical post-war years. A stable agriculture should prove a powerful balancing factor in the national economy.

In Britain particularly, concern is felt for the future of agriculture. The possibility that all the world will be knocking at Britain's door begging her to buy cheap food is under serious consideration. If entry of imports is unregulated, it is believed that British agriculture would soon be swamped. That is the British viewpoint, and it serves as an indicator for our own producers of export commodities. There is a moral to be drawn from it too, and that is that quality—and quality of the highest attainable grade—must be the continuous watchword of Queensland producers if we are to maintain our hold on British markets when Europe returns to sanity.

The Thinning and Cultivation of Cotton.

THE thinning and cultivating operations are very important features of cotton-growing and every cotton-grower should, therefore, give careful attention to each detail connected with them. Each season a considerable number of farmers experience in some degree a reduction in crop yields through failure to practise the most suitable methods of thinning and cultivating their cotton crops. These notes have, therefore, been prepared to bring to the attention of cotton-growers important aspects of thinning and cultivating the cotton crop.

Thinning.

There is a decided tendency for many growers in Queensland to refrain from thinning their cotton crop, particularly where a grower has sufficient acreage to necessitate the employment of much labour. Experiments carried out by the Department of Agriculture and Stock at the Biloela Research Station and in co-operation with a number of farmers have definitely proved over a series of years, however, that the cotton crop should be thinned, and, if the thinning is done properly, that profitable returns generally result from carrying out this operation.

Unthinned plants tend to be more sensitive to climatic conditions. In wet seasons, particularly if on soils of a fertile nature with a high nitrate content, unthinned plants generally grow tall and spindly, which prevents the normal formation of the bottom bolls through the suppression of the lower fruiting branches. Under such circumstances the main crop of bolls usually forms late, and is thus subjected to the sucking insects that occur generally in greater numbers during the latter part of the season. The lint produced under such conditions is frequently of a wasty, weak nature, with a large amount of stains and yellow spots. In dry seasons, or in seasons experiencing favourable growing conditions until the plants are well laden, and then a severe dry period of marked duration develops, the competition for moisture and plant food soon becomes acute amongst unthinned plants during the stress period. This results first in serious shedding of the top and middle crops of flower buds and small bolls, and finally affects the development of the remaining bolls, which frequently open prematurely. Such restriction of boll development generally lowers the quality of the cotton contained in them, the fibres usually being short, weak, and of a wasty type.

Suitable Plant Spacings.

The fact that soils and climatic conditions and the habit of growth of the variety exercise a determining influence on plant development makes it advisable for each grower to carry out tests over a series of years to ascertain the most suitable spacing for his conditions. It appears, however, that spacings of 20 to 24 inches are necessary for normal plantings on the harder, less fertile clay loams and loams of the forest slopes, particularly in the drier districts, where the drought-resistant, more vigorous growing varieties, such as Lone Star and Mebane, are required. In late plantings of these varieties, fewer bolls per plant are likely to develop, hence a spacing of approximately 18 inches is advisable, as the extra number of plants may compensate for the lighter production per plant.

The results which have been obtained in spacing trials conducted in the Indio Acala and Miller varieties on alluvial loams and clay loams, indicate that plant spacings of 12 to 15 inches in these varieties can be relied upon to produce satisfactory yields of cotton of good quality. Farmers who have tried such spacings in these and the Half and Half and New Boykin varieties have realised satisfactory results. On the very fertile alluvial soils of the abovementioned types in the southern district, wider distances appear to be beneficial, however, and the general practice is to space the plants 20 to 24 inches apart. These spacings are also advisable for the wetter coastal areas. No greater distances than 24 inches appear to be necessary for satisfactory plant development in the main cotton-growing districts.

Height of Thinning.

The results of height of thinning experiments indicate clearly that a suitable stage at which to thin the crop is when the plants are from 4 to 8 inches high, as this prevents the plants from growing tall and spindly, and also reduces competition for moisture and plant food. If the field has been cultivated and cross-harrowed to eliminate early weed growth, the thinning operations can be performed easily and rapidly when the plants are at this stage.

Plate 101.

A Cultivated Clean Field Speeds up the Rate of Thinning, thereby Reducing the Cost of this Important Operation.—These plants average 6 inches tall.

How to Thin.

In thinning, or "chopping," as this operation is frequently called, the most suitable implement to use is a light goose-neck hoe with the length of the handle and the set of the blade adjusted to suit the operator. As the plants should be cut just below the surface of the ground to prevent their regrowth, it is necessary to sharpen the cutting edge of the hoe frequently with a file in order that a clean cut through the cotton stalk is accomplished with each stroke. In this respect, the corners of the cutting edge of the hoe should be kept square

and sharp. With a hoe in this condition, the chopping operations can be speeded up through the ability of the user to cut out with the corner of the hoe the unwanted plants in a crowded bunch of seedlings. Where the chopping is done properly the one stroke removes the unnecessary cotton plants as well as any young weed and grass growth that may be amongst them, thus increasing the efficiency of the chopping operations and thereby reducing the cost of production.

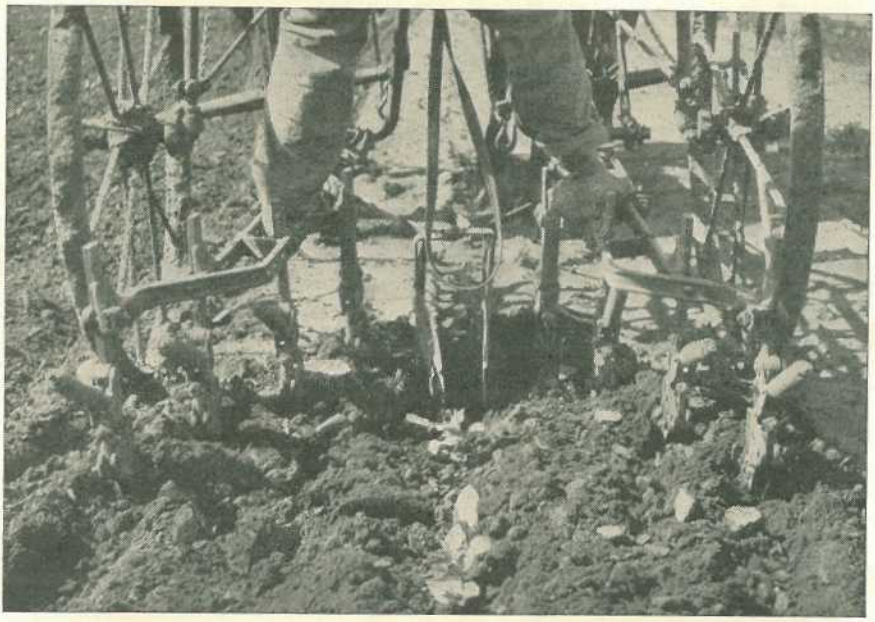


Plate 102.

ILLUSTRATING WHEN THE FIRST CULTIVATION OF COTTON SHOULD BE MADE.—The plants in the foreground were young velvet beans, which are very brittle, yet with the equipment being used no damage was done to them. The soil in which they were growing is of a clayey nature, and the cultivating was done three days after a heavy beating rain.

Cultivating.

The general tendency of growers is to wait until the cotton plants are well developed towards the thinning stage before the first cultivation is made. In many fields, particularly on old cultivations, considerable growth of pigweeds and summer grass will be present by then, especially in a season in which early showers occur, and it will be nearly impossible to destroy all of such growth without hand labour, even with the most efficient cultivators. It is highly advisable to prevent the growth of weeds amongst the young cotton plants in order that the latter will have the benefit of all available moisture during dry conditions. Freedom from weeds will also simplify the problem of insect control. The practice at the Biloela Research Station is to cultivate with a riding cultivator of the foot-steered type as soon as the cotton seedlings are 2 or 3 inches high, using tines 2¼ inches wide, with guards to prevent the soil covering the plants. This eradicates most of the weed and grass seedlings between the rows and establishes a nice mulch around the plants, which helps to prevent the growth of weeds in the row.

If further rainfall is experienced before thinning time, it will be necessary to cultivate again, otherwise no other cultivation is required until the thinning is completed.

This second cultivation may be done by cross-harrowing if the plants average approximately 4 inches in height. Not only will this operation largely destroy weed growth, both between and in the rows, but provided the work is done with a lever-equipped spike-tooth harrow, the teeth can be set so that a certain amount of beneficial elimination of thick stands of cotton plants can be accomplished. This also helps to reduce the cost of hoe thinning. It is pointed out, however, that cross-harrowing should not be done on fields in which sufficient roots, old cotton stalks, or trash occur to clog the harrow teeth enough to drag out an excessive number of the cotton plants.

It is not advisable to use the disc cultivator in the cultivations done before the thinning operations are carried out, for the size of the plants will necessitate setting the discs to cut the soil away from the row. This will leave the plants on a narrow ridge if the discs are set close enough to cultivate efficiently. Such a ridge will dry so hard as to restrict the growth of the young plants unless another cultivation is made soon afterwards to throw the soil back to the plants. Guards should be used in this latter operation to protect the plants from being covered with the loose soil resulting from the double cultivation.

Cultivations after Thinning.

A careful cultivation is given after the crop is thinned to re-establish the mulch between the rows and around the plants. This should be done as quickly as possible after the thinning, on account of the removal of most of the mulch in the row during the thinning operations being conducive to the exposed soil around the plants drying out and setting very hard under either dry conditions or following severe storms. Generally speaking, not more than three or four cultivations should be required after the one immediately following thinning to maintain a satisfactory mulch free of weeds if cotton is grown in rotation with grass land, but more may be required on old cultivations. At each of these operations it is recommended that the soil be worked towards the plants, for not only does the resultant mulch suppress most of the weed and grass growth, thereby conserving the moisture for the cotton crop, but a firm brace is established around the plants which helps to prevent them being blown over when the soil is wet. Where cotton is being grown with supplementary irrigation a cultivation should be given after each watering.

Cultivation Efficiency.

The utmost efficiency should be obtained in the cultivation operations. For most districts it is recommended that the best work can be done with a two-row cultivator of the type where the driver steers the carriage, on which the tines are fastened, with his feet, rather than by depending entirely on guiding the horses. There are several makes of this type of machine on the market, all of which can be equipped with tines, sweeps, duck feet, and in some cases, discs. By using such a type of machine, more efficient work can be done close to the plants than is possible with either the horse-guided rigid carriage types of riding cultivators or the one-horse-drawn scuffler.

It is important, however, to equip the cultivating machine with equipment suitable for each operation that is performed. Thus, when it is desired to establish a deep mulch, especially if the soil has set somewhat, the tines should be used on the machine. If, however, the soil is not set too hard and eradication of weed growth is desired, sweeps or duck feet should generally be used on most soils. Sometimes a combination of tines and sweeps may give the best results.

At times such prolonged wet conditions may be experienced that the cultivating operations cannot be done before an excessive development of weeds and grasses occurs. Under such circumstances a very satisfactory cleaning between the rows may be accomplished with the pony mould-board plough. The procedure is to start near the centre between the rows and make two complete rounds with the plough set shallow and turning the soil each time away from the plants towards the centre. This will leave the plants on a narrow ridge which can then be cleaned satisfactorily and reasonably cheaply with the heavy chipping hoe. As soon as the grass and weed growth in the ploughed middles has dried out sufficiently, the ploughing operations are reversed so as to hill up the soil towards the plants and thus restrict further growth amongst them.

On all occasions the cultivating parts of a machine should be properly set. Likewise, the parts should be kept properly shaped and sharpened. A duck foot that has been used until the point is worn off and the cutting edges rounded, is not suitable for efficient cultivation and destruction of weeds. Similarly, tines which have been worn down until they do not enter the ground at the correct angle are not suitable for economically establishing a satisfactory mulch.

Reduction in Costs of Production Required.

Reducing the cost of production of the pound of raw cotton is a very important factor for the average Queensland cotton-grower. This can be accomplished by increasing the average yield per acre and lowering all costs whenever possible. It is believed that by practising the cotton-grassland rotation and giving careful attention to the various features which have just been touched upon, many growers can undoubtedly substantially reduce their costs of production.

WAGON SEAT.

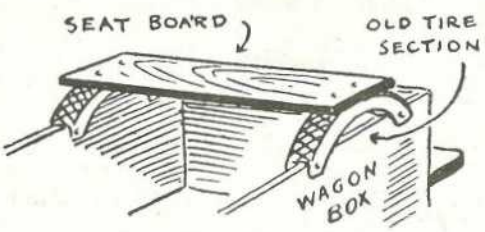


Plate 103.

An excellent wagon seat easy to make and easy to ride on can be made from a short length of board and an old tyre. Two sections are cut from the tyre and nailed to the board the proper distance apart. Heavy duty or six-ply tyres should be used if possible.

The Plough Cultivation of Tobacco.

L. F. MANDELSON, B.Sc.Agr., Research Officer, and H. McNEE, Q.D.A., Instructor in Agriculture.

IN an article on "The Tobacco-Growing Industry in the United States of America," published in the "Queensland Agricultural Journal" in 1936,* a procedure known as plough cultivation was fully discussed. This method differs from the customary procedure used for tobacco cultivation in Queensland in that it consists of carrying out a few very thorough and deep cultivations rather than performing a greater number of shallow cultivations.

Since 1936, plough cultivation has given fairly promising results in field trials, both with improvised implements as well as with special implements more recently introduced from the United States of America for the purpose. Consequently, it might be of interest to discuss briefly these results and to again describe this method of cultivating tobacco.

Field Experiments.

Simple field trials to investigate cultivation as well as fertilizer placement methods were established in various districts during the 1936-37 and 1937-38 seasons. These exploratory trials, which were at Dimbulah, Bowen, and Mackay, yielded results in the first season which appeared to indicate that plough cultivation would be of value under Queensland conditions. Owing to the simplicity of the experimental design and adverse local conditions, however, actual results in yield and value of leaf were not in all cases in favour of plough cultivation.

During the second season the trials, which were established in the Bowen and Mackay districts, were more conclusive. In both cases, plant development during the entire growing season was obviously better with plough cultivation than with the usual method of cultivation with a scuffler. Results, as expressed in average yield per acre and value of leaf, were also slightly in favour of the former method. During the same season a more elaborate type of experiment to investigate cultivation methods as well as plant-spacing distances was established in the Dimbulah district. In this case, also, field observations as well as final results favoured plough cultivation. Actually, on the average, yield was increased from 1,209 lb. to 1,256 lb. and leaf value from £132 to £138 per acre in this experiment.

During the 1938-39 season, the more elaborate type of experiment was again established at Dimbulah. Whereas improvised implements had been used up till this time, a sweep stock with attachments, as well as a plough introduced from the United States, were available for this experiment. The experiment was initiated in late November, and plots for plough cultivation were cultivated with bull tongue and plough two weeks later. Unfortunately, abnormally dry conditions then made further thorough cultivation inadvisable. Consequently, the soil was not again disturbed until mid-January, when, owing to extensive root development, a middle burster was run down the rows instead of using a plough, which would have caused some damage at that time. Although this experiment, therefore, did not receive the full cultivation treatment

* Mandelson, L. F.—The Tobacco-Growing Industry in the United States of America. "Queensland Agric. Journal" 45 : 5 : 461-483; 45 : 6 : 541-574; 46 : 1 : 4-25; and 46: 2 : 143-169. Reprinted as Bulletin No. 14, 1936.

as planned, outstanding differences in growth in favour of the plough-cultivated plots were soon obvious. It is of interest to note, furthermore, that these plots reached maturity from seven to ten days earlier than those cultivated in the usual manner. The results of this experiment indicated that, on the average, yield was increased from 1,012 lb. to 1,263 lb. per acre, and value of leaf from £76 to £114 per acre by means of plough cultivation.

The results of these field trials and experiments, which were established during three consecutive seasons in various districts, suggest, therefore, that possibly better results might be obtained under Queensland conditions by using a plough for tobacco cultivation rather than a scuffler. Accordingly, details of the plough-cultivation method are briefly discussed hereunder, to facilitate its adoption by growers who might wish to give it a trial during the coming season.

Plough Cultivation Method.

The original ridges or hills on which tobacco plants are set out in the field should not be much higher than the surrounding ground level. They are made over drills by a single plough furrow on each side, after the fertilizer has been thoroughly mixed in the drill with a scuffler or some such implement. Frequently the crests of the ridges so constructed are flattened down by dragging a log over the surface.

A week or so after plants have been set out, and as soon as they are established and have commenced to grow, they should receive their first cultivation. This consists of three operations—namely, deep aeration of the soil, hoeing between the plants, and the construction of a broad high hill. The first is carried out with a bull-tongue blade, which is a metal blade 8 to 10 inches by 2 inches attached to a sweep stock (Plate 104; figs. *b* and *e*). With this implement, two deep narrow furrows are made on either side of the row, and as close as possible to the plants without disturbing them. The object to be aimed at is to deeply aerate the soil as closely as possible to the plants. It is inadvisable to leave the soil exposed in this condition for more than an hour before throwing the soil back towards the plants to avoid its drying out. Consequently, as soon as a few rows have been aerated, two furrows are made with a plough on each side of the row. The usual type of pony plough has been found satisfactory for the purpose. Next, the soil crust around the plants should be broken with a hoe. Finally, the hill is still further widened, and the space between the hills is cleaned out by making a furrow down the centre with a sweep blade attached to a sweep stock (Plate 104; figs. *b* and *f*).

When the tobacco is about 6 or 8 inches high, it should receive a second cultivation. On this occasion, however, a bull tongue is not used, since it would tend to cut roots and injure the plants at this stage. This second cultivation consists of (1) making two furrows with a plough on either side of the row; (2) breaking the soil about the plants with a hoe; and (3) cleaning out the space between the rows with a sweep blade.

In some cases, two thorough cultivations may be quite sufficient, but generally it is advisable to make three cultivations during the season. The final cultivation should be made when the crop is about knee high, and particular care should be exercised at this stage to avoid damaging roots growing out into the space between the rows. As with other cultivations, the soil on the hills should be hoed and pulled up well around the plants. After making sure that roots will not be unduly damaged,

the hills should be built up with two plough furrows as before. During this final cultivation, soil should be thrown up well towards the plants by suitably regulating the speed of the plough, and eventually the work should be finished off by cleaning out the space between the rows with a sweep. Should it be found that roots have grown too far into the space between the rows, it is then inadvisable to use a plough at all for this final cultivation. In this case, the best procedure is to run a middle-burster (Plate 104, figs. *b* and *c*) or some such implement down the centre of the furrow to throw soil on to the hill with a minimum of disturbance to the tobacco roots.

All the essential operations referred to above are fully illustrated in the bulletin on "The Tobacco-Growing Industry in the United States of America," in which this cultivation method was originally discussed.

Plough Cultivation with Improvised Implements.

Though Queensland farmers have not the actual types of implements used in the United States of America, they may by combining the use of an ordinary pony plough and a scuffler give the crop a satisfactory cultivation, which will embody the principles of the plough cultivation method just described.

In performing the first cultivation a complete round is made with a pony plough, with or without a mouldboard attached, to throw the soil away from the plants. This operation will leave the plants on a narrow ridge 8 to 10 inches wide and 7 or more inches high. Before the soil has dried out excessively another complete round is made with a plough, but in the reverse direction so as to throw the soil back to the plants, and thus rebuild the hills. The untouched area between and around the plants should next be chipped with a hoe. A scuffler with hillers drawn as closely together as possible or with a sweep blade in place of the hillers should then be run between the rows to widen the hills, and to leave a deep narrow drain to carry off storm waters.

The second cultivation, made when the crop is 6 to 8 inches high, is carried out with a plough, as described in the preceding section, and the space between the hills may be cleaned out with a scuffler with sweep blade attached or with hillers drawn close together. Succeeding cultivations, if necessary, may be made in a similar fashion.

Advantages of Plough Cultivation.

The cultivation procedure discussed above has the following advantages over less thorough methods:—(1) Lateral root growth is encouraged which tends to induce more rapid plant growth, larger leaf development, and minimisation of losses by root rots. (2) The possibility of the soil becoming water-logged after heavy rain is reduced by better drainage. (3) The width of the hills tends to reduce the rate at which the soil dries out during prolonged dry weather. (4) The above-mentioned factors tend to produce greater returns per acre.

It has been found that about 1 acre per day may be cultivated when the plough cultivation procedure is used. Some growers may consider that this rate is unduly slow. It is better, however, to cultivate 1 acre thoroughly in a day rather than 4 acres less effectively in the same time, if in the latter case the land has to be recultivated frequently and the final result is inferior. The cultivation trials discussed above suggest that this is actually the case.

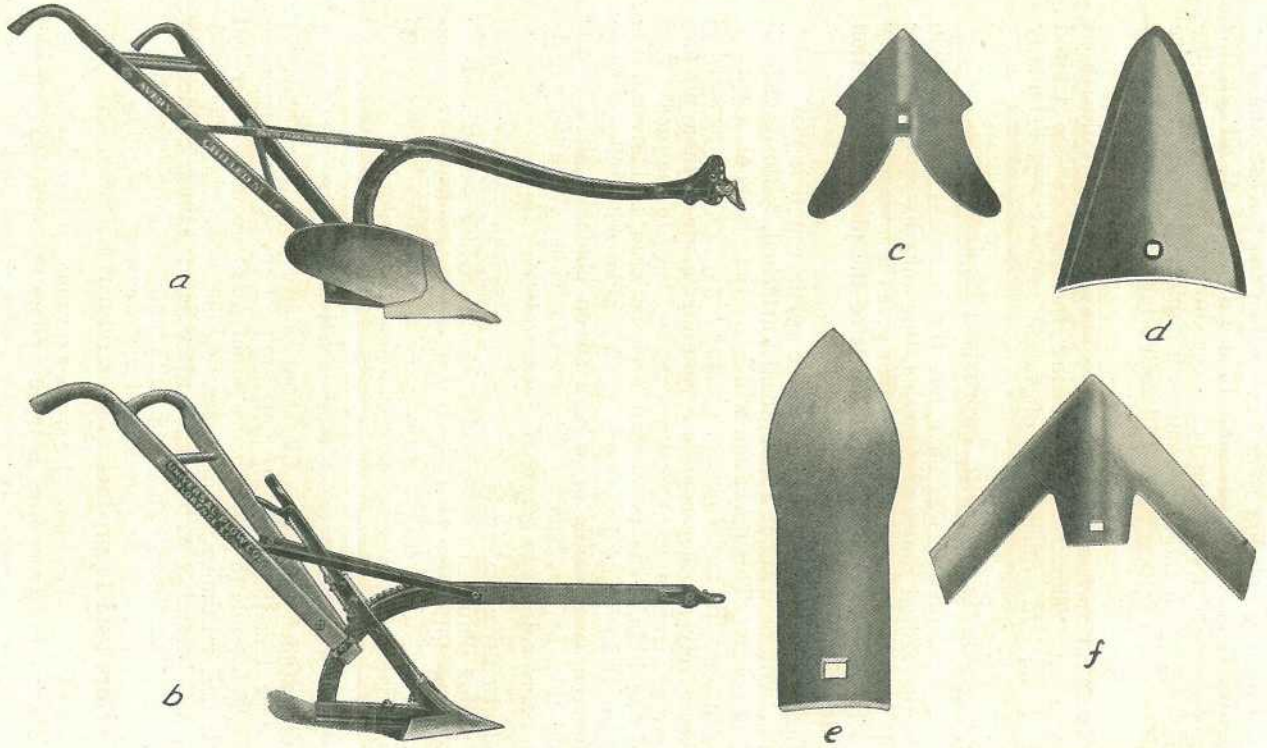


Plate 104.

THE PLOUGH CULTIVATION OF TOBACCO.

Fig. *a*. Plough. An American " turning " plough which is very similar to the light single furrow or " pony " plough used in Queensland.

Fig. *b*. Sweep stock with wing sweep blade attached. The attachments (*c*), (*d*), (*e*), and (*f*) are all used with this stock.

Fig. *c*. Middle-burster blade used for final cultivation when root development does not permit the use of a plough.

Fig. *d*. Shovel plough blade used for laying-out drills in which fertilizer is placed prior to hilling-up.

Fig. *e*. Bull tongue blade used for deeply aerating soil close to young tobacco plants when first cultivated.

Fig. *f*. Wing sweep blade used for cleaning out the space between tobacco rows after each plough cultivation.

Hybrid Maize for Queensland.

W. W. BRYAN, M.Sc.Agr., and A. J. SCHINDLER, B.Sc.Agr., Plant Breeding Section, Queensland Agricultural College.

HYBRID maize has been such a remarkable success in United States of America that probably over one-fifth of the American corn acreage of 100,000,000 acres will this year be sown to hybrids. The average increase in yield is about 15 per cent.

The purpose of this article is to tell what is being done in Queensland to produce maize hybrids, to give the production figures of a few of the better hybrids, and also to tell of some of the steps proposed for the introduction of suitable hybrids into Queensland maizegrowing.

What is a Maize Hybrid?

As far back as 1926 a hybrid maizebreeding programme was begun at the Queensland Agricultural College, Queensland being the first Australian State to realise the value of maize hybrids. The old breeding methods of various types of selection, of the crossing of varieties, and so on, will no longer give marked improvement. In order to make big forward strides we have first to go backwards. That is to say, the first step in the production of vigorous high-yielding hybrids is to produce inbred lines, which themselves are so weak, low-yielding, and unprepossessing that no maizegrower in his right senses would treat them with anything but utter scorn. Yet, generally, five to eight years' work has to be done on their production and testing before any use can be made of them. The procedure is to select desirable plants from as wide a range of varieties as can be obtained. These selections are then inbred for a number of generations, and by rigorous selection during inbreeding undesirable types are eliminated. After several years then we finish up with a number of inbreds. These are tested for high-yield capacity and other characteristics, the better ones retained, and the breeder is then ready to begin the production of hybrids from them.

In Queensland, some 500 varieties derived from many parts of the world have been subjected to inbreeding, and from well over 5,000 initial plant selections we now have about sixty inbreds, with which we are working. The average yield of the majority of these inbreds is only 10 to 15 bushels per acre. These then form our building blocks. What sort of structure can we build with these blocks?

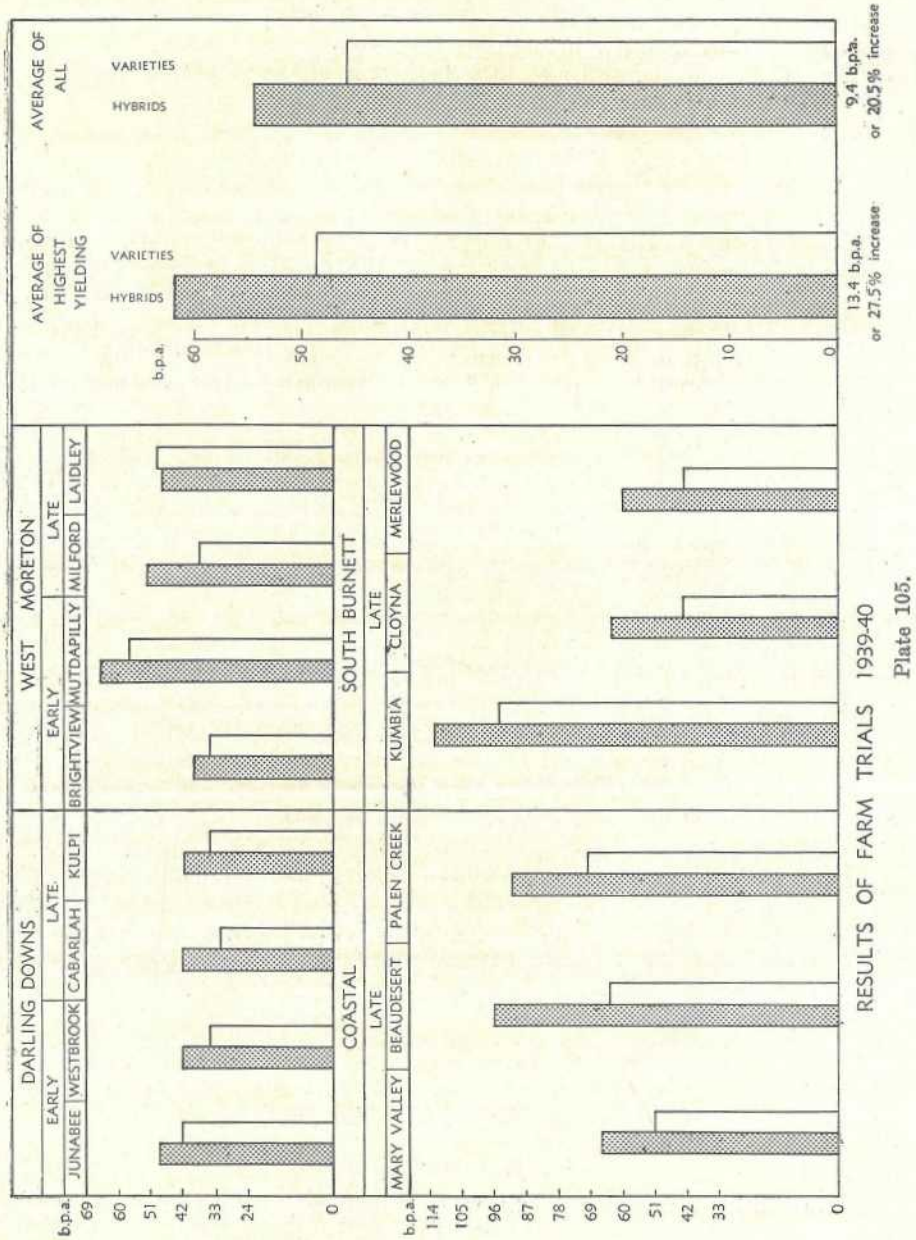
The inbreds are crossed in pairs to produce single crosses or foundation hybrids, and the best of the single crosses are combined in pairs to make double crosses. The seed of the best of these double crosses is used by farmers for their ordinary corn crops. When inbreds are combined, there is an immediate and great manifestation of hybrid vigour, as you will see when we quote yield figures shortly. But not every hybrid is a good one (it depends on the heredity received), and not every good hybrid is necessarily suited to more maize areas than a few. Every likely hybrid produced has, therefore, to be tested for yield in trials, which should be located as widely as possible over the maize areas of the State. This work we are now beginning to do.

Testing Hybrids for Yield.

Naturally, the first and the most extensive testing is done at the breeding station, and we now have yield data for the College for the past

five years. But Lockyer conditions are different from those of other parts of the West Moreton, or the Darling Downs, or the South Burnett. In consequence of this, the testing of hybrids for yield now runs on the following lines:—

The College has made and initially tested at the College nearly 2,000 hybrids of various types. All but 300 of these have already been discarded. Each year between 3,000 and 4,000 yield trial plots are planted and harvested. The hybrids are compared with each other, and



RESULTS OF FARM TRIALS 1939-40

Plate 105.

also with three standard varieties. These varieties are each the best of its type, selected after variety trials which were conducted for several seasons. Of the 300 remaining hybrids, some thirty have so far been outstanding, and these thirty were selected for wider testing.

The present testing plan provides for farm trials throughout South-eastern Queensland, every major maize area being represented. In these trials on private farms, for whose continuance we are indebted to the loyal co-operation of farmer friends, six or seven hybrids have been planted, together with the farmer's own variety and with two standard varieties chosen as being most suited to the locality.

Results of Yield Tests.

In 1939-40 fourteen trials were harvested. Additional trials planted on the Darling Downs at Westbrook and near Clifton were destroyed in the early stages by grasshopper invasions.

Method of Procedure.

Each trial consisted of a randomised block design, with six replications. Plots were each of two rows, 44 feet long, plot size 1/110 acre, with lanes of 3 feet between ends of plots. Two guard rows were sown along each outer edge of the trial. Planting was done by hand by a member of the College staff, the planting of each trial being completed within a half-day period. Each trial was sown in part of a maize paddock, which assisted in ensuring that during growth the crop received only normal cultivation.

Harvesting was carried out by the College Plant Breeding Section, the crop being husked as it was pulled. After pulling, the plots were immediately shelled in a small portable sheller and weighed. From each of three replications a 2-lb. sample was taken for the determination of moisture content and damaged kernels (disease estimation). All yields were finally computed on a 14 per cent. moisture basis before being statistically analysed. In the notes on each trial which follow, differences which are statistically significant are marked with an asterisk. The fully detailed results of each trial are not given, as undue weight should not be given to the results of a single season. In fact, the chief justification for publication at this stage is the good agreement shown by the results of last season's farm trials and the results over several seasons past at the College. This agreement appears to justify the belief that the favourable results now put on record should be repeated in future seasons.

DETAILS OF FARM TRIALS.

Trials of Early Hybrids.

West Moreton—Brightview.

Co-operator	Mr. F. Heiner.
Planted	7–8–39.
Soil type	Black friable loam.
Climatic conditions ..	Long dry period after sowing, then very hot. Generally unfavourable.
Harvested crop ..	Somewhat pinched and small grain.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	38·6	Highest yielding variety..	34·2	4·4	12·8
Average of all hybrids (7)	33·8	Average of all adapted varieties (3)	31·0	2·8	9·0

Darling Downs—

(1) Junabee.

Co-operator .. .. Mr. V. Braithwaite.
Planted .. .. 2–11–39.
Soil type .. .. Red volcanic loam.
Climatic conditions .. Long dry period after planting. Generally only moderately favourable.
Harvested crop .. Fair condition.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	48·4	Highest yielding variety..	41·9	6·5	15·5
Average of all hybrids (6)	43·0	Average of all adapted varieties (3)	39·7	3·3	8·3

(2) Westbrook.

Co-operator .. .. Farm Home for Boys, Westbrook.
Planted .. .. 30–11–39.
Soil type .. .. Typical Downs black soil.
Climatic conditions .. Hot, dry period after planting. Only moderately favourable.
Harvested crop .. Fair condition.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	42·1	Highest yielding variety..	34·5	7·6	22·0
Average of all hybrids (6)	37·1	Average of all adapted varieties (2)	33·8	3·3	9·8

Trials of Late Hybrids.

West Moreton—

(1) Mutdapilly (near Harrisville).

Co-operator .. .. Mr. H. Reed.
Planted .. .. 27–10–39.
Soil type .. .. Black moderately light silty clay loam.
Climatic conditions .. Only moderately light rain during growth.
Harvested crop .. Normal.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	65·0	Highest yielding variety..	57·1	7·9	13·8
Average of all hybrids (7)	61·2	Average of all adapted varieties (2)	54·2	7·0	12·9

(2) Milford—Low-hill country south-east of Boonah.

Co-operator .. .. Mr. A. N. Krey.
Planted .. .. 29–11–39.
Soil type .. .. Black loam (brigalow).
Climatic conditions .. Only slight rain during growth. Dry heat wave at tasselling.
Harvested crop .. Of fair appearance.

—		—		Difference.	
				Hybrid.	Variety.
				p.b.a.	per cent.
Highest yielding hybrid..	51·7	Highest yielding variety..	37·7	14·0	* 37·1
Average of all hybrids (7)	45·1	Average of all adapted varieties (3)	31·0	14·1	45·5

(3) Laidley.

Co-operator .. .. Mr. M. Lester.
Planted .. .. 24–1–40.
Soil type .. .. Sandy loam (light scrub).
Climatic conditions .. Good until flowering, then extremely dry until harvest.
Harvest .. .. Most of the grain light, chaffy, and obviously seriously affected by dry conditions.

—		—		Difference. Hybrid.	Difference. Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	47·8	Highest yielding variety..	49·2	−1·4	− 2·8
Average of all hybrids (7)	41·7	Average of all adapted varieties (2)	48·6	−6·9	−14·2

Darling Downs—

(1) Cabarlah (13 miles North of Toowoomba).

Co-operator .. .. Mr. H. Adams.
Planted .. .. 13–11–39.
Soil type .. .. Reddish brown sandy loam.
Climatic conditions .. Dry, very hot after planting to tasselling. After tasselling the trial was invaded by grasshoppers and many of the lower leaves completely eaten.
Harvest .. .. Shallow grain generally.

—		—		Difference. Hybrid.	Difference. Variety
				b.p.a.	per cent.
Highest yielding hybrid..	42·4	Highest yielding variety..	31·5	10·9	* 34·6
Average of all hybrids (7)	35·1	Average of all adapted varieties (3)	27·3	7·8	28·5

(2) Kulpi (Cooyar Line).

Co-operator .. .. Mr. L. Garvis.
Planted .. .. 22–11–39.
Soil type .. .. Black slightly sandy loam.
Climatic conditions .. A little rain in the month after planting. Dry, and heat wave at tasselling.
Harvest .. .. Ears generally small and thin. Yields of two of the varieties were so low that they were not weighed.

				Difference. Hybrid.	Difference. Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	41·2	Highest yielding variety..	28·4	12·8	* 45·1
Average of all hybrids (7)	32·9	Average of all adapted varieties (1)	28·4	4·5	15·8

(3) Nobby.

Co-operator .. .. Mr. G. Christian.
Planted .. .. 4–1–40.
Soil type .. .. Typical Downs black soil.

The trial was eaten by grasshoppers when some inches high.

Coastal—

(1) Mary Valley.

Co-operator .. .. Mrs. A. M. Poulsen, Beechwood.
Planted .. .. 31–10–39.
Soil type .. .. Dark-grey alluvium.
Climatic conditions .. Generally fair
Harvested crop .. Normal.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	65·5	Highest yielding variety..	50·5	15·0	* 29·7
		Average of adapted			
Average of all hybrids (7)	59·0	varieties (2)	45·5	13·5	29·7

(2) Beaudesert.

Co-operator .. .. Mr. E. M. Shaw, Nyama, Innis Plain.
Planted .. .. 20–12–39.
Soil type .. .. Black clay alluvial.
Climatic conditions .. Generally fair.
Harvested crop .. Normal.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	95·7	Highest yielding variety..	63·6	32·1	* 50·5
		Average of adapted			
Average of all hybrids (7)	83·7	varieties (2)	63·2	20·5	32·4

(3) Palen Creek.

Co-operator .. .. Palen Creek Prison Farm.
Planted .. .. 20–12–39.
Soil type .. .. Dark-grey loam (basaltic).
Climatic conditions .. Generally fair.
Harvested crop .. Normal.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	90·6	Highest yielding variety..	69·6	21·0	* 30·2
		Average of adapted			
Average of all hybrids (7)	84·2	varieties (3)	67·1	17·1	25·5

South Burnett—

(1) Kumbia.

Co-operator .. .. Mr. J. C. Noller.
Planted .. .. 1–12–39.
Soil type .. .. Red loam, virgin land.
Climatic conditions .. Highly favourable for maize.
Harvested crop .. Normal.

—		—		Difference.	
				Hybrid.	Variety.
				b.p.a.	per cent.
Highest yielding hybrid..	112·8	Highest yielding variety..	94·2	18·6	* 19·7
		Average of adapted			
Average of all hybrids (7)	105·7	varieties (3)	88·1	17·6	20·0

(2) Murgon (Cloyna).

Co-operator .. .. Mr. J. A. Heading, Highfields.
Planted .. .. 31–10–39.
Soil type .. .. Dark-grey volcanic loam, long cultivated.
Climatic conditions .. Long dry period after planting which delayed germination. Severe heat wave about flowering time. Otherwise satisfactory.
Harvested crop .. Normal.

—			Difference.	
			Hybrid.	Variety.
			b.p.a.	per cent.
Highest yielding hybrid..	62·9	Highest yielding variety.. 43·1	19·8	* 45·9
Average of all hybrids (7)	53·4	Average of adapted varieties (2) .. .. 41·8	11·6	27·7

(3) Murgon (Merlwood).

Co-operator .. .. Mrs. J. M. Wisseman.
Planted .. .. 2–12–39.
Soil type .. .. Red volcanic loam, old cultivation.
Climatic conditions .. Severe heat about flowering time. Otherwise fairly satisfactory.
Harvested crop .. Normal.

—			Difference.	
			Hybrid.	Variety.
			b.p.a.	per cent.
Highest yielding hybrid..	60·2	Highest yielding variety.. 42·5	17·7	* 41·6
Average of all hydrids (7)	54·9	Average of adapted varieties (2) .. .. 40·1	14·8	36·9

RECORD OF SOME INDIVIDUAL HYBRIDS.

Hybrid.	Tested at—	Hybrid Average.	Best Variety Average.	Hybrid Increase.	
		b.p.a.	b.p.a.	b.p.a.	per cent.
Late Hybrids—					
A ..	College, 5 years ; Cabarlah, Mary Valley, Beaudesert	52·8	38·8	14·0	36·1
B ..	College, 6 years ; Carbarlah, Murgon, Boonah	46·6	38·0	8·6	22·6
C ..	College, 5 years ; Murgon, Mutdapilly, Beaudesert	48·0	38·6	9·4	24·4
D ..	College, 5 years ; Kumbia, Beaudesert, Palen Creek	59·6	52·2	7·4	14·2
E ..	College, 6 years ; Laidley, Kulpi, Mary Valley, Beaudesert ..	48·7	42·2	6·5	15·4
F ..	College, 6 years ; Beaudesert, Laidley	46·9	42·5	4·4	10·4
Early Hybrid	College, 1 year ; Junabee, Westbrook	41·5	38·6	2·9	7·5

Summary of Yield Tests.

To summarise, it would appear that by using the better hybrids an increase of about 20 per cent. may be expected for those areas for which the particular hybrid is suited. We feel that this increase, which is 6 to 10 bushels per acre on the average, fully justifies an attempt to introduce maize hybrids to Queensland farmers.

Warning!

Here let a warning be sounded. The hybrids which have been developed up to the present are only suited to South-east Queensland. Moreover, hybrids will not immediately, or, perhaps, for a long time, displace the present standard varieties on all farms. There will continue to be a demand for good varieties for many years. If you have a really good variety, do not lose it. It will still be of considerable value. Another very important point is this: No seed for further planting can be taken from a hybrid crop. Seed from such a crop, however attractive it may appear for seed purposes, will produce a crop yielding from 15 per cent. to 25 per cent. less than the original crop of hybrid. A

hybrid is a mule in the sense that it does not reproduce its kind. For this reason, fresh seed of hybrids has to be obtained each year from some seed-producing source. This is a real objection to the use of hybrids, but it fades into insignificance in comparison with the advantages that hybrids give.

Trial Seed Samples.

It was mentioned before that the hybrids are tested for yield and other characteristics at the College and on private farms throughout South-eastern Queensland. These trials will be continued and, if possible, extended. But conditions of soil and rainfall vary from farm to farm, so that the results of a trial, say, in the Murgon area, may not hold for every farm in that area. To overcome the difficulties of this variation from farm to farm, there are available for the coming planting season small free samples of seed of promising hybrids (1-lb. samples), which are available to any maizegrower who would like to try for himself the possibilities of hybrid corn. As the amount of seed on hand for samples is limited, conditions have to be imposed in the distribution of the samples in order that the best use may be made of the seed available. These conditions are, briefly, that the grower receiving a sample should promise to plant the hybrid in competition with his own choice of variety according to a simple but definite plan of alternate pairs of rows, and that the results of his test should be made available to the breeding station. Applicants for a sample should apply to the Plant Breeder, Queensland Agricultural College, Lawes, when they will be supplied with full details. The area required for the farm test will be $\frac{1}{4}$ to $\frac{1}{3}$ of an acre. Most of the hybrids available are late types, but there will be a few early types available. The distribution of samples will be continued in future seasons.

This, then, completes the testing scheme—i.e., initial testing at the College, carefully conducted trials throughout the maize districts, and the distribution of small samples of the more promising hybrids to individual farmers. The question naturally arises: "but how can we obtain seed of hybrids in larger quantities sufficient for our planting requirements?" This question will be answered later when we know better which hybrids are finally to be used.

Other Objectives.

High yield is not the only objective of our breeding work. At the same time we are subjecting each hybrid to searching scrutiny for any weaknesses. To be retained, a hybrid, however high yielding, must equal or better the best of our present varieties in such things as root and stalk strength, good husk cover, ability to turn its ears down at maturity, resistance to earworm, weevil, aphids, and to ear and stalk rots and other diseases. Any major weakness is sufficient to have it rejected.

Another point we have in mind is that our hybrids should be dual-purpose types—i.e., they should have a green fodder yield equal to our good varieties, in addition to their superior grain yield. This eliminates the need for a farmer who requires both green fodder or silage as well as grain from having to use more than one hybrid.

The maize-breeding work as a whole is designed, not with a view to the extension of existing maize areas, but to give increased yields in the present recognised maize areas—i.e., to lower the present cost of production, or, in other words, to give an increased margin of profit.

Sheep Feeding Methods.

J. M. HARVEY, M.Sc., Department of Agriculture and Stock.

THE secret of success in drought feeding lies mainly in correct management of the property. A judicious subdivision of paddocks is necessary to enable feeding in mobs of convenient size. The manager must be able to recognise when his animals should be fed. This means the commencement of feeding at an early stage, because it is not an economical proposition to feed once the animal starts to draw heavily on its muscle. The classing of sheep according to strength is important. By dividing into three groups, say, a hospital mob, weak mobs, and strong, it is possible to feed differently according to requirements and to a certain extent nurse the poorer sheep. The nature of the property will, of course, have a considerable influence on the type of feeding and the management of the flock.

In general, when the country starts to go off during a dry spell, although there may be a large body of dry grass, this has lost a considerable amount of two of its essentials, viz., protein and minerals. At this stage a supplement should be supplied preferably in the form of a lick. For example, this could be supplied by a mixture of bone meal, vegetable protein meal, and a small amount of salt. The quantity of bone meal, which is very unattractive to sheep, could be increased rapidly once the animals are accustomed to the lick and in this way limit the consumption. The protein meal serves a double purpose. It provides an adequate supply of protein, which is essential for maintenance of muscle, and it enables the animal to make much better use of some of the otherwise undigested carbohydrate material in the grass itself. Good bone meal, in addition to 28 per cent. phosphate and 32 per cent. lime, also contains 17 per cent. of protein material.

The next stage in feeding is when the country has started to slip badly. No longer can the sheep obtain an adequate supply of carbohydrate, or energy food, from the scanty pasture, even with the assistance of a protein supplement. At this stage some cereal meal must be fed together with the protein. The type of cereal meal to be fed will be largely governed by price and quality, as there is very little difference in the digestible carbohydrate content, with the exception of oats.

The final stage of feeding is, of course, on bare country. Even at the previous stage, viz., when the country has deteriorated badly, it may be economical to adopt this type of feeding. In the first place, temporary fencing will have to be erected to keep the animals in fairly small enclosures. This is important, as it prevents a considerable energy waste expended by the sheep in walking over a large area in search of food. Also, it serves to spell the large paddocks which will then pick up much more rapidly when rain does come. Naturally, these enclosures will have to be shifted from time to time, as the ground will become very dusty and contaminate both wool and food.

It has been quite definitely established that it is possible to maintain dry sheep on concentrates only. Care, of course, will have to be exercised when such sheep are brought back on to roughage, especially if the feeding period has been a long one.

In the case of lambing ewes and lambs, the feeding of roughage is essential. It is important, however, to avoid selective feeding, and for this reason concentrates and roughage are not fed together. The best plan is to set aside two days in the week when roughage only is fed.

The feeding of ewes and lambs presents quite different problems of management and feeding from the handling of dry sheep. Lambing ewes will require about three times the digestible protein, twice the digestible carbohydrate, and about twice the lime for a dry sheep. Consequently, they will require a ration high in protein and minerals prior to lambing and afterwards for the production of milk. In the case of lambs, an inadequate supply of roughage prevents the proper development of the paunch. Such development cannot take place in later life, and the result is a sheep with an insufficient food storage capacity.

Lambing in a drought then presents these alternatives—

(1) Feeding of lambs with their mothers.

(2) A method of creep feeding.

(3) An early weaning of lambs.

1. The first type is generally uneconomical.

2. The second has been found quite successful. Small enclosures are erected close to where the ewes are fed and arranged so that the lowest strand of wire or rail of the fence is about 8 inches above the ground. This allows access of the lambs and a separate means of feeding, although the lambs are still running with their mothers.

3. The third type has been used to advantage on many properties. Lambs start to take an interest in feeding at about fourteen to nineteen days. In general, however, lambing takes place over about six to eight weeks; so that it is certainly not possible to wean the lambs as they reach a particular age. What can be done is to wean the whole flock, say, at fourteen days after lambing ceases. There are then only two possible rations for the rearing of such lambs, i.e.—

(i.) A ration of good-quality, bright lucerne and maize or other suitable meals.

(ii.) If lucerne is unprocurable, either bright, good-quality wheaten or oaten together with a good growing mash from a reputable poultry firm or its equivalent.

In the former case, whole maize must not be fed to lambs. The best proposition is maize meal, but whole maize soaked in water for twelve hours and drained is fairly satisfactory.

Now, as regards methods of feeding, there are two alternatives—(1) trough feeding, and (2) broadcast feeding.

The broadcast method, although still in use, is rapidly being replaced by the former. It presents three very great disadvantages—

(*a*) While protein food is available in nut forms—e.g., Meggitts nuts, cotton-seed nuts, Thorpe's cubettes, carbohydrate feeding is limited, irrespective of price to whole maize. As previously stated, this must be avoided in the case of lambed ewes, or, at least, the maize must be soaked, and this necessitates some form of trough feeding.

(*b*) The sheep uses up energy which he cannot afford in a wild scramble after the food lorry.

(*c*) The ground is quickly powdered up by the sheep and considerable quantities of earth are taken in together with the food.

There are several types of troughing in use at present. The most satisfactory but most expensive is a type of self-feeding hopper. This consists of a V-shaped container over a feeding tray. The tray is arranged about 15 inches above the ground and is gravity-fed from the container. The whole structure is protected from the weather by an iron or fibrolite roof.

Log-troughing is very successful and convenient if there are facilities on the property. If handy to a timber mill, low-grade 8-inch boards can be made into either V or U-shaped troughs.

Some considerable success has been achieved in the past using fibreen. This is a special water-proof material bought in rolls cut to suitable width—e.g., 30 inches. It is bellied out and fastened by means of clips or tie-wire to two parallel strands of fencing wire, supported at about 8-feet intervals by suitable stakes. Lately, however, some samples have not shown to advantage when subjected to vigorous feeding on bare country.

Iron troughs are in use, but this commodity is practically unprocurable at present. Bag troughing both fouls and tears easily, but in case of necessity it is possible to peg out bags on the ground.

For the feeding of hay, experience has shown that the most satisfactory method is a wire rack. This is constructed by bellying out wire-netting of large mesh between two parallel rows of posts carrying a top rail. The posts should be arranged at a height such that lambs have access to the lowest part of the netting. This ensures them the bulk of the leaf, as it naturally falls to the bottom of the rack. It is considered an advantage to peg out bags underneath the rack both to prevent any wastage of leaf and to eliminate the possibility of lambs eating earth together with the fallen leaf.

The use of troughs has brought about two systems of feeding. In certain localities success has been claimed by a system of controlled feeding by the addition of some unattractive material to the ration. This material must, of course, have no harmful and preferably a beneficial effect on the sheep. The obvious advantages of such a method is the much less area of troughing required and the fact that two and three days' supply of food can be put out at once.

However, even in areas where it has been found impossible to obtain a satisfactory control and consequently necessitated a large increase in area of troughing to enable all animals to have access to the trough at the one time, it is admitted that the trough system is definitely superior to any broadcast method.

In conclusion, it is considered that the ideal system of feeding lies in the use of numbers of scattered troughs of the hopper type. These can be used as lick troughs, and when supplementary feeding is necessary, protein meal and cereal meal can be introduced as required. This, of course, like any other system, demands continuous attention and careful management.

Variation of the Prussic Acid (HCN) Content of *Sorghum verticilliflorum* at different stages of growth.*

W. R. WINKS, B.Sc., A.A.C.I., Analyst, Department of Agriculture and Stock, Queensland.

SORGHUM verticilliflorum, commonly known as Wild Sorghum, "is a tall, robust, perennial grass, 6-8 feet high or more, the leaves and stems often stained a purplish red by bacterial infection; not producing underground runners as in Johnson Grass" (*Sorghum halepense*), with which it is often confused, "but perennial through buds developed at the base of the stems. Leaf-blades 9-18 inches long, ½-¾ in breadth, uppermost leaf sheaths about 1 foot long, lower ones successively shorter; ligule silky, hairy. Inflorescence (seed head) 12-18 inches long and about 12 inches across. Spikelets of two sorts, the smaller, narrower ones males or sterile, the larger, plumper ones female or fertile. Fertile spikelets ¼ inch long, covered with brown silky hairs; awn brown, bent and twisted, ½ inch or more long." (White, "Queensland Agricultural Journal," April, 1937, p. 368.)

The plant is a native of Africa, though it is now naturalised to many warm countries. In Queensland it finds its greatest development in the coastal part of the State from Brisbane to Bundaberg, but is found as far north as Cairns and as far west as Emerald and Hughenden.

Material and Methods Used.

The material used in this investigation was natural growth obtained from a plot 12 feet by 18 feet in the grounds of the Department. This plot was first cut short and cleaned of weeds, and the subsequent ratoon growth used for analytical purposes.

Cuttings were first made at monthly intervals, but during the early investigations the growth was so rapid that it was decided to halve the plot and analyse the new growth at weekly intervals, while monthly determinations were continued on the original growth. The samples selected consisted of one stalk from each of several stools. New growth appeared after each cutting, but only those stalks which had started to grow before the previous cuttings were selected for determinations.

The whole plant was used for the determination of HCN for most of the period, but as the stalks hardened some determinations were made of the leaves alone. In the older plants secondary growth took place from the nodes, and this growth matured in time and set seed.

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* Contribution No. 11 from the Poison Plants Committee, Department of Agriculture and Stock, Queensland, established as the result of a grant from the Australian Wool Board for the purpose of conducting investigations with plants suspected of being poisonous to stock.

Monthly cuttings commenced in October, when growth—about 2 feet per month—was rapid. In May half of the plot was cut, and the subsequent young growth tested at weekly intervals. From May to August growth was slower—about 2 feet 6 inches over the whole period. Unfortunately, owing to pressure of other work, it was not possible to maintain the regular cuttings; hence the results are shown in tabular form instead of graphically.

The method employed in determining the HCN content was that described by Finnemore and Williams ("Australian Journal of Pharmacy," January, 1935, p. 41), with the slight modification that the HCN was absorbed by a saturated solution of $NaHCO_3$ and titrated directly with N/20 iodine. Emulsin was employed as an enzyme instead of the ground sweet almonds used by Finnemore and Williams.

Simultaneously with the HCN determination, a moisture analysis was carried out on portion of the sample at 105 deg. C.

The results are set out in the following tables:—

TABLE I.

Lab. No.	Date Collected.	Moisture.	HCN in—		Remarks.
			Mgs. per 100 Gms. Green Sample.	Mgs. per 100 Gms. Moisture-free Plant.	
		%			
2912	25/10/38	86·2	24·7	179·0	Height 2 ft. 3 in. Whole plant.
3443	21/11/38	77·4	21·3	94·3	Height 5 ft. 6 in. Whole plant.
4094	21/12/38	63·5	17·9	49·0	Leaves only. Height 7 ft. 6 in. In tassel.
4800	23/1/39	60·0	15·9	39·8	Whole plant. Height 8 ft. In seed with about half of seed fallen. Stalk very coarse.
4800	23/1/39	57·6	32·4	76·4	Leaves only of previous sample No. 4800.
5880	1/3/39	62·9	19·5	52·5	Whole plant. Height 7 ft. 6 in. All seed fallen.
5880	1/3/39	68·5	66·1	209·8	Leaves only. Mostly regrowth from nodes.
6557	3/4/39	63·7	13·4	36·8	Whole plant. Height 7 ft. 6 in. Old seed fallen and seed heads dry. Many new seed heads from secondary branches.
6556	3/4/39	71·4	47·1	164·6	Leaves only of 6557. Mostly on branches from nodes.
7174	2/5/39	59·7	10·1	25·1	Whole plant. Height 7 ft. 6 in. New secondary branches in seed.
7174	2/5/39	67·4	22·1	67·8	Leaves of previous sample No. 7174. Mostly from branches.
8832	27/6/39	58·1	13·2	31·5	Whole plant. Height 7 ft. 6 in. No seed. Very old.
8832	27/6/39	60·9	24·8	63·5	Leaves only, mostly from branches.
963	7/8/39	55·2	9·2	24·8	Whole plant. Height 7 ft. 6 in. A little seed on secondary growth. Very old.
963	7/8/39	66·5	24·8	74·1	Leaves only, almost entirely from secondary growth.

TABLE II.

Lab. No.	Date Collected.	Moisture.	HCN in—		Remarks.
			Mgs. per 100 Gms. Green Sample.	Mgs. per 100 Gms. Moisture-free Plant.	
		%			
6981	24/4/39	89·2	56·4	522·7	Height 4 in. to 6 in. Whole plant.
7175	2/5/39	89·3	31·0	289·8	Height 6 in. to 7 in. Whole plant.
7405	9/5/39	88·1	30·8	258·7	Height 6 in. to 9 in. Whole plant.
8833	27/6/39	83·8	32·1	198·5	Height 2 ft. Whole plant.
340	10/7/39	85·1	16·7	112·1	Height 2 ft. 3 in. Whole plant.
432	17/7/39	82·3	15·9	90·0	Height 2 ft. 3 in. Whole plant.
714	24/7/39	83·2	16·7	100·0	Height 2 ft. 3 in. Whole plant.
789	31/7/39	81·7	5·1	28·0	Height 2 ft. 3 in. Whole plant. Evidently some error in this determination.
965	7/8/39	82·5	17·3	98·8	Height 2 ft. 3 in. Whole plant.
3335	13/11/39	77·0	21·3	92·7	Height 2 ft. 6 in. to 3 ft. Whole plant.

Conclusions.

1. *Sorghum verticilliflorum* is dangerous to stock throughout the entire period of its life. In this respect it differs from the cultivated sorghums.

2. This danger is due to the secondary growth, which frequently contains considerable quantities of HCN.

3. Ratoon growth during autumn and winter (Table II.) frequently contains considerable quantities of HCN. It would therefore constitute a special danger where other feed is scarce.

TOOL RACK.

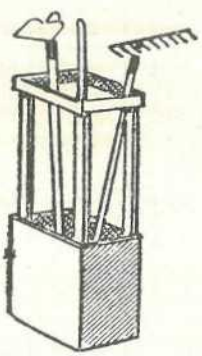


Plate 106.

To keep together those small farm tools that are usually out of place when wanted it would be a good idea to make a tool rack. A small, strong box, with a top like the one shown in the drawing can be made in a few minutes. It will hold hoes, forks, crowbars, and many other tools. A couple of these made on rainy days will save a hunt for tools when wanted in a hurry.

Milking Methods—A Comparison.

W. J. PARK, Dairy Branch.

CAREFULNESS in the production of milk is obviously of the first importance in respect of quality, but in order that the work may be done efficiently and conveniently, certain facilities are essential. The use of steam for sterilisation in the dairy industry has made rapid progress in the past two years. The equipment of the dairy shed with an approved steam steriliser, where milking machines are in use, is now a compulsory requirement under *The Dairy Products Acts.*

With the object of ascertaining under everyday average dairying conditions in Queensland the efficiency of steam in comparison with other methods of cleansing dairy utensils, and particularly milking machines, data accumulated from routine tests over a period of four months on the Darling Downs have been analysed. The test used for the purpose was the well-known methylene blue reductase test,* the samples being distributed into four grades according to the reduction times, as under:—

Grade 1—(Well-produced milk). Reducing methylene blue in over 4 hours.

Grade 2—(Satisfactory milk). Reducing methylene blue between 2 and 4 hours.

Grade 3—(Unsatisfactory milk). Reducing methylene blue between 1 and 2 hours.

Grade 4—(Very unsatisfactory milk). Reducing methylene blue in less than 1 hour.

For the purpose of determining the relative efficiency of methods of production under varying conditions, the samples of milk examined were divided into the following groups:—

Group 1—Milk produced by hand-milking.

Group 2—Milk produced by machine-milking on farms equipped with steam sterilisers.

Group 3—Milk produced by machine-milking on farms not equipped with steam sterilisers.

The total number of suppliers to four cheese factories was 72, their distribution in the foregoing groups being—

Hand-milking farms	27
Machine-milking farms equipped with steam sterilisers	21
Machine-milking farms without sterilisers	24
Total number of farms	72

During the investigation, 814 samples of milk were examined, the samples being taken from the suppliers at each of the factories at regular intervals. All tests were made on samples of the evening's milk upon its arrival next morning at the factory, and thus, as the samples were about 16 hours old when tested, considerable multiplication of the original bacterial flora had occurred. The investigation also was undertaken in the warmest months of the year.

* "Queensland Agricultural Journal," August, 1938.

In Table 1 are summarised the results of all tests during this investigation, together with those obtained from a similar investigation made at a number of cheese factories during the previous summer.

TABLE 1.

	Distribution of Samples according to Reduction Times.			
	Less than 1 Hour.	1–2 Hours.	2–4 Hours.	Over 4 Hours.
Summary of 814 tests, Jan.–May, 1940—				
No.	315	179	229	91
Percentage	38·7	22·0	28·2	11·1
Summary of 526 Tests, Oct.–March, 1939—				
No.	351	86	60	29
Percentage	66·7	16·3	11·4	5·5

A comparison of the results for each of the summer periods reflects the improvement of the quality of the milk supply achieved as a result of the educational and advisory assistance given to producers at this group of factories during hot weather. Incidentally, it emphasises the value of regularity of testing at cheese factories of milk supplies as a means of fostering enthusiasm among producers, and affording them a measure of the efficiency of their daily operations.

In Table 2 the results of all methylene blue tests made on the milk of suppliers in each group are classified according to reduction times:—

TABLE 2.

	Distribution of Samples according to Reduction Times.			
	Less than 1 Hour.	1–2 Hours.	2–4 Hours.	Over 4 Hours.
Machine-milked samples (With steam steriliser)	—			
No.	47	31	87	33
Percentage	23·7	10·6	44·0	21·7
Hand-milked samples—				
No.	90	56	69	38
Percentage	35·9	22·1	27·3	14·7
Machine-milked samples (Without steam steriliser)—				
No.	178	92	73	20
Percentage	49·0	25·3	20·1	5·6

In a previous paper by Rice* covering tests prior to the introduction of steam sterilisation on Queensland dairy farms, it was established that machine-produced milk was then of inferior bacteriological quality to hand-produced milk. Steam sterilisation was suggested as a means of solving the problem of maintaining mechanical milking plants in a sanitary condition.

Of the 72 farms included in the present investigation, 21 were operating milking machines equipped with steam sterilisers, 24 were using milking machines but had not provided sterilisers, and 27 were hand-milking and did not have steam sterilisers.

* "Queensland Agricultural Journal," November, 1939.

The results of the tests carried out regularly on the milk supplied by these three almost evenly numbered groups of producers, all situated in the same locality, should, therefore, enable the efficiency of steam sterilisation under practical conditions to be compared with the efficiency obtainable under otherwise similar conditions on farms not using steam sterilisers and farms employing hand milking. Under *The Dairy Produce Act,* the compulsory requirement of steam sterilisation applies only to users of milking machines, dairy farms on which hand-milking is employed being exempt.

Table 2 clearly reveals that milk of satisfactory bacteriological quality can be produced with milking machines if an approved dairy shed hygiene technique embracing steam sterilisation is applied in their use; in fact, a considerably higher proportion of the satisfactory samples were produced on farms combining machine-milking and steam sterilisation than under hand-milking conditions, while on farms operating milking machines without sterilising facilities the least satisfactory results were obtained.

Summary.

Eight hundred and fourteen samples of milk which had been held overnight on the producing farms at ordinary summer evening temperatures before arrival at the factory and sampling were examined. Seventy-two farms were covered by the investigation. The results disclosed that the quality of the milk, depending on production methods, varied in the following order:—

(1) Milk produced on farms using milking machines in conjunction with steam sterilisation—65·7 per cent. of the milk samples examined from supplies in this group were of satisfactory quality.

(2) Milk produced by hand-milking (without steam sterilisation) —42·0 per cent. of the samples examined from supplies included in this group were of satisfactory quality.

(3) Milk produced on farms using milking machines, but without adequate washing and sterilising facilities—25·7 per cent. of the samples examined from suppliers included in this group were of satisfactory quality.

Gambia Pea as a Green Manure Crop.*

H. W. KERR.

FROM time to time progress reports have been issued to keep cane growers informed regarding the trials which have been made with this green manure species, which gave promise of becoming a standard crop for green manurial purposes.

During the 1939-40 growing season a substantial number of moderate plantings were made in most cane areas of the State, and these have been the subject of close supervision by the field officers of the Bureau. Based on the reports received, the following comments are offered for the guidance of growers generally.

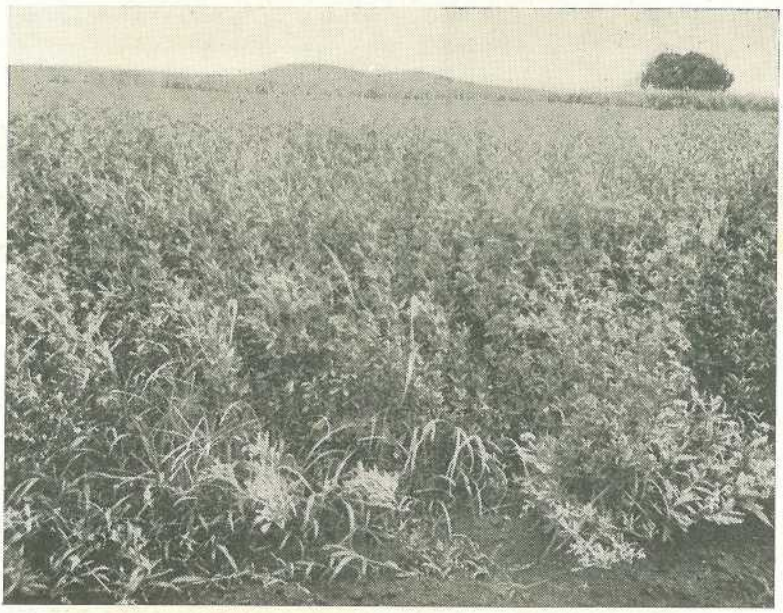


Plate 107.

ILLUSTRATING A YOUNG GAMBIA PEA CROP AT THE BUNDABERG STATION, JANUARY, 1940.

Some fourteen trial plots were planted in the area from Mossman to Babinda, on all major soil types. While there were some disappointments, due to a variety of causes, most of the farmers are seeking seed for further plantings, this year. In some cases excellent crops were produced, exceeding 6 feet in height at maturity. One of the accompanying illustrations shows a crop grown on a Babinda gravelly slope: it will be seen that the horse plough is making an excellent job of covering it.

One major advantage which it possesses over other species in these parts is that it not only produces a heavier weight of green matter to be ploughed in, but it does not flower until April and is thus providing a cover during the period of heavy rains, by which time most legumes have seeded and died. It might be noted, in passing, that the value of these latter crops is by no means lost for this reason: but it must be

* From *The Cane Growers' Quarterly Bulletin*—Bur. Sugar Expt. Stns. (Dept. Agric. and Stock, Q.)—for October, 1940.

admitted that best results will follow where the succulent crop can be turned under to rot, instead of decomposing on the ground surface. Little of the valuable nitrogen will be lost due to this cause, but the mellowing effect of the decomposing organic matter on the soil is dissipated.

With plantings extended from mid-October to mid-January, the better results were obtained for the earlier plantings. Those planted late were not satisfactory. Soil type seemed to have little influence on germination and growth, as splendid crops were obtained on sands, gravels, schist, and clay loams.

Plate 108.
SHOWING ONE OF THE BEST CROPS PRODUCED LAST YEAR ON MOURILYAN SANDY SOIL.

Germination varied considerably. It was mostly slow, taking from one to three weeks, and in many cases it was patchy in point of both time and position in the block. It would appear that one fault lay in burying the seed unduly. A small seed such as this gives best results when covered very lightly, and some of the best germinations were obtained where the field was merely rolled after the seed was sown. However, this had no undue influence on the speed of germination, and it would appear that some experimentation is necessary to determine how this can be accelerated. Soaking the seed before broadcasting, in either hot or cold water, may be found beneficial.

In its early stages of growth the crop makes slow progress, and in general it appears that weeds and grasses would smother it. But when this initial period is past, it makes very rapid headway and completely controls its competitors.

About 10-lb seed should prove sufficient to sow an acre. Care is required to get an even spread, and it is advantageous to mix it with a proportion of dry sand or sawdust to improve the distribution. If the germination is complete, the field produces a close stand of upright plants

which give little branching. Where the stand is more sparse, the individual plants will spread and branch, covering an overall width of 2 to 3 feet.

Practically all crops flowered in April, irrespective of planting time, but seed was not set until late in May. A continuous ground cover for from five to seven months is therefore possible. Although small patches in wet fields died out, due to wilt, this trouble was not nearly so bad as is experienced in similar circumstances with Poona pea, and should definitely not be regarded as a deterrent, even in the wettest districts.

Plate 109.

ILLUSTRATING THE EASE OF PLOUGHING UNDER A HEAVY CROP, ON BABINDA GRAVELLY SOIL.

The ploughing under of the crop is a simple matter. Being upright in growth habit and free from runners, the touch of the plough disc turns it over. In a heavy crop at Mossman, the rubber-tyred tractor tended to slip on the heavy mat of material. The plant tissue, even when fully mature and with enlarged stems, does not offer much resistance to rotting. The stems are remarkably free from long fibre, and are rather pithy in structure.

Experience in the Innisfail district, with some fifteen plots, was generally similar to that recorded for the north. The season was by no means a good one for green manure crops generally, but the results with Gambia pea were, on the whole, satisfactory. All plantings which were made in a fine, moist seed bed and covered lightly, germinated and grew well; those made in a dry seed bed, and for the most part deeply covered, germinated poorly and produced an indifferent stand of fairly well-grown plants.

Its reaction to the heavy wet season conditions of this area appears highly satisfactory, and it is definitely superior to the green crops usually grown: the resistance to floods is remarkably good, and the

species deserves attention in respect of soil erosion prevention. One crop which was submerged for several days did not suffer any loss of plants, while an adjoining crop of Mauritius bean was practically killed off.

It is considered that best results will be obtained if seeding is carried out during November and early December, in a fine, moist seed bed, covering with a light leveller or peg-tooth harrow.

Yields estimated for those crops which made reasonable growth, ranged from 10 to 30 tons per acre of green matter. Perhaps the best crops in these parts, illustrated in Plate 108, was produced on an area of sandy soil in the Mourilyan area.

During late 1939 it was arranged to have plantings of Gambia pea made in the southern areas of the State where legumes are grown for the purpose of seed collection. An estimate of yields from these sources indicates that 2 or 3 tons of seed will be available, and arrangements are being made for the sale of the crop in all major cane areas. Farmers desiring seed should get in touch with their local District Executive secretary, with whom we have had correspondence on the matter. The Bureau has no seed for sale, so enquiries should not be directed to the Experiment Stations or to the Brisbane Office.

To assure a seed supply in the future, we would recommend to cane growers who have well-seeded crops, to gather the pods when mature, and thrash them out after drying. It is not a particularly troublesome business. Incidentally, it is not anticipated that much difficulty will be experienced in controlling young seedlings of the species, should a crop mature seed before it is ploughed under.

A HORSE'S NOSE-GUARD.

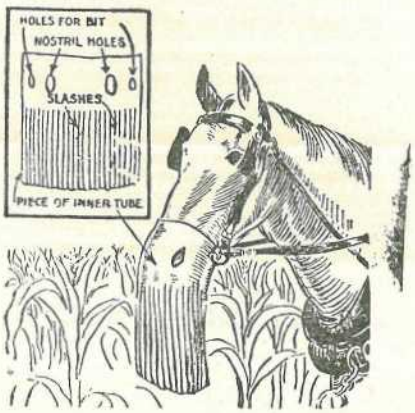


Plate 110.

A simple guard that will help keep insects from bothering the nose of a working horse, and also prevent the animal from constantly nibbling at growing crops, can be made from a piece of inner tube as indicated. The large holes cut in the rubber should coincide wtih the horse's nostrils so that its breathing will not be impeded. The guard will also tend to discourage a horse that has acquired the habit of nipping at another when they are yoked together.

The McNichol Grader-Leveller.*

H. W. KERR.

IN recent years cane growers have devoted considerable time and effort to permanent farm improvements which are calculated to enhance both the yielding capacity of the land and the convenience of working the farm. In this respect land grading has been concentrated upon, in its influence on drainage properties of wet blocks, and ease of irrigation in areas such as the Lower Burdekin. This project is one which demands careful forethought and intelligence, so that undue removal of fertile surface soil and the creation of sterile patches may be avoided; and also a high measure of skill in scooping the ridges and depositing the soil in hollows.

During a recent visit to the Mackay district, the writer was interested to see demonstrated an implement which should prove extremely useful as an adjunct to such work; though it was intended rather to put the finishing touches to an otherwise good job of grading, the machine is actually a combined grader and leveller, and under demonstration it was at times moving almost a full cubic yard of loose soil.

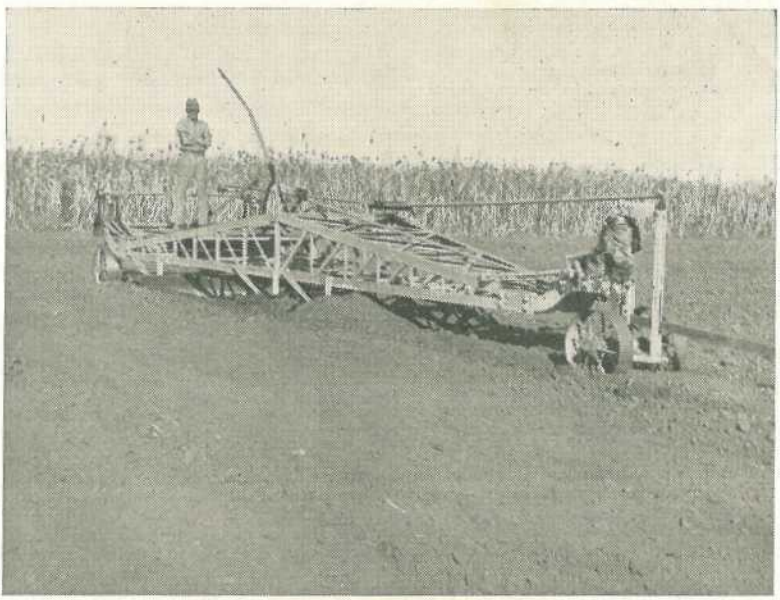


Plate 111.
THE LEVELLER OPERATING IN A SCOOPED FIELD.

The accompanying illustrations (Plates 111, 112) demonstrate the essential features of the unit. It was designed by Mr. W. McNichol, a canegrower of Palmyra, Mackay, who has had extensive experience in converting a poorly-drained area into land of better than average yielding capacity. One of the chief features of the machine is the long wheel base, which is essential for accurate levelling. This machine has an overall length of 30 feet, and a width of 9 feet. By means of levers the elevation of the machine may be adjusted fore and aft on the wheels. It is fitted with three blades, each 1 foot in depth. The front blade,

* From *The Cane Growers' Quarterly Bulletin*—Bur. Sugar Expt. Stns. (Dept. Agric. and Stock, Q.)—for October, 1940.

which is set at right angles to the frame, is 8 feet wide; the middle blade is set at a slight angle to the front blade, and is 8 feet 6 inches wide; while the rear blade, also set at a slight angle, but in the opposite sense from the central blade, is 9 feet wide.

Plate 112.
ILLUSTRATING HOW READILY THE LEVELLER MAY BE TURNED ON THE HEADLAND.

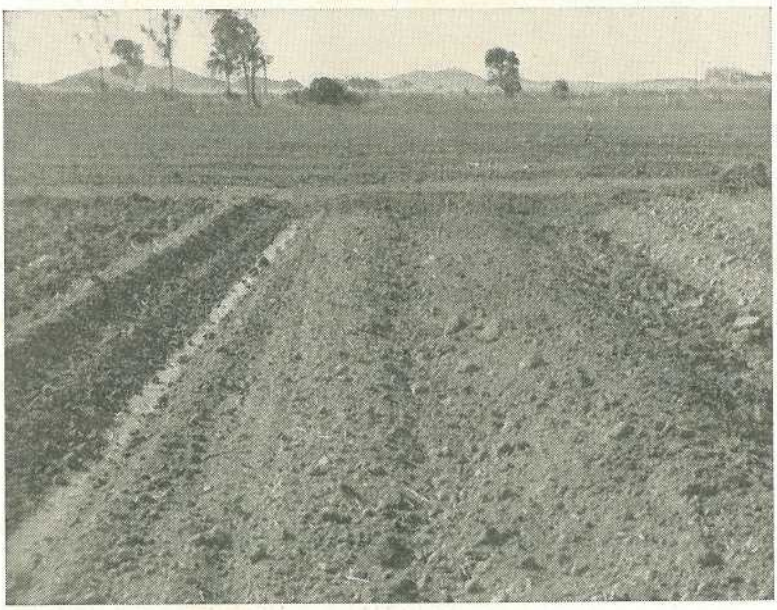


Plate 113.
AN EXAMPLE OF THE CLASS OF WORK DONE BY THE LEVELLER.

The frame of the machine is constructed of ¼ inch angle iron of suitable section, and it is welded into a very strong and rigid unit. It was constructed by a Mackay engineering workshop.

A very interesting feature is the coupling of the front and back wheels in such a manner that they operate in opposite directions, when turning, and the leveller can actually be turned on a headland 25 feet wide.

A high-powered tractor is, of course, necessary for hauling the machine. A 35-h.p. diesel unit is found to be most satisfactory, and it may usually be operated in second or third gear; this is, of course, governed by the load which it is required to move. The depth of the blades may be regulated while working. Where a high ridge is encountered, a large amount of soil may be taken off and carried along until a depression in the surface is met. The efficiency with which the machine is operated may be gauged from the accompanying illustrations (Plates 112, 113). On this field it was working, with the tractor in second gear, at a speed of 2½ miles per hour. With reasonable field length, 2 acres of land may thus be covered in an hour. For best results, the field should be worked over twice, either in the same direction, or at right angles to one another.

Plate 114. [*Photo.: Bur. Sug. Expt. Stns.*

TWO EXCELLENT GRAIN SORGHUM HEADS PRODUCED AT THE BUNDABERG SUGAR EXPERIMENT STATION.

Grafting Male Papaw Trees.

W. G. HANCOCK, Fruit Inspector.

THIS method of papaw grafting was evolved as a means of working over male papaw trees in the plantation, and with reasonable care, a really keen knife, and attention to details it is quite easy to do. The results approach 100 per cent. success, and a very strong union results.

Papaw tissue appears to be naturally very ready to unite, but the copious flow of sap, and the liability of the cut surface to rots, and the tendency of the stock to die back for a few inches are the main difficulties to be overcome. Moreover, scions while keeping fresh and turgid under suitable conditions will quickly wilt when exposed to dry air.

Plate 115.
GRAFTED PAPAW, FOUR MONTHS AFTER GRAFTING.

The stage preferred for grafting is when the stocks are between $1\frac{1}{2}$ inches and $2\frac{1}{2}$ inches in diameter; also, the first flowers usually appear at this stage, and the sex can be determined.

The scions are side shoots from a mature tree; about 6 to 8 inches long is handiest, and the best are those which have a small hard knob at the base. If desired, a mature tree known to bear good fruit can be cut back some time before it is known that some grafting will be necessary. Indications are that in a comparatively short-lived plant like the papaw, shoots from a comparatively young tree are better than those from an aged tree. When grafted, the latter tends to produce a tree which appears senile from the beginning. Remove the leaves from the scions, leaving a short stub of the petiole. Rinse these in a strong solution of potassium permanganate and keep them wrapped in a cloth wrung out in it.

A very keen, thin-bladed grafting knife for the grafting cuts and a stronger knife for preparing the stock and some raffia are required.

Drive a stake as near as possible to the tree without injuring it, and bind the top of the tree to the stake to prevent movement. Make a horizontal cut nearly three-quarters through the stock about 6 inches from the ground. The stems are solid at this point. Then commencing about 10 inches above this cut take out a deep slice from the stem. Swab all cut surfaces with potassium permanganate solution, but do not allow any on the actual grafting surfaces. This appears to hasten callousing and stops the flow of sap. In the step so formed the cleft is made as near to the standing part as possible. The scion is cut wedge-shaped similar to an ordinary cleft graft, but as papaw tissue is very soft it is best to slightly shape the cleft and wedge to prevent undue pressure when the former is inserted. Bind with raffia, and mound up with moist sandy soil to just cover the tip of the scion. The portion of the trunk is left standing to maintain a flow of sap past the graft and prevent die-back.

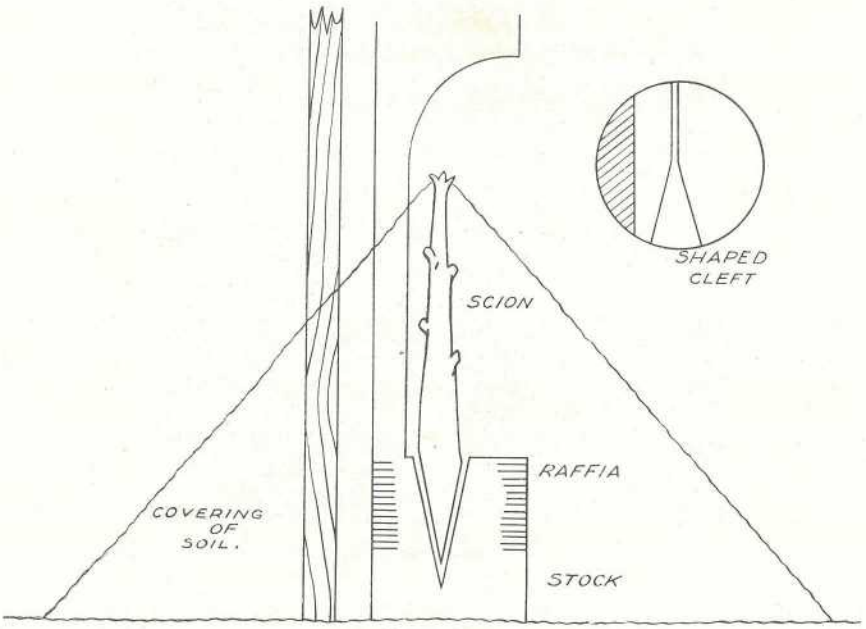


Plate 116.

PAPAW CLEFT GRAFT.

In fourteen days the soil can be gently removed. By this time the raffia is rotted and the graft has either taken or failed. If the graft has taken, gently mound it up again. Growth should commence in about another two weeks, and when it has definitely started the standing part of the stock is cut off level, but the graft is kept covered with soil for a while to hasten a complete union and protect it from the heat of the sun.

The rapidity with which papaw tissue callouses under cover of moist earth is remarkable. In the case of the graft, whereas the surface of the lower sliced-away portion will have completely calloused

in a fortnight, the top uncovered part will probably be already dry and shredding. Also, if a handful of moist soil is plastered over the cut top of a tree, which for some reason or other has been cut down, it will very quickly heal over perfectly, instead of shredding and rotting back.

This graft has proved successful in North Queensland and also has been successful on occasions in southern districts of the State.

SHEEPYARD GATES.

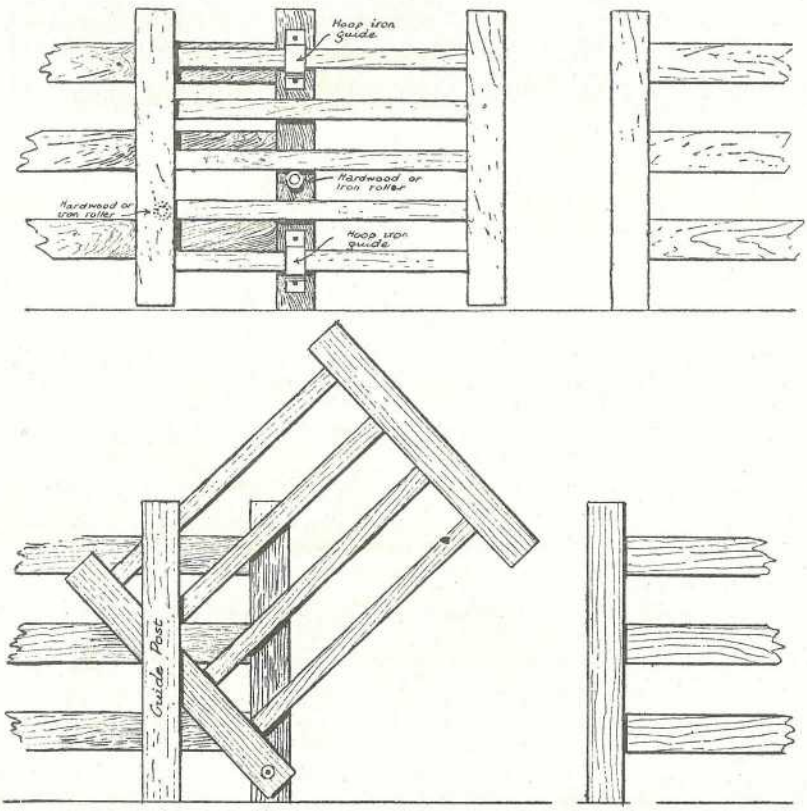
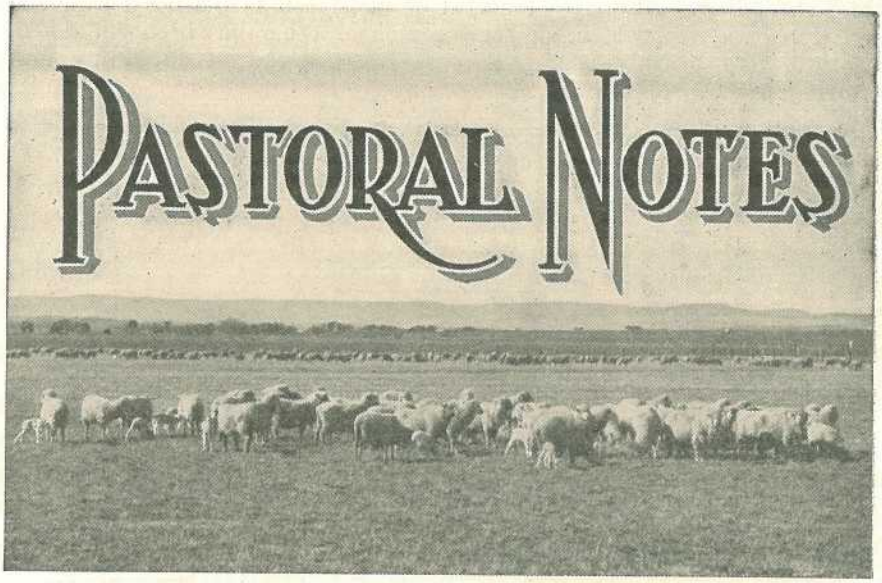


Plate 117.

Here are sketches of two types of sheepyard gates. Where only small gates, say, 4 or 5 feet wide, are required, these types should prove handy, as with adjoining yards full of sheep it is often difficult to close or open swinging gates. No such disadvantage exists with either of these gates, as one slides across and the other lifts. The sketches are intended to convey the idea only, details of construction, hinging, and fastening being left to the ingenuity of the maker.



Acute Bloating of Cattle.

ACUTE bloating of ruminants, cattle particularly, may occur at any time from a variety of causes, but most commonly through turning hungry cattle on to luxuriant green feed, or on to herbage country, after heavy rains and when the young herbage is making rapid growth.

Under station conditions, where stock are not seen every day, little can be done to prevent loss, but on smaller holdings losses may be minimised if a stack of dry hay is provided and to which stock have access before and after being allowed on to green feed. The long, dry hay assists regurgitation, which is difficult when large quantities of short, succulent feed has been eaten, and, if it is available, animals will always take a few mouthfuls, with beneficial results.

Symptoms of bloating appear quickly. Animals stop feeding and stand still with arched backs, turning their heads frequently to the abdomen, which increases rapidly in size—the swelling becoming most marked on the left side. As the abdomen enlarges, breathing becomes more and more difficult. In very acute cases the nostrils dilate, the animal stretches out its tongue, bellows, and finally staggers and dies in convulsions.

In less acute cases the development of gas is slower, and frequent belching and vomiting prevents its excessive accumulation. In these cases the use of a gag made from a stick about 8 inches long and 2 inches in diameter, with holes at each end through which a thin rope is run to form a rough bridle—the stick being smeared with tar or grease before being put into the mouth—is of value, as it facilitates belching.

Massage of both flanks, applying moderate pressure with both fists upwards and downwards—particularly over the whole of the left flank—while the animal stands with its head uphill, is also beneficial.

Puncture of the rumen with a trocar and canula saves many valuable animals. The instrument must be sterilised by boiling for ten minutes before use. It is wise to keep it ready, wrapped in a sterile towel. The trocar, with its protecting tube, is pushed into the most prominent point of the left flank, usually midway between the point of the hip and the middle of the last rib. Holding the instrument in the left hand, a sharp blow with the palm of the right hand causes it to penetrate the skin, abdominal wall, and the rumen.

The point of the trocar is directed towards the right elbow.

The trocar is withdrawn gradually from its sheath, allowing the gas to escape slowly, giving immediate relief to the animal.

When gas ceases to escape, a cork may be used to close the canula, which is left in position and secured by a clean bandage tied over it and round the body of the animal. Any further accumulation of gas is allowed to escape slowly by removing the cork. When no longer required the canula is withdrawn, and the small puncture dressed with tincture of iodine.

WOUNDS IN HORSES—SIMPLE TREATMENT.

The fundamental principle underlying all wound treatment is the provision of suitable downward drainage for the discharges from the wound. If such drainage is provided, then most wounds tend to heal well, but deep wounds penetrating downwards and which form pockets do not progress satisfactorily, for the reason that pus and discharges collect within them and cannot get away. Wounds which penetrate in an upward direction need little treatment, beyond ensuring that they remain open while healing from their deepest part and that they are reasonably clean on the surface. In the case, however, of downward penetrating wounds, it is necessary to use a knife judiciously in order to allow the discharges a free outflow.

Before any wound treatment is attempted, the injured edges of the wound should be clipped with scissors to remove the hair and reveal the true nature of the wound. The next thing to do is to wash the wound thoroughly with a warm, weak disinfectant solution. Then, if necessary, the depth of the wound can be explored with a blunt probe which has been boiled, or with the fingers after the hands have been thoroughly washed and scrubbed. Punctured wounds—such as nail or stake wounds—are always difficult to drain and often have to be opened up. Microbes are carried in when the foot is punctured, pus of a black liquid and foul smelling nature may gather in the foot, and may continue to accumulate because it cannot drain away. If that happens, acute lameness is certain to follow. If unattended, these corrupt fluids rise slowly above the level of the horn and eventually break out through the soft skin over the coronet; but by that time the structures within the foot are in a nasty mess and the case has become very serious.

To treat hoof punctures, the whole foot is cleaned and, if possible, it is held in a bucket of warm disinfectant solution to still further cleanse it and also soften the horn. The sole of the foot is then pared away by making a cone-shaped hole at the point where pain is most acute. The apex of the cone must be carried right through the horn until blood or pus is revealed. The pus should then be allowed to drain away. To prevent the hole from closing, a pad soaked in a solution of iron perchloride should be placed in the wound, and the treatment should be repeated daily while necessary. If treated thoroughly in the way described little further attention is necessary.

SELECTING THE SITE FOR A WELL.

On many grazing properties in Queensland there is sufficient surface water to last until June or July in a normal year, and possibly until August in a good year, when there has been a heavy wet season. There is a period between the time that the surface water dries up and the first storms fall in which it is necessary to provide water, either by well or bore.

When selecting a site for a well or a bore, the grazier should first make a survey of his country. A site should, if possible, be selected on a part of the property where cattle do not feed intensively when surface water is available. On a number of grazing properties the mistake has been made of putting down a bore in close proximity to surface water. As the surface water dries up, the grass in the immediate vicinity is also eaten out, and when it is necessary to pump water for stock there is often no grass anywhere near the bore or well. As a result, the stock are forced to walk long distances to grass.

When bores and wells are put down in places away from surface water, there will probably be grass near at hand in a dry time, and cattle will do better, drink oftener, and retain condition that they would otherwise lose through excessive walking.

SHEEP RAISING NEAR THE COAST.

Farmers on coastal country who are desirous of stocking sheep usually ask the question how to start to the best advantage. Conditions and circumstances along the coast vary so greatly that no hard and fast rules can be laid down.

It is usually considered that where dairying, pig raising, and mixed farming can be successfully combined in coastal areas the conditions are favourable for fat lamb raising. There is one chief guiding point, and that is, where the rainfall can be considered as excessive for the combination mentioned, it will be decidedly against the wellbeing of sheep.

For fat lamb raising the British breeds should be used. The most suitable of them is the Romney Marsh, and the wetter the conditions the nearer to the pure Romney Marsh the breeding flock should be. If crossbred or Corriedale ewes are not available, then strong-woolled, plain-bodied merino ewes should be introduced, to which should be mated pure Romney Marsh rams. Of the progeny, ewes should be retained for breeding and the wethers used for home consumption or sold as fat lambs. Merino ewes should not be retained on the coast for longer than two seasons.

All lambs should be marked during August, and the ewes shorn in September. If the ewes are healthy and well fed from the time the lambs are dropped, all lambs that are to be sold should be fit before or during December. A month after the lambs are disposed of, the ewes that are to be sold should be fat and sold as such to secure best results. Healthy merino ewes with good teeth and carrying not more than four or five months' wool should fatten on good feed in three or four weeks.

CLASSING THE CLIP.

As the great bulk of the wool produced in Queensland is merino, there is no great difficulty in having it classed properly. Most Queensland pastoralists keep their sheep in as good condition as seasonal and other circumstances permit, and do everything else necessary to produce a good clip of wool.

To add to the benefit of good flock management, the clip should be classed to best advantage. The large flock owner realises that it pays to obtain the services of a highly qualified classer to do the work. It has been the get-up of these clips which has gained for Queensland clips the confidence of buyers. To retain this confidence and to have it extended to manufacturers is most important. It should be understood that station brands are well known to both buyers and manufacturers, and if the wool is classed and baled in keeping with the requirements of the trade, the owner is bound to obtain the full benefit of a properly classed clip.

Some buyers deal chiefly in long staple, and others require shorter wools, and they will buy with confidence if they are sure of getting the type they require, and not a mixture of lengths and qualities. Yield also has a considerable influence on values; and as values are based on suitable length and spinning quality, as well as yield, the importance of maintaining lines of even standard should be obvious. As the wool is purchased on a clean-scoured base, the purchaser of greasy wool must calculate the percentage of the clean product he will obtain, therefore, the more even respective lines are in length, spinning, quality, character, soundness, colour, and condition, and yield, the more accurate he will be in appraising the true value of each class. Not only in large, but also in the smaller clips, correct classing is important, especially under changing selling conditions. Arrangements have been made for the purchase of the whole of the Australian wool clip by Great Britain, with control of selling procedure vested in a central wool committee.

All wool has now to be submitted for appraisement, and experts appointed by the central committee are responsible for its valuation. This means that classing to obtain the best returns for the grower will be even more necessary than under the former system of auction sales, although both brokers and their experts receive and handle clips as usual.

Where small owners are concerned, the expense of a qualified classer may not be warranted, especially where family labour is utilised. To assist them, the Department of Agriculture and Stock is prepared to instruct them in the classing of their own clips.

Farmers' Wool Scheme.—A scheme also is in operation which is limited to those who run 1,500 sheep or less, British breeds and crosses, and odd lots, bags and butts from any holding, for which 10s. per bale is charged for classing. The only preparation necessary is the removal of wet stains. An advance of 60 per cent. of the estimated value of the wool free of interest to owners running less than 1,500 sheep is made on consignments.

Dairy Practice.

MAXIMUM results on the dairy farm can only be obtained by the successful combination of three factors—the farmer, the pasture, and the stock. The farmer must efficiently mange and improve his pastures, while the stock must give the highest possible amount of milk fat from the quantity of food consumed.

The farmer may claim that he has good cows, and produce factory returns as evidence thereof. That evidence, however, is merely proof that the herd is good, not that each individual member is good. Until he submits his herd to regular testing, he has no definite proof that his herd contains no unprofitable cows, that his herd sire is at least maintaining the production in the younger stock, or that he is breeding from the right cows. A record of any drop in factory returns is an open book to the regular testing farmer, but a sealed book to the farmer working solely on factory returns.

If the position is to be improved by herd testing, the responsibility is on the farmer to consider the individual results and carry out the necessary remedies. Failure to act on the part of the farmer cannot be held against herd testing.

The fertility of the land must be maintained if the pastures are to carry the stock economically. Each cow returns to the soil a proportion of the plant food it consumes in the form of manure, which should be regularly broken up and distributed by harrows. The plant foods which are not returned to the pastures are those which make the milk and those used to produce and maintain the body of the animals. A cow which produces 500 gallons of milk in a lactation period, equivalent to approximately 200 lb. of fat, removes from the pasture at least 7 lb. of lime and 11 lb. of phosphoric acid in the milk alone. This is equivalent to approximately a half-hundredweight of bonedust or superphosphate. Thus a herd of forty such cows would remove yearly the equivalent of 1 ton of those fertilizers from the pasture. As a large proportion of Queensland soils are deficient in phosphorus, particularly in coastal areas, a loss such as this is a very serious matter, and if not returned to the soil in some form, pastures will deteriorate, and conditions conducive to the occurrence of stock diseases peculiar to phosphorus deficiency may develop.

There are various ways in which these plant foods can be returned to the pastures. The obvious method is to distribute the phosphatic fertilizer over the pastures; a less obvious but efficient method is to administer at least 2 oz. of bone meal to each cow daily. This weight only makes good the calcium and phosphorus removed in the milk and is distributed over the pastures in the droppings.

The introduction of improved pasture grasses and the adoption of rotational grazing would also assist materially in obtaining the maximum efficiency on the dairy farm.

COMMON DEFECTS IN CREAM.

Following are the causes and remedies of some common defects in cream faults:—

Over-ripe Cream.—Caused by the cream developing excess acidity, by skimming cream too thin, or by infrequent deliveries to factory.

Do not skim cream below 40 per cent. test. Cool and aerate cream on the farm. Deliver to factory frequently—daily when possible.

Staleness.—Caused by keeping cream too long in the dairy. Often the balance after filling the cream can is held until next delivery, and held at too high a temperature.

Send all the cream in the dairy to the factory on days of delivery. Keep cream cool while on the farm.

Ropy Cream.—Caused chiefly by bacteria in water, especially in swamps and stagnant dams also by unclean, dusty yards and bails, dairies, and utensils.

Prevent cows from wading in stagnant waters; udders and flanks of cows should be washed and wiped before milking. Premises and utensils should be kept clean. This defect is very difficult to overcome, unless clean methods are adopted generally in dairy work. Use soda when washing utensils, and boiling water to scald all utensils. At least once a day remove all cow droppings 100 feet from dairy yards and bails.

Curdy Cream.—Caused by skimming too thin, insufficient skimming discs in separator bowl, by keeping cream at high temperatures, or by adding warm cream to cool cream.

Keep cream cool. Skim cream at a 40 per cent. fat test; be sure there are enough discs and that they are tight in the bowl of the separator. Mix fresh cream with older cream only when both are at the same temperature; give the whole an occasional stir to make the mass uniform, and stir at least four times daily.

Fermented Cream.—Caused by the development of bacteria, mostly the result of unclean methods in dairy work. Thin separation contributes to the trouble; also inadequate cooling, and the mixing of thin warm cream with older lots.

Give strict attention to cleanliness in plant and premises, using boiling water morning and evenings; wash udders of cows and see that hands of milkers are clean. Skim cream not less than 40 per cent. test; mix different separations as described for curdy cream.

Cowy Flavour.—Caused by absorbing offensive smells from dirty bails and yards—such as floors and drains saturated with urine—especially in wet weather; also by milking unhealthy cows, and milking cows too soon after calving.

To remedy this defect, see that bails and yards are kept clean; hard-surfaced yards are easiest to keep in a sanitary condition. Remove dung daily from the main yard. Never use milk from sick cows, or from cows too soon after calving.

Rancid Cream.—Caused by over-staleness, the result of not delivering to the factory frequently enough. This class of cream is condemned, being unfit to manufacture into butter. Caused also by contamination from cracked or badly mended utensils.

Cleanliness should be observed, with frequent delivery to the factory. Cracked and badly repaired utensils which have become impossible to clean thoroughly should be dumped.

BLOOD MEAL FOR DAIRY STOCK.

Blood meal feeding to dairy cattle presents little difficulty when the meal is fresh and free from objectionable odour. It may be incorporated in the regular feed or mixed with appetising foods, such as maize meal, bran, pollard, and cotton seed. Care should be taken, however, to see that the feed box is kept clean.

In the presence of moisture, blood soon fouls and an objectionable smell results from the fermentation. Stock dislike this intensely, and it may be difficult to get animals into the bail where such food has lain.

THE CARE OF CREAM IN TRANSIT.

A contributing factor in the low grading of some cream at the butter factory is often lack of thought and care for it while in transit. Some farmers blame cream carriers or railway officials for any deterioration which occurs while it is on the road; but, presumably, if the carriers and the railwaymen do neglect to give the extra care which cream needs, particularly in hot weather, they may be merely following the example of indifference displayed by the owner of the cream.

For example, cream may be brought in by a farmer and left at the station overnight to be consigned by a train timed to leave, say, at 7.20 next morning. Mostly such cream comes from farms only 2 or 3 miles distant. Surely, any dairyman who takes a pride in turning out choice cream can arrange such a short journey in the three hours of daylight before train time. The owner should realise the deterioration which must develop in cream in cans which may be left to stand at the station for twelve hours lidded down and unstirred through a warm night; but let the train be an hour late and hear the complaints about the neglect of the Railway Department!

A less frequent fault in delivering cream too early at the railway siding or roadside is the neglect to make allowance for the alteration of the sun's position as the day advances. A shady spot selected at 10 o'clock in the morning may be no longer shady at noon, and by the time the cream can is lifted by the railwayman or the cream carrier it may have been exposed to the direct heat of the sun for an hour or longer.

In many parts of Queensland extra attention to details is demanded by the exigencies of the climate and, in this, the efforts and care of each individual handling cream in transit becomes all important.

PALATABILITY OF FEEDS.

While the cost of the ration fed to dairy cows is likely to influence its composition, consideration should also be given to the palatability of the feeds selected. Nothing should be fed to the animals which will affect the quality of the product yielded. What is suitable for one animal may not be suitable for another, and the method of using stock foods governs their value. For producing animals—i.e., animals converting the food eaten into some product such as milk—it is essential that they should eat enough. In order to guarantee this sufficiency, care should be taken to ensure that the ration fed is wholesome and palatable.

Unless the ration is palatable, cows and fattening pigs will not consume sufficient food for the efficient production of milk and cream, and bacon. Unpalatable foods which have to be fed to milking cows should be used sparingly and mixed with some other well-liked feed. In this way, the bulk of the ration can be increased, the more palatable ingredients inducing the animal to consume the whole of the mixture. Roughage can be chopped and mixed with concentrates. The roughage often becomes softer, and the mixture more wholesome and appetising by mixing it with a dilution of molasses.

It is only by feeding rations of a palatable nature that the maximum production can be obtained from live stock. At the same time, it must be remembered that an important function of farm animals is to convert into useful products material which would otherwise be wasted. By keeping a watch on the materials at hand, it should be possible to dispose of practically all the feed available in a way which will ensure the best return.

AN IMPORTANT POINT IN CALF-FEEDING.

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.

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.

PROTEIN AND MEAT MEAL.

Protein meal is a meat meal prepared from the clean edible portions of viscera of animals slaughtered, inspected, and passed for human consumption, together with carcases which have been rejected because of some fault rendering the carcase unsuitable for human food. The carcases of immature calves are also utilised for purposes of stock food manufacture. In process of manufacture of protein meal, a soft bone meal is added to the meat to assist in more complete treatment of the meal when passing through the grinding and seiving machinery. The whole mixture is then subjected to cooking at 60 lb. steam pressure for four to six hours, the time varying with the assortment of the charge (i.e., the mixture). Further heat treatment is then required to render the fat highly mobile for purposes of separation from the crackling (or remaining fatty fibrous matter). This treatment alone is sufficient to render the finished artele sterile and free of risk from a disease point of view, hence protein meal is quite a safe product to use.

Meat Meal is a stock food prepared in a similar manner to protein meal, but the raw products consist entirely of livers and lungs from animals slaughtered and passed for human consumption. The carcases or viscera of animals condemned for tuberculosis are not used in the manufacture of protein meal, meat meal, or any other edible line, and hence there need be no fear of transmitting disease through use of these meals; but it is essential in storing them to keep them in a dry place where there is a strong draught of air, for this maintains the condition and prevents formation of mould and of objectionable odours.

PROFITABLE DAIRYING.

The first essential is to have every cow in the herd tested to make certain that she is worth keeping. As the animals must be adequately and properly fed, the next important factor is that governing production.

A good water supply is necessary. An ideal condition is, of course, sufficient water at convenient points in every paddock. Many dairy farmers, however, are satisfied with at least one good watering place. That means that if the herd is feeding at a distance from the water the cows do not go to the trough to drink as frequently as they would if it were closer to their grazing ground. On hot days it takes quite a lot out of animals to walk any distance, and when they do come in to water they stay in its vicinity. As the area surrounding the water is usually bare from over-grazing, they get very little to eat. So, in either case, the milk flow is seriously affected.

Another point which is often overlooked is the destruction of grass and herbage caused by the extra tramping of the animals going to and fro. Cows frequently destroy more feed with their feet than they actually eat.

Subdivision of paddocks will provide succulent pastures carrying a full complement of proteins, which the cattle relish and clean up as they proceed without tramping half of it into the ground. With pastures under complete control, the herbage and grasses can be fed off as required; and, in times of plenty, all surplus growths may be mown and conserved either as hay or ensilage.

The Breeding Sow.

EXPERIENCE has shown that sows having the benefit of succulent and nutritious pasture and plenty of daily exercise in the sunshine in clean paddocks, where they are undisturbed by other stock, are more likely to have big litters than sows which are continuously housed or confined to a small pen.

Keeping pigs in paddocks is satisfactory only where clean, warm, dry shelter sheds are available, in which the pigs may camp at night.

As the farrowing stage approaches, it is advisable to place each sow in her own individual yard or pen. The best time to do this is about three weeks before the sow farrows.

Sows housed together at farrowing time are likely to become quarrelsome, and any disturbance, particularly at feeding time, may result in abnormal births, if not in abortion.

Under open-air conditions and with succulent grazing, there should be little or no necessity for purgative medicines before farrowing. However, as individual animals differ in habits, and some are lethargic at this stage, a warm bran mash in which is mixed three fluid ounces of castor oil and just enough table salt to disguise the flavour of the oil will be beneficial, if given two or three days before the farrowing date.

Use of drastic purgatives should be strictly avoided, as the after effects are liable to bring on irregularities in the digestive organs. Careful control will do more than medicine or force in assuring satisfactory results. The food should be of a laxative, nourishing nature, and quantity should be strictly regulated according to the condition of the sow and litter.

SERVICE FOR PIG FARMERS.

Among the services provided by the Department of Agriculture and Stock for the man on the land is a comprehensive free advice service for pig raisers.

Pamphlets are available, on request, dealing with various aspects of pig-raising.

A free course of instruction by correspondence is available to anyone engaged in the pig industry. The lessons cover breeds, selection of stock, breeding, feeding, management, and marketing; plans of equipment and notes on pig foods also are included.

In writing to the Department for advice, full details concerning age of pigs, numbers, varieties, and quantities of foods used and type of piggery should always be included.

MAIZE AND PORK QUALITY.

Because of its relatively high fat content and the low melting point of its fat, maize can cause 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, butter-milk, 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 born 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, there appears to be little danger of pigs receiving sufficient maize to depreciate their carcase quality.

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

CHARCOAL FOR PIGS.

Digestive efficiency in farm animals depends largely on their ability to grind their food well. Thorough mastication is therefore linked with ease of digestion. Some animals may eat food rapidly without ill-effects. Thus the domestic fowl swallows quickly, but it has a remarkable mechanism in the gizzard for grinding the food to a fine state for subsequent digestion and absorption.

The pig is not so well equipped as the fowl to handle rapidly eaten food, yet under most farm conditions fast eating is the rule. The pig can be helped to make better use of its foods in the following ways:—

(i.) By feeding easily digested material;
(ii.) By grinding the less digestible foods;
(iii.) By ensuring the animals sufficient feeding room;
(iv.) By arranging for some open grazing where the animals may eat at their leisure;
(v.) By feeding aids to digestion.

It is the last with which this note is concerned.

Charcoal and coke are extraordinarily cellular in structure and possess a great number of surfaces. At these surfaces rapid digestion of food can take place. By feeding either of them in powdered form, coarse lumps of food become coated with a film possessing an actively digesting surface.

An alternative and cheaper method is to throw coarse charcoal or coke into the pig sty and let the animals grind and eat as they feel inclined.

WEIGHT FROM THE WALLOW—MAKING PIGS PAY.

Tests carried out at the Texas Agricultural Experiment Station (U.S.A.) show that pigs provided with a clean wallow gained weight quicker than pigs without a wallow.

Ten pairs of pigs were used in a ninety-day test. One pig in each pair had access to a concrete wallow, and the other was kept away from it. All pigs were self-fed the same food in individual pens. The average temperature during the summer months when this test was conducted was 83 degrees F. All the pigs had access to shade.

The ten pigs which had access to the wallow made an average gain of 14 lb. more per pig, and required 10 lb. less feed per 100 lb. gain in weight than did similar pigs without access to the pig wallow.

On that evidence, the pig wallow certainly pays.

Name and Address.	Name of Hatchery.	Breeds Kept.
G. Adler, Tinana	Nevertire ..	White Leghorns, Australorps, Rhode Island Reds, and Langshans
F. J. Akers, Eight Mile Plains ..	Elmsdale ..	Australorps
E. J. Blake, Rosewood	Sunnyville ..	White Leghorns, Australorps, White Wyandottes, and Rhode Island Reds
W. Brown, Waterworks road, Ashgrove	Strathleven ..	White Leghorns
A. F. Buchler, Milman	Pincrow ..	White Leghorns
J. Cameron, Oxley Central ..	Cameron's ..	White Leghorns and Australorps
M. H. Campbell, Albany Creek, Aspley	Mahaca ..	White Leghorns and Australorps
J. E. Caspaney, Kalamia Estate, Ayr	Evlington ..	White Leghorns
J. L. Carrick and Son, Manly road, Tingalpa	Craigard ..	White Leghorns and Australorps
N. Cooper, Zillmere road, Zillmere	Graceville ..	White Leghorns
R. B. Corbett, Woombye ..	Labrena ..	White Leghorns and Australorps
T. G. Crawford, Stratford, via Cairns	Rho-Isled ..	Rhode Island Reds
B. Cross, Apple Tree Creek, Childers	Spring Hill ..	White Leghorns, Australorps, and Langshans
Dr. W. Crosse, Musgrave road, Sunnybank	Brundholme ..	Australorps, White Leghorns, and Rhode Island Reds
O. M. Dart, Upper Brookfield ..	Woodville ..	Australorps, White Leghorns, Langshans, and Rhode Island Reds
Dixon Bros., Wondecla ..	Dixon Bros. ..	White Leghorns
W. Easson, Formosa road, Tingalpa	Grassdale ..	White Leghorns and Anconas
E. O. F. Eckert, Laidley ..	Laidley ..	Australorps, White Leghorns, and Langshans
F. G. Ellis, Old Stanthorpe road, Warwick	Sunny Corner ..	Australorps
Elks and Sudlow, Beerwah ..	Woodlands ..	White Leghorns and Australorps
B. E. W. Frederich, Oxley road, Corinda	Glen Albyn ..	Australorps
W. H. Gibson, Manly road, Tingalpa	Gibson's ..	Australorps and White Leghorns
Gisler Bros., Wynnum ..	Gisler Bros. ..	White Leghorns

Name and Address.	Name of Hatchery.	Breeds Kept.
G. Grice, Loch Lomond, via Warwick	Kiama ..	White Leghorns
J. W. Grice, Loch Lomond, via Warwick	Quarrington ..	White Leghorns
Mrs. M. Grillmeier, Mount View, Milman	Mountain View	Australorps, Minorcas, and Rhode Island Reds
C. and C. E. Gustafson, Tannymorel	Bellevue ..	Australorps, White Leghorns, and Rhode Island Reds
P. Haseman, Stanley terrace, Taringa	Black and White	Australorps and White Leghorns
C. Hodges, Kuraby	Kuraby ..	White Leghorns and Anconas
H. Hufschmid, Ellison road, Geebung	Meadowbank ..	White Leghorns, Brown Leghorns, Minorcas, Australorps, and Rhode Island Reds
S. W. Kay, Cemetery road, Mackay	Kay's	White Wyandottes, Light Sussex, Rhode Island Reds, Australorps, White and Brown Leghorns
F. W. R. Longwill, Birkdale ..	Nuventure ..	Australorps and White Leghorns
J. McCulloch, Whites road, Manly	Hindes Stud Poultry Farm	White Leghorns, Brown Leghorns, and Australorps
W. S. MacDonald, Box 208, Babinda	Redbird ..	Rhode Island Reds and Anconas
F. McNamara, Vogel road, Brassall, Ipswich	Frammara ..	White Leghorns and Australorps
A. Malvine, junr., The Gap, Ashgrove	Alva	Australorps and White Leghorns
H. L. Marshall, Kenmore ..	Stonehenge ..	Australorps and White Leghorns
W. J. Martin, Pullenvale ..	Pennington ..	Australorps, White Leghorns, and Langshans
C. Mengel, New Lindum road, Wynnum West	Mengels ..	Australorps
J. A. Miller. Racecourse road, Charters Towers	Hillview ..	White Leghorns
F. S. Morrison, Kenmore ..	Dunglass ..	Australorps, White Leghorns, and Brown Leghorns
Mrs. H. I. Mottram, Ibis avenue, Deagon	Kenwood Electric	White Leghorns
J. W. Moule, Kureen	Kureen ..	Australorps and White Leghorns
D. J. Murphy, Marmor ..	Ferndale ..	White Leghorns, Brown Leghorns, Australorps, Light Sussex, and Silver Campines
S. V. Norup, Beaudesert rd., Cooper's Plains	Norups ..	White Leghorns and Australorps
H. W. and C. E. E. Olsen, Marmor	Squaredeal ..	White Leghorns, Black Leghorns, Australorps, Brown Leghorns, and Anconas
A. C. Pearce, Marlborough ..	Marlborough Stud Poultry Farm	Australorps, Langshans, Rhode Island Reds, Light Sussex, White Wyandottes, Khaki Campbell Ducks, Indian Runner Ducks, and Bronze Turkeys
E. K. Pennefather, Douglas street, Oxley Central ..	Pennefathers ..	White Leghorns and Australorps
G. Pitt, Box 132, Bundaberg ..	Pitt's Poultry Breeding Farm	White Leghorns, Brown Leghorns, Australorps, Langshans, White Wyandottes, Rhode Island Reds
G. R. Rawson, Mains road, Sunnybank	Rawson's ..	Australorps
J. Richards, Atherton	Mount View ..	White Leghorns and Australorps
H. K. Roach, Wyandra ..	Lum Burra ..	Australorps and White Leghorns
W. G. Robertson, Bilson road, Nundah	Ellerslie ..	Australorps, Light Sussex, and Plymouth Rocks
C. L. Schlencker, Handford road, Zillmere	Windyridge ..	White Leghorns
S. E. Searle, New Cleveland road, Tingalpa	Tingalpa ..	White Leghorns and Australorps

Name and Address.	Name of Hatchery.	Breeds Kept.
A. Smith, Beerwah	Endcliffe ..	White Leghorns and Australorps
A. T. Smith, Waterworks road, Ashgrove	Smith's ..	Australorps and White Leghorns
T. Smith, Isis Junction	Fairview ..	White Leghorns and Langshans
H. A. Springall, Progress street, Tingalpa	Springfield ..	White Leghorns
J. Steckelbruck, The Gap, Ashgrove	Cosy Nook ..	White Leghorns and Australorps
A. G. Teitzel, West street, Aitkenvale, Townsville	Crescent ..	White Leghorns
W. J. B. Tonkin, Parkhurst, North Rockhampton	Tonkin's ..	White Leghorns and Australorps
P. and K. Walsh, Cleveland ..	Pinklands ..	White Leghorns
W. A. Watson, Box 365 P.O., Cairns	Hillview ..	White Leghorns
G. A. C. Weaver, Atherton ..	Weaver's ..	Australorps, White Leghorns, Buff Leghorns, Wyandottes, Anconas, Indian Game, Rhode Island Reds, Barred Rocks, Buff and Black Orpingtons
H. M. Witty, Kuraby ..	..	White Leghorns and Australorps
P. A. Wright, Laidley ..	Chillowdeane ..	White Leghorns, Brown Leghorns, and Australorps
R. H. Young, Box 18, Babinda	Reg. Young's ..	White Leghorns, Australorps, and Brown Leghorns

THE PURCHASE OF POULTRY.

At this time of the year, the upward trend of egg values tempts many beginners, and also persons who keep a few fowls, to increase their income from poultry by purchasing pullets or hens. The idea is fairly sound, but there are numerous pitfalls for the inexperienced buyer.

Assuming that the beginner sets out to buy pullets about four or five months old, it is only natural to expect that the quoted price will have an important bearing on the transaction. For instance, if pullets four to five months old are obtainable from one source at 6s. per pair and from another at 10s. per pair, the cheaper lot may be bought.

The inexperienced buyer seldom appreciates the necessity for paying the higher price, as the birds are of the same age and breed. It should be borne in mind, however, that there is usually a definite reason for the difference in the price, and that difference can be summed up in one word—quality. The cheaper birds may have been culled from flocks, as the result of their being backward or stunted in growth. Such birds cannot be expected to commence egg-laying at the normal time and be profitable. If they are culls as pullets, it is unwise to breed from any of them. They cannot return a profit, irrespective of the purpose for which they are used.

After allowing for feeding costs and a slight increase in egg values, it is unlikely that the more expensive birds will show any profit during their pullet year. It is quite probable, however, that they will repay their purchase price. At the same time, many of these birds should make suitable breeders, and their use for this purpose would be profitable.

Much the same applies in the case of hens. Cheap hens are usually unsuitable as breeders, whereas many breeding birds may be selected from the more expensive birds. The purchase of old hens is not good business, apart from their value as future breeders. Again, while the beginner may be able to distinguish a pullet before it begins laying, once production starts it is more difficult to separate hens which have just completed a moult and pullets which have been laying for a few weeks. It is also very difficult to distinguish between a hen that is fifteen months old and one four years old. This means that in buying alleged first-year hens the birds could be any age above that mentioned.

In such circumstances, it is advisable for the prospective buyer to inspect the flock from which it is proposed to make the purchase before parting with his money.

Agricultural Notes

After the Burdekin Flood.

IN the July issue of the *Cane Growers' Quarterly Bulletin* was published a description of the disastrous flood experienced in the Burdekin district early in April last. A selection of photographs, illustrative of the damage caused to farms, was also reproduced.

During a recent visit to the area, the writer was struck by the energetic manner in which the farmers were attempting to rectify the damage they had suffered, and in many cases fields which appeared hopeless earlier in the year have been graded for irrigation and planted even where 18 inches of surface soil had been removed. In other cases, heavy sanding of fields had necessitated extensive scooping and grading, and this has also been carried out successfully.

Plate 118.

A SANDED FIELD WHICH HAD BEEN SCOOPED AND PLOUGHED.—A thin layer of original soil has been brought up by the plough.

Plate 119.

Illustrating the Extent and Nature of the Sanding Experienced in Certain Fields.—What remained of the mature crop had been harvested when the photograph was taken. The field has since been levelled and ratooned.

The illustrations printed here might be of interest to growers. Plate 118 shows a sanded field which has been scooped, and it will be noted that a deep ploughing has succeeded in bringing to the surface 2

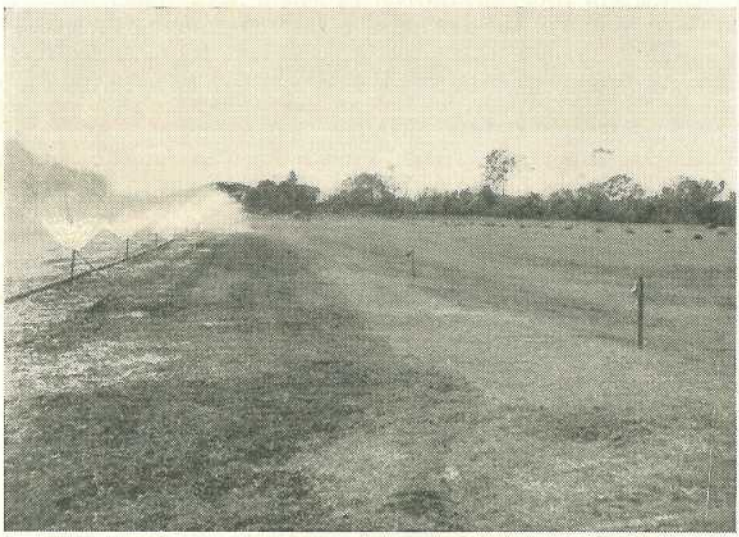


Plate 120.

Showing a Lucerne Field from which the First Cut had just been Removed.—The field received up to 12 inches of silt in April.

or 3 inches of the buried original surface soil. In cases such as this, it is recommended that alternate ploughing and scooping should be carried out, so that the land to which the sand is transferred will benefit from the admixture of surface soil which will be taken with it.

The second picture (Plate 119) illustrates the condition of a field of plant cane which was sanded and covered with flood debris. The crop had just been harvested, leaving, of course, a heavy tonnage of cane sticks buried in the sand, which was in places 3 feet in depth. The farmer has since graded the surface as well as possible and a profusion of "ratoon" shoots have developed from the eyes of the buried stalks. By means of discs, it has been possible to destroy most of those in the interspaces, so that it will be practicable to irrigate later in the season. It is confidently expected that a satisfactory ratoon crop will be harvested and, when ploughed out next year, the farmer can undertake the task of removing some of the sand, if necessary.

The third illustration (Plate 120) is a striking example of the benefits which some farmers experienced from silt deposits, following the flood. This picture was taken ten weeks after an earlier inspection when a deposit of silt 12 inches deep was just about ready for ploughing (*see* Fig. 19, *Cane Growers' Quarterly Bulletin*).

The field had been tilled, seeded to lucerne, and a first cut of this fodder removed in that short period. The hay cocks may be seen in the background, while on the left-hand side are seen the irrigation sprays applying water to ensure a second cut. This was taken five or six weeks later, and yielded about 1 ton of hay per acre.

H.W.K.

THE PLANTING OF SORGHUMS.

From time to time the Bureau of Sugar Experiment Stations has warned canegrowers of the danger of planting maize in cane areas where downy mildew disease exists, in conjunction with susceptible cane varieties. In these circumstances, the use of sorghums is strongly recommended; in fact, it is the experience of many farmers who have heretofore grown maize for fodder purposes that sorghums are much more reliable and satisfactory. There is no danger in feeding sorghum to stock, provided it has flowered. It should not be cut in its early green state.

Two major classes of sorghum are employed—(1) the saccharine or sugary types, such as Saccaline, which owe their food value largely to the sugary juice contained in the stems; and (2) the grain types, which concentrate food, in the form of starches, in the heads.

Seed of Saccaline can be obtained from most reputable seed dealers, while seed of the grain types are obtainable from the Department of Agriculture and Stock. The price charged is 4d. per lb., freight paid. At the present time seed of the following varieties may be obtained:—Kalo (recommended for the wetter districts), Hegari, Texas Black Hull, and Kaffir.

The seed may be sown broadcast (30 lb. per acre) or drilled at the rate of 4-5 lb. per acre. Drilling is recommended, notably for the grain types, as it assures the formation of better heads.

Plate 121.

PLOT OF GRAIN SORGHUMS, MERINGA.

During the past season, very good crops of sorghum were seen in the southern cane areas, while good grain crops were obtained as far north as the Meringa Sugar Experiment Station.

H.W.K.

WHITE WASH WHICH LASTS.

Common limewash, made by slaking freshly burnt lime and diluting it with water, is often found to be friable when dry and rubs or flakes off rather easily. Effort has, therefore, long been directed to the discovery of a method of preparation which will make the coating more resistant to rubbing, less liable to flake off, and having some waterproofing qualities.

At the start, it should be said that a good deal of the flaking which occurs is due to new coats being put over previous applications which are practically already detached from their base, and merely require the slight "pull" caused by a succeeding coat to cause them to break. There is no known way of overcoming this condition other than removal by washing or scraping of the defective coating.

Ordinary limewash is made by slaking about 10 lb. of quicklime with 2 gallons of water. As an ordinary fixative, alum, 1 oz. to the gallon, will stop whitewash from rubbing off easily.

Flour Paste.

Alternatively, the addition of flour paste, which, however, needs the further addition of zinc sulphate as a preservative to prevent mildew, may be tried.

A reliable recipe for interior use (walls, ceilings, &c.) is:—

(*a*) 62 lb. (1 bushel) quicklime, slake with 15 gallons of water, and cover with sacking till steam ceases to rise. Stir occasionally to prevent scorching.

(*b*) 2½ lb. flour, beat up in ½ gallon cold water, then add 2 gallons boiling water.

(*c*) 2½ lb. common rock salt dissolved in 2½ gallons hot water.

Mix (*b*) and (*c*), then pour into (*a*) and stir until well mixed. This produces a mixture of good brushing consistency, and is used in factories, being recommended to prevent easy ignition.

Where a weatherproof coating for use out-of-doors is required, the following is a recipe which should prove satisfactory:—

Place 1 bushel of good fresh quicklime in a barrel with 20 lb. of beef tallow, slake with hot water (about 15 gallons added gradually so as not to "drown" the lime)

and cover with sacking to keep in steam. When the lime has slaked the tallow will have disappeared, having formed a chemical compound with the lime. Dry earth colours (ochre, sienna, &c.) may be added before slaking if a cream or buff tint is desired. The mixture should be stirred occasionally, and thinned to easy-flowing consistency with clear water when cold.

"Lighthouse" whitewash, again suitable for exterior purposes, is made in the following way:—

(*a*) 62 lb. (1 bushel) quicklime, slake with 12 gallons hot water;

(*b*) 12 lb. rock salt, dissolve in 6 gallons boiling water;

(*c*) 6 lb. Portland cement.

Pour (*b*) into (*a*) and then stir in (*c*) and use at once.

Skimmed milk used in place of diluting water is sometimes advocated to increase the tenacity of the wash, and an old recipe for external colouring of farm buildings is:—Lime ½ bushel slaked with 1 gallon of milk and remainder of water; 1 lb. salt, ½ lb. zinc sulphate to withstand weather.

It has been found that an old cobwebby roof not easily accessible to brushing can be effectively cleaned by machine spraying with common limewash (well strained) which will bring the dust and cobwebs down, so that a second application produces a reasonably clean, white finish.

RIVER EROSION IN THE PROSERPINE DISTRICT.

The disastrous flood experienced in the Ayr district earlier this year was paralleled by a similar occurrence at Proserpine, where the river cut a new channel through its northern bank, and washed out a section of valuable cane land in the process.

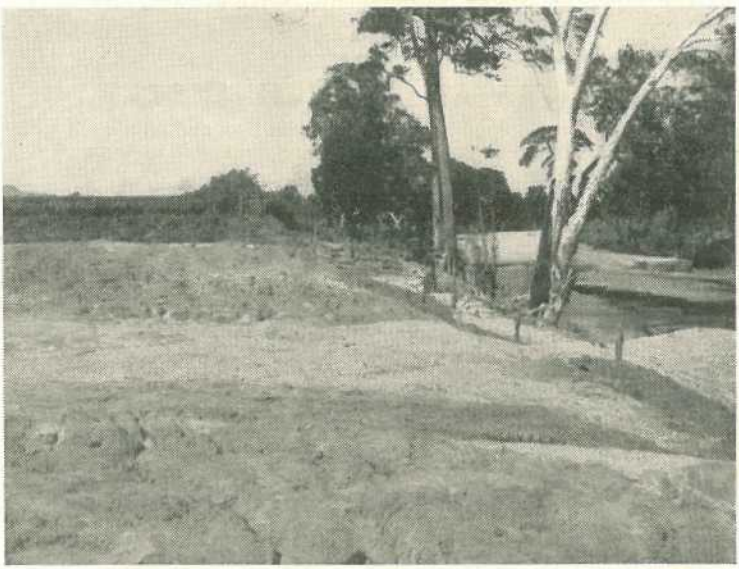


Plate 122.

SHOWING THE SERIOUS BREAK IN THE PROSERPINE RIVER BANK CAUSED BY EROSION DURING THE RECENT FLOOD.

The accompanying illustration (Plate 122) indicates the depth to which erosion has taken place. It is feared that successive floods may follow this new course, and farms which lie in its path will be endangered unless the breach can be repaired.

H.W.K.

A USEFUL HINT WHEN LAND GRADING.

Most farmers, when grading for drainage or irrigation, do not have access to a surveyor's level or other device to enable them to determine when they have scooped just sufficent soil to provide the surface slope required.

One Burdekin farmer has evolved a very ingenious method to provide him with the information he needs in this respect. He can determine accurately the condition of the surface, without any guess-work, merely by using two or three petrol or kerosene tins and an ordinary spirit level.

Plate 123.

ILLUSTRATING THE WAY IN WHICH PETROL TINS MAY BE USED IN FINDING LEVELS.

The tins are set on the loose surface, as shown in the illustration (Plate 123) and by pressing lightly on one side or the other the top edge of the tin is adjusted until the level shows that it is horizontal. The remaining tins are similarly adjusted. Then by sighting along the top edge of the first tin, it may readily be determined whether the land surface falls away or rises, regularly or irregularly, as evidenced by the corresponding edges of the successive tins.

This little trick is both simple and convenient, as well as accurate.

H.W.K.

CLEANING PAINT TINS.

Paint tins and drums make handy containers about the farm when cleaned inside. To do this easily and thoroughly first remove all the paint that can be scraped out of them. Then set them in a tub of water with a weight in each to keep them down, and drop a lighted newspaper inside of each. The paint residue will ignite and burn away without melting the solder joints as the surrounding water protects them against excessive heat.

THE FELTED GRASS-COCCID.

A small, globular insect with a white felted covering is a widely distributed pest of grasses in pastures, lawns, and greens. Two insects of this type are well known, one being confined to nut-grass and related sedges, while the other has been recorded from a wide range of grasses including couch grass, buffalo grass, Para grass, Rhodes grass, red Natal grass, and Kikuyu grass.

The insect attacking various true grasses, and known as the felted grass-coccid, belongs to the mealybug group of scale insects. The adult female is brownish-purple in colour, globular in shape, and is enclosed in a white, felted, waxy sac which almost completely covers the insect. The female is attached to both the rhizomes and stems of grasses usually at the nodes where it is sheltered by the axils of the leaves. The numerical strength of the colonies is greatest close to ground level. The adult male insect is winged and is very rarely seen.

The eggs are retained within the body of the female until its death. On hatching, the eggs yield tiny active crawlers which leave the protective shell of the dead parent. They wander about on the plant stem or rhizome for one or more days and at this stage spread short distances from plant to plant. If the grass is uprooted the crawlers can be seen as minute, cream-coloured moving spots against the brown or green stem. When the young insect has found a suitable position for feeding, its long thread-like sucking tube is inserted into the tissues and sap is extracted as food. Thereafter it remains in the one position and, on moulting, loses its legs. The characteristic waxy-felt covering is then secreted by various glands on the body.

The number of times this life cycle recurs each year is at yet unknown, but there are probably two or three generations in the summer, followed by a period of very little activity in winter.

In view of its protective cover and sheltered position, the control of this insect is difficult and is normally necessary only when growing conditions are poor. Owing to the wide distribution of the species, eradication must be considered impossible.

In lawns, and more particularly greens, such as bowling greens, which are subject to close mowing practices, drains on the food reserves of the plant by innumerable coccids may cause wilting and browning of the grass. Every attempt should be then made to restore vigorous growth by top-dressing, fertilizing, watering, and, when possible, spelling the grass for longer periods between mowings.

Fertilizing treatment comprises firstly, the incorporation in the spring top-dressing of sulphate of ammonia at the rate of 3 cwt. per acre or 1 oz. per square yard of green, and secondly, watering the green in autumn with a solution of sulphate of ammonia at the rate of 2 to 4 oz. of the fertilizer per square yard.

When greens or lawns are heavily infested the following mixture, applied with a watering can, may be used.

1 fluid oz. nicotine sulphate.
1½ oz. soap.
2½ gals. water.

The soap, a good quality kitchen soap, should be shredded and heated in a small quantity of water to form a solution. This is then made up to 2½ gallons by the addition of cold water, and the measured quantity of nicotine sulphate is stirred in. This material can have no deleterious effects on the lawn and if applied so as to thoroughly wet the grass, will have a part contact poison, part fumigating effect on the insect. The fumigating effect may be increased by treating a section of the lawn and then covering it immediately for two or three hours with a large tarpaulin; an adjacent section can then be similarly treated. Crawlers should be killed by such treatment but some eggs may survive and a second application may be necessary.

Treatment of pastures is hampered by economic considerations and efforts should, therefore, be made to improve the vigour of the grass by orthodox methods, These may involve manuring, mechanical renovation or even pasture re-establishment after a short period of cropping. Details of such pasture improvement must be worked out for each district to conform with local requirements and can best be discussed with the resident instructor in agriculture.

Summer Lettuce.

WHILE lettuce thrives best in the early spring and autumn, good grade summer lettuce can be produced on the heavy soils of the highlands where the temperature of the air and soil is moderately cool.

Lettuce, particularly at this time of the year, cannot stand a check, therefore an even supply of moisture and plant food must be available.

The preparation of the soil should include the digging in of a generous supply of farmyard manure. Besides supplying the necessary readily available food, this manure greatly assists in the retention of moisture and in keeping the soil cool.

As frequent waterings will be necessary, any extra time required for levelling the land will be well spent.

If the land is dry when the beds are formed, it will be advisable to thoroughly soak them before sowing the seed as it will be found that the beds are inclined to settle unevenly after the first watering.

The seed being very small should be sown as shallow as possible and covered with just sufficient soil to ensure germination. A top dressing of fine manure after sowing will greatly assist in the germination, seedling, and maturing stages. Very thick seeding, besides being wasteful, entails much additional work in thinning. Successive sowings should be made at intervals of ten days throughout the summer. The seedlings should be thinned before crowding takes place. Thinning is best done with a light hoe, blocking out the plants to approximately 12 inches apart in the row; further thinning by hand to one plant in any place may be necessary. To enable the plant to develop deep roots, over-watering at this stage should be avoided. More frequent waterings will be required as the plants increase in size.

Lettuce is a shallow rooter and a poor forager, and, therefore, well regulated waterings will do much to assist the growth of a strong deep-rooting plant. Over-watering is very damaging, and it will take some experience to tell just when the lettuce needs water. Generally, a tough appearance and a darkening of the leaf are symptoms pointing to a lack of water.

It is very important to select a variety for planting which grows well in the locality under consideration. Climatic conditions and market requirements also should be considered. In this respect both "Imperial F" and "Iceberg" are recommended.

WASHING OF SOIL IN ORCHARDS.

Surface drainage should be studied before laying out an orchard. In established orchards where it is found that surface wash and scouring is occurring, much can be done to prevent it. All surface water from above the orchard may be diverted by making a wide, shallow contour drain on the top side of the orchard, where the ground may be grassed. With a plough and scoop, this drain can be made usually at a very small cost. Depth and width will be determined by the volume of water to be diverted, but a drain about 4 feet wide and 18 inches deep, with the soil scooped on to the lower side, will do in most cases. This type of drain will not scour nor silt up readily, and if well grassed will need very little attention.

It should be remembered that a fall of 18 inches in every 100 feet is the correct grade for surface contour drains in a cultivated area.

To reduce loss of soil by the action of heavy rains on the cultivated areas, the planting of suitable cover crops should receive attention.

If it is not intended or desired to plant cover crops, it should be remembered that badly cultivated land with a hard pan near the surface will wash more severely than if good cultivation has been the rule.

Where the ploughing has been left in the rough it will be found that each furrow will carry its own water, whereas a final cross-ploughing tends to back the water up until it forcibly breaks through at a low point, generally causing a big run and considerable damage.

TOMATO MARKETING.

A comparison of tomato prices during the past season places the Southern Queensland output in a secondary position. There is strong reason to believe that this is influenced by (1) poor maturity of fruit, and (2) faulty packing. Another comparison shows that coloured fruit brings much better prices than green fruit. The question naturally arises as to why green fruit should be delivered when a higher price is obtainable for coloured grades.

No difficulty in marketing coloured fruit should occur until late in the season. By that time, supplies will have begun to ease off, enabling extra care to be taken. Growers may achieve a desirable maturity standard by picking only matured fruit, and packing to a colour standard, any green fruit being left in a cool place until fit for a later consignment.

Difficulties may be experienced on large plantations, but these may be largely overcome by appointing one of the workers as a special packer. Having everybody on the farm doing all sorts of work does not make any man an expert in any particular job. A specialist in any type of work becomes fast and expert, always doing better work than the jack of all trades.

In furthering the aim of better packing, free tuition is available to growers from the Department of Agriculture and Stock by applying to the Under Secretary.

TRANSPLANTING TOMATOES.

When tomatoes are transplanted during summer, considerable loss is often caused by the young plants "burning off" at ground level. This is particularly noticeable where the soil is fine or sandy.

A dull day should be chosen for transplanting, but if the area is large and transplanting cannot be postponed, it should be done late in the day. Roll the stem of each plant in paper just before planting. This is best done by having a sufficient supply of papers cut to a suitable size—for the average size plant, about 4 inches by 1½ inches. The papers may be threaded on a string and suspended from the belt of the field worker for convenience in use. On taking a plant from the carrying-box or basket, the paper is snapped off the string and rolled round the stem of the plant—like rolling a cigarette—leaving only the top leaves and the root exposed. The plant may then be placed in the ground in the usual way. It will be found that after a little practice very little extra time will be required for this method of planting. Other advantages of this method are that the young plant does not readily droop, and soon becomes established. Where cutworms are troublesome, it also will give a good measure of control during the early stages of growth.

THE FRUIT MARKET.

J. H. GREGORY, Instructor in Fruit Packing.

THIS month's notes are from the Sydney markets. Pineapples and tomatoes have been affected by the same set of conditions. Prices were as high as 15s. for pines and 18s. for tomatoes, but consumer demand suddenly dropped to the disadvantage of retailers who had bought at top values. A slow market for consignors was the inevitable consequence. The usual thing happened when the prices gained for early consignments became known. In efforts to be "in on the big money," growers increased their deliveries, in some cases casting aside all sound marketing practices. Among the heavy pineapple consignments were green and badly graded fruit, and fruit which had been pulled and so subject to damage in transit. A "dead" market soon developed. In tomato consignments, smalls and B grade fruit were mixed and supplies accumulated. As some growers had not separated green from coloured fruit, within a week there were both green and over-ripe fruit in the same cases. It was just a recurrence of the age-old human failing of "grasping at the shadow and losing the substance." Good, brisk, constant markets at medium prices are always more satisfactory than high peaks and steep declines in values. The higher the rise the harder the fall when the inevitable reaction sets in.

Some fine lines of papaws were delivered on the Sydney market. Stone fruits are coming in, and first Queensland consignments of mangoes are arriving. Only special classes and varieties of mangoes should be sent South. Towards the end of the month, late strawberries were still to be seen, but quality was poor. Many lines of partially-filled bananas were on offer to reluctant buyers. Good quality fruit of all kinds were selling well in Sydney, but low quality offerings were hard to quit.

Prices during the last week of October were:—

TROPICAL FRUITS.

Bananas.

Brisbane.—Cavendish: Smalls, 4s. to 7s. 9d.; Sixes, 4s. 6d. to 12s.; Sevens, 5s. to 16s. 6d.; Eights and Nines, 8s. to 18s. Bunches, 1d. to 7d. dozen.

Sydney.—Cavendish: Sixes, 10s. to 12s.; Sevens, 12s. to 16s.; Eights and Nines, 16s. to 20s.

Melbourne.—Cavendish: Sixes, 10s. to 14s; Sevens, 13s. to 16s; Eights and Nines, 15s. to 18s.

Newcastle.—Cavendish: Sixes, 12s. to 14s.; Sevens, 14s. to 17s.; Eights and Nines, 18s. to 20s.

Brisbane.—Lady Fingers: ½d. to 10¼d. dozen.

Pineapples.

Brisbane.—Smooths: 6s. to 7s. case; 2s. to 5s. 6d. dozen. Ripleys: 7s. to 10s. 9d. case; 2s. to 7s. dozen.

Sydney.—10s. to 14s. early in month; now 8s. to 10s.

Melbourne.—9s. to 14s.

Papaws.

Brisbane.—Yarwun, 5s. to 7s. tropical case; Gunalda, 3s. 6d. to 5s. bushel; Locals, 2s. 6d. to 3s. bushel.

Sydney.—8s. to 14s. tropical case.

Melbourne.—9s. to 13s. tropical case.

Mangoes.

Brisbane.—8s. to 10s. bushel.

Sydney.—First lines arriving. No sales made.

CITRUS FRUITS.

Oranges.

Brisbane.—5s. to 8s. bushel.

Lemons.

Brisbane.—Locals, 8s. to 12s.; Gayndah, 14s. to 18s.

Passion Fruit.

Brisbane.—First, 14s. to 17s.; Seconds, 8s. to 12s.

Sydney.—14s. to 20s.

Melbourne.—18s. to 22s.

Strawberries.

Brisbane.—Boxes, 7s. to 10s. dozen.

Sydney.—Trays, 1s. to 4s.; Boxes, 6s. to 12s. Most lines poor in quality on arrival.

Apples.

Brisbane.—5s. to 12s.

MISCELLANEOUS, VEGETABLES, ETC.

Rhubarb.—Brisbane, 6d. to 1s. 3d. bundle.

Carrots.—Brisbane, 3d. to 1s. bundle.

Parsnips.—Brisbane, 9d. to 1s. 6d. bundle.

Celery.—Brisbane, 9d. to 2s. bundle.

Lettuce.—Brisbane, 6d. to 1s. 6d. dozen.

Peas.—Brisbane, 4s. to 7s. per bag.

Beans.—Brisbane, 5s. to 10s. per bag.

Pumpkins.—Brisbane, Old, 12s. to 15s. bag; New, 18s. to 20s. per bag.

Marrows.—Brisbane, 2s. to 6s. dozen; 5s. to 7s. case.

Cabbages.—Brisbane, 2s. 6d. to 9s. per bag.

Cucumbers.—Brisbane, North Queensland, 6s. to 10s.; South, 6s. to 18s. per bag.

Tomatoes.

Brisbane.—Coloured, 6s. to 8s.; Ripe, 4s. to 6s.; Green, 2s. to 8s.

Sydney.—Original packs over 2 inches, 5s. to 9s.; Smalls, 1s. to 4s., hard of sale; Ripe, 2s. to 4s.; Glasshouse to 14s.

PINEAPPLE MARKETING.

When the summer smooth leaf pineapple crop in South Queensland is ready for market, the necessity of packing only good class, matured fruit will demand renewed 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 on 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 suburn, mechanical injury, or insect damage, and which are reasonably assured of being free from water blister, should be packed. Packing with wood-wool 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.

THE LATE ROBERT WILSON.

Tributes in Parliament.

IN the course of the debate in the Legislative Assembly on the estimates of the Department of Agriculture and Stock, fine tributes were paid to the public services of the late Robert Wilson, formerly Acting Under Secretary and Director of Marketing.

Hon. H. F. Walker, formerly Minister for Agriculture and Stock, said that the late Mr. Wilson was a public administrator of outstanding value. With unerring judgment he selected juniors for the job for which they were most suited by talent and temperament, and imbued them with his own enthusiasm for efficient and ungrudging service to the community. "We can ill afford to lose such a fine man; primary industry has suffered severely by his death" added Mr. Walker.

Hon. Frank W. Bulcock, Minister for Agriculture and Stock, expressed cordial appreciation of the references by the hon. member for Cooroora (Mr. Walker) to the late Mr. Wilson whose death occurred while the Minister was abroad last year. Continuing, Mr. Bulcock said: "I have worked with many men, and I say without hesitation or reservation that Mr. Wilson was one of the finest men I had ever had the pleasure of working with. He was a man to whom duty and service were paramount, and he is probably the ideal of many men in the Public Service. Certainly the inspiration he left behind has been a very potent factor in developing the Department of Agriculture and Stock. He had served in the Department for something like forty-six years, and saw it grow from infancy to adolescence and then to maturity. He was associated with all the big decisions made by the Department. There is one thing I did love above all else about the late Bob Wilson, and that was when a youngster came into the Department he always sought to find where his particular bent lay, and he always encouraged the youth and helped in the development of his natural bent. The loss of Robert Wilson will be felt as long as there are officers in it—and in other departments, too—whom he trained or who served with him."

These fine tributes in the Parliament of his native land were doubly earned by the late Robert Wilson as a front line soldier of the A.I.F. as well as a citizen "who in his time rendered great service to the State."

Plate 124.

A STAND-BY FOR STOCKOWNERS.—Florida Oshima Cow Cane in a departmental variety trial at Rockhampton. Yield 48 tons to the acre.

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 September, 1940 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
MATURE COW (STANDARD, 350 LB.).				
Sunnyside Mabel 16th	P. Moore, Sunnyside, Wooroolin	11,971·5	429·734	Countess Lad of Cosey Camp
Rosenthal Perfect 4th	S. J. H. Mitchell, Rosenthal	9,834·68	411·927	Ardendeuchar Admirable
Rosenthal Perfect 5th	S. J. H. Mitchell, Rosenthal	9,572·34	406·412	Rosenthal Carbine
JUNIOR, 4 YEARS (STANDARD, 310 LB.).				
Springlands Gentle	Mr. V. A. Wyvill, Yarralea, Upper Yarraman	10,614·75	413·734	Osiris of Greyleigh
SENIOR, 3 YEARS (STANDARD, 290 LB.).				
Alfa Vale Star 5th	W. H. Thompson, Alfa Vale, Nanango	12,328·9	502·974	Reward of Fairfield
JUNIOR, 2 YEARS (STANDARD, 230 LB.).				
Rosenthal Maggie 17th	S. J. H. Mitchell, Rosenthal	6,368·97	264·021	Rosenthal Perfection
JERSEY.				
MATURE COW (STANDARD, 350 LB.).				
Golden Lady of Springvale	P. J. Neal, Peeramon	6,177·35	361·962	Prides Noble of Burnleigh
SENIOR, 4 YEARS (STANDARD, 330 LB.).				
Windyway Duchess	Wakefield Bros., Upper Barron, Atherton	7,281·5	417·155	Royal Emblem 2nd of Rosedale
Lucy of Windyway	Wakefield Bros., Upper Barron, Atherton	6,613·9	376·066	Royal Emblem 2nd of Rosedale
JUNIOR, 4 YEARS (STANDARD, 310 LB.).				
Calton Averier	W. J. Semgreen, Tecoma, Coolabunia	8,106·15	435·87	Laddie of Calton
SENIOR, 3 YEARS (STANDARD, 290 LB.).				
Windyway Melba	Wakefield Bros., Upper Barron, Atherton	5,269·35	338·575	Royal Emblem 2nd of Rosedale
JUNIOR, 3 YEARS (STANDARD, 270 LB.).				
Windyway Crystal	Wakefield Bros., Upper Barron, Atherton	5,714·55	328·105	Royal Emblem 2nd of Rosedale
Lady Primula	E. G. Rothery, Ringarooma, Archer	7,038·95	310·191	Booser of Cooeeall
SENIOR, 2 YEARS (STANDARD, 250 LB.).				
Lermont Belette	J. Schull, Lermont, Oakey	5,269·2	303·783	Woodside Golden Volunteer
JUNIOR, 2 YEARS (STANDARD, 230 LB.).				
Windyway Feather	Wakefield Bros., Upper Barron, Atherton	4,830·25	275·832	Royal Emblem 2nd of Rosedale
Ashview Essie	C. Huey, Ashview, Sabine	4,952·75	251·369	Martinville Duke

General Notes

Staff Changes and Appointments.

Executive approval has been given to the appointment of Messrs. H. McNee, A. F. Skinner, G. W. Smith, and E. W. Baird as instructors in Agriculture.

The appointment of these officers is in accordance with the established policy of the Department of Agriculture and Stock in recruiting its staff for extension services from students who have successfully completed a Diploma Course at the Queensland Agricultural High School and College. Messrs. McNee, Smith, and Baird hold the Queensland Diploma in Agriculture, and Mr. Skinner the Queensland Diploma in Horticulture. The appointment involves promotion from the position of field assistant, in which capacity they have served in the General Agriculture section of the Department for the required period.

Mr. W. A. McDougall, M.Sc., assistant entomologist, Bureau of Sugar Experiment Stations, has been appointed entomologist, Sugar Experiment Station, Mackay.

Mr. G. A. Christie, Q.D.A., field assistant, Bureau of Sugar Experiment Stations, has been appointed instructor (Sugar Cane Culture), Meringa.

Mr. L. F. Mandelson, B.Sc.Agr., research officer, Agricultural Section, Division of Plant Industry (Research), Department of Agriculture and Stock, will be transferred to Inglewood.

Messrs. A. D. R. James (Toowong) and J. G. Grant (Greenslopes) have been appointed honorary rangers under *The Native Plants Protection Act* and honorary protectors under *The Fauna Protection Act*.

Mr. D. Ryan, Acting Police Magistrate, Bundaberg, has been appointed an agent of the Central Sugar Cane Prices Board for the purpose of inquiring into sales and leases of assigned lands, during the absence of Mr. C. D. O'Brien, Police Magistrate.

Constable P. James (Meringandan) has been appointed an inspector under *The Slaughtering Act*.

Fauna Sanctuary at Drayton.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937" declaring "Smithfield," the property of Mrs. R. G. Winten, Drayton, to be a sanctuary for the protection of native fauna.

Mr. D. J. Callaghan, inspector of dairies, Boonah, has been appointed dairy instructor, Department of Agriculture and Stock, Brisbane.

Mr. C. J. Payne, assistant, Sheep and Wool Branch, Department of Agriculture and Stock, has been appointed senior classer.

Mr. J. A. Franzman, Clerk of Petty Sessions, Babinda, has been appointed chairman of the Babinda Local Sugar Cane Prices Board and an agent of the Central Board.

Mr. A. H. Ashton, David avenue, Bardon, has been appointed an honorary fauna protector and an honorary ranger under *The Native Plants Protection Act*.

Mr. B. G. Scheuer, Yarraman, has been appointed an honorary protector of fauna.

Banana Industry Protection Board.

A Regulation issued under *The Banana Industry Protection Acts* provides that for the period up to and including 30th September, 1941, the two growers' representatives on the Banana Industry Protection Board, in lieu of election shall be nominated by the Committee of Direction of Fruit Marketing from its banana sectional group committee.

Messrs. W. J. Branch (Russell Island) and A. W. Chapman (Eumundi) have been appointed growers' representatives on the Board until 30th September, 1941.

Fig Levy.

A Regulation has been issued under *The Fruit Marketing Organisation Acts* empowering the Committee of Direction of Fruit Marketing to make a levy at the rate of 5s. per ton, and/or a proportionate part of 5s. for each part of a ton, on growers of figs delivered to canners on and from 1st December, 1940, until the 30th April, 1942. The sums raised will be expended only on advertising in the interests of the fig-growers concerned.

Answers to Correspondents

BOTANY.

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

Caustic Creeper.

J.P.H.C. (Emerald)—

The specimen is *Euphorbia Drummondii*, the Caustic Creeper, a native of Western Queensland and the interior of Australia generally. This plant has at times been accused of poisoning stock, but at other times seems to be eaten with impunity. Most of the trouble seems to be with travelling animals.

In New South Wales the plant has been found to contain a prussic-acid-yielding glucoside, and to kill stock in the same way as young sorghum. In Queensland repeated tests have always yielded negative results, and the symptoms described by experienced stockowners have not been those of HCN (prussic acid) poisoning. All the reports that have come to us state that the head and neck of affected animals swell considerably. If this swelling is pierced an amber-coloured fluid exudes, and the life of the sheep may be saved. Dr. D. A. Herbert, when Government Botanist of Western Australia, found that experimental feeding on rats with Caustic Creeper produced the effect of swelling of the head and neck, as described by experienced stockowners in sheep. A similar condition is also reported as caused by the Bottle Caustic (*Euphorbia eremophila*).

Native Quinine.

M.R.I. (Rockhampton)—

The specimen is *Alstonia constricta* var. *mollis*, generally known as Native Cinchona, or Native Quinine. It is widely spread in Central and Southern Queensland from the coast to about 300 miles inland. It is sometimes eaten by stock, but is not known to have any fodder value. The plant, so far as we know, has not been suspected of causing losses in stock. It grows on a considerable range of soil, but favours sandy loam. Sometimes in such country it becomes rather of a pest in cultivation because of its habit of suckering. The plant contains the alkaloid alstonine, and has been tried as a substitute for quinine, but has been reported on by manufacturing chemists as useless in this respect. It has been used as a stomachic.

Cassia.

W.D. (Brooweena)—

The specimen is *Cassia bicapsularis*, a shrub native of tropical America. It is mostly listed by nurserymen under the name of *Cassia Candolleana*. We have not heard a local name applied to it. It is usually simply called "Cassia." It is a handsome shrub, usually propagated from seed, and has showy yellow flowers. It does quite well about Brisbane, and we have seen it in the South Burnett. In the Kingaroy district, however, we noticed it was very frost-tender. Nevertheless, it seems to come up from the old stump the following year.

A Native Couch Grass.

F.H.D. (Longreach)—

The specimen is *Brachyachne convergens*, a native couch grass. It is one of the numerous grasses known in the Central-West as "Star Grass." So far as we have observed, stock do not take readily to it, and we should say it is only of secondary value. The disadvantage of the grass is that it contains a prussic acid-yielding glucoside in large quantities. Some recent losses on a stock route at St. George were attributed to this grass. Ordinary paddock stock, so far as we know, are seldom affected by the plant. We hardly think it worthy of encouragement.

Regarding the use of Red Burr, Goat Head, and Saltbush for silage, we think the only one that would be feasible would be the last. We do not think the plants, on the whole, very serviceable.

Tree Nomenclature.

H.S. (State School Forestry Club, Kalpowar)—

Subjoined is a list showing the botanical names you require. Several of these names should be used with caution. For example, two different trees are commonly called Swamp Mahogany (*Tristania suaveolens* and *Eucalyptus robusta*). The name Plum is applied to several different trees, including *Sideroxylon australe* and *Sandalwood* (*Santalum lanceolatum*), as well as to the common Burdekin Plum. Similarly, several different trees are commonly called Apple. The name Pinkheart is also used for widely different trees. The name given in the list is the small tree growing in the scrubs (rain forests), which is also known as Bone Wood.

Blue Gum (*Eucalyptus tereticornis*).
Grey Gum (*Eucalyptus propinqua*).
Spotted Gum (*Eucalyptus maculata*).
Gum-topped Box (*Eucalyptus hemiphloia*).
Stringybark (*Eucalyptus acmenioides*).
Broad Leaf Ironbark (*Eucalyptus siderophloia*).
Narrow Leaf Ironbark (*Eucalyptus crebra*).
Golden Wattle, Queensland (*Acacia fimbriata*).
Black Wattle (*Acacia Cunninghamii*).
Silver Wattle (*Acacia podalyriæfolia*).
Creek Oak (*Casuarina Cunninghamiana*).
Mountain Oak (*Casuarina torulosa*).
Bloodwood (*Eucalyptus corymbosa*).
Plum, Burdekin (*Pleiogynium Solandri*).
"Flandosia," probably Flindersia is meant.
White Cedar (*Melia dubia*).
Red Cedar (*Cedrela Toona* var. *australis*).
White Myrtle (*Rhodamnia argentea*).
Black Myrtle (*Diospyros pentamera*).
Lignum Vitæ, native (*Vitex Lignum-vitæ*).
Tree Zamia (*Cycas media*).
Pinkheart (*Medicosma Cunninghamii*).
Grass Tree (*Xanthorrhœa*).
Yellow Jacket (*Eucalyptus* sp.).
Glasswood. We do not know this species. Could you send a specimen?
Ironwood, scrub (*Myrtus acmenioides*).
Ironwood Wattle is *Acacia excelsa*.
Hoop Pine (*Araucaria Cunninghamii*).
Supple Jack (*Ventilago viminalis*).
Cabbage Tree Palm (*Livistona australis*).
Bangalow Palm (*Archontophœnix Cunninghamiana*).
Brigalow (*Acacia harpophylla*).
Apple (*Angophora*).
Moreton Bay Ash (*Eucalyptus tesselaris*).
Crow's Ash (*Flindersia australis*).
Crow's Foot (*Tarrietia Argyrodendron*).
Bottle Tree (*Sterculia rupestris*).
Kurrajong (*Sterculia diversifolia*).
Cork (Native Corkwood is *Erythrina vespertilio*).
Pomegranate (Native Pomegranate is *Capparis*).
Fig (*Ficus*).
Weeping Willow, introduced tree along creeks is *Salix babylonica*.
Quinine, native (*Petalostigma quadriloculare*).
Sour Leaf, we do not know this species. Could you send a specimen?
Rose Apple (*Owenia venosa*).
Turpentine (*Syncarpia laurifolia*).
Mahogany (Swamp), (*Tristania suaveolens*).
Pepperina (*Schinus molle*).
Tea Tree (*Melaleuca*).
Coolibah (*Eucalyptus coolibah*).
Flindersia (*Flindersia*).
Milk Wood. We cannot be sure of this species from popular name only. Could you send a specimen to verify?

Blueberry Ash.

H.M. (Tewantin)—

The specimen is *Elaeocarpus obovatus*, the Blueberry Ash, a small tree worthy of cultivation, and very handsome both in flower and fruit. In the open it forms a very shapely tree, but in the scrubs and rain forests sometimes attains a considerable height, and is cut for timber.

Boonaree.

Inquirer (Brisbane)—

Your specimen is the Boonaree (*Heterodendron oleæfolium*), a tree very widely spread in Australia. It is very common in parts of Western Queensland, and is frequently fed to sheep without any ill effects. Like sorghum and some other plants, however, it contains a prussic-acid-yielding glucoside. Tests by the Agricultural Chemist show that the poisonous principle is at its maximum in the late summer months, and lowest in winter and early spring. It is an excellent fodder, but serious losses sometimes occur. Because of the presence of prussic-acid-yielding glucoside, it is a risky practice to feed hungry or starving sheep on the plant in great quantities. Ordinary paddock resting sheep are usually unaffected. It is a good practice to allow the leaves to wilt for a day or two before putting sheep on to them.

" Buttercup Bush."

H.E. (Yaraka)—

The specimen you forward is *Cassia Sturtii*, a native shrub for which we have not heard a distinctive local name. We have heard it called "Buttercup Bush," because of its yellow flowers. We also have heard it called "Turkey Bush," a name, however, applied indiscriminately to a number of plants in Western Queensland.

The plant is only superficially like the Heart-leaf Poison Bush (*Gastrolobium grandiflorum*), and is not known to possess any poisonous or harmful properties. If eaten in quantity it may have a purgative effect, as it belongs to the group of plants which produce the senna leaves of commerce. We have a number of native species of *Cassia*, and some are somewhat purgative in their effects on stock.

Western Grasses and Shrubs.

H.W.B. (Eulo, W.Q.)—

1. *Neurachne Mitchelliana*, Mulga Mitchell, or, preferably, Mulga Grass. Although sometimes called Mulga Mitchell, this grass is not related to the true Mitchell grasses. As the common name implies, it is often found associated with the Mulga, though not invariably. Sheep do not seem to be particularly fond of the grass, although it is usually eaten readily enough in drier times, and is generally regarded as a useful standby.
2. *Amphipogon* sp. aff. *strictus*, a grass for which we have heard no suitable common name. It is sometimes called Mulga Grass, but that name is more commonly applied to No. 1. Like the true Mulga Grass, it is very common throughout the South-West, but is not quite such a good fodder.
3. *Digitaria Brownei*, sometimes known as Silver-spike grass. This is quite a common species in the South and Central-West, more particularly where there are some trees, although it does occur in open grasslands. It is usually eaten freely enough.
4. *Eremophila longifolia*, Berrigan or Emu Bush. This usually does not grow beyond a shrub, or very small tree. Stock eat the leaves sometimes, and as the common name suggests, emus like the fruits.
5. *Eremophila Bowmanii*. This shrub belongs to the same genus as Nos. 4 and 6, but is not very common in Queensland, and consequently nothing practically is known about its properties. We have only had three or four specimens of this plant from Queensland localities before, and your specimen was of interest, and will be placed in our collection.
6. *Eremophila Gilesii*, Turkey Bush. This plant is quite a common shrub in parts of the South-West, and is particularly common about the Charleville district. It is generally left untouched by stock.
7. *Cassia eremophila*, a native Cassia or Buttercup bush, as it is sometimes called.
8. Bell Fruit (*Codonocarpus cotinifolius*), found in Western Queensland and New South Wales, An allied species sometimes comes up very thickly as secondary growth in coastal scrub areas. The tree which grows nearer the coast has much narrower leaves, but the same bell fruits as yours. "Native Poplar" is a name sometimes given to the tree, but we prefer the one of Bell Fruit.

Siris Tree. Carob Bean.

B.J.R. (Jundah)—

The specimen is not the Carob Bean, but is *Albizzia lebbek*, the Siris Tree, a native of India. It is now widely cultivated as an ornamental tree in some tropical and subtropical countries. In Western Queensland it is universally known as "Acacia." We have not known stock other than goats to eat the pods of this tree, but have passed your letter on to the Senior Instructor in Sheep and Wool (Mr. J. Carew) for an expression of opinion as to the suitability of the pods for sheep feed.

The Carob Bean, we do not think, is very suitable for Northern Queensland, as it likes a much cooler climate, and does best in Queensland on the Darling Downs. It has a very much fleshier pod than the Siris Tree, and the seeds are enclosed in a sweet sugary pulp. They are something like Tamarind pods, which you probably know, but in place of the acid flavour, have a sweet one.

Sarsaparilla. Bearded Grass.

M.R.M. (Mundubbera)—

1. The vine is *Hardenbergia monophylla*, commonly known in Queensland as sarsaparilla. It is not known to possess any poisonous or harmful properties and so far as we know has not come under suspicion before.

2. The grass specimen is *Echinopogon nutans*, Rough Bearded Grass. We were very interested in these specimens, as we had not received this grass from your district before. It is fairly common in parts of South-Eastern Queensland, and frequently grows on the edges of scrubs and similar places. We also were very interested in your notes on the palatability of the grass, and had not noticed stock eat it to any great extent.

Hairy Indigo. Canavalia.

C.P.L. (Burleigh Heads)—

The specimen is Hairy Indigo, *Indigofera hirsuta*.

Regarding the edibility of *Canavalia obtusifolia*, I might say that I have looked on this as somewhat harmful. The plant is, however, widely spread over the Pacific, and Mr. S. F. Kajewski, who did considerable botanising in the New Hebrides, told us that the natives there used the seeds regularly as a vegetable. We recently tried some out on pigs, as the plant is fairly common as a regrowth in some scrub areas, and the question is often asked whether the seeds can be used as pig feed. Tests with the beans, raw, showed they were unpalatable, but no ill effects followed their use.

Loblolly Pine.

R.B. (Pomona)—

Pinus taeda, the Loblolly Pine, is a large tree, 80-100 feet high, with a straight trunk 2-5 feet in diameter. The bark is bright red-brown, and the wood is largely used in the United States for interior work in buildings. The leaves are pale green, 6-9 inches long, and are borne in clusters of three. They are known as pine needles. The cone is oblong-conical to ovoid-cylindrical, 2-6 inches long, and composed of a number of scales. These scales are comparatively thin, rounded at the apex, and armed with short, stout, straight, or recurved prickles. The seeds are ¼ inch long with a pale brown lustrous wing. The tree is a native of South-Eastern United States of America.

Regarding observations you could make on the growth of the trees from time to time that would be of value from a forestry standpoint, you are advised to write to the Secretary, Forestry Sub-Department, Executive Buildings, Brisbane.

Rural Topics

Chemurgy.

Boiled down, chemurgy means the bringing of industry together through the medium of chemistry.

Here is a recent example of what has been done through what is called the chemurgic movement in the United States. Before the war, America imported practically all its cigarette paper from France where it was made from linen rags. Linen, of course, is made from flax. The blocking of their French sources of supply by the war placed American cigarette manufacturers more or less in a cleft stick, so they set about looking for substitutes for the accepted raw material for cigarette paper making. A lot of flax is grown in the States, and as linen is made from flax, one large cigarette paper importer put the chemist on the job of finding out what could be done with flax fibre. The search for a linen rag substitute was successful, and before long a new industry was established with modern paper mills working round the clock.

The agricultural background of flax production was studied in various parts of the country, and it was found that flax straw could be made into top-grade cigarette paper, and, therefore, added as a new cash crop for farmers. This single enterprise now employs 900 people, and provides a striking illustration of farm chemurgy possibilities.

New Industrial Products from Farm Waste.

And talking of chemurgy—that is the practical co-operation of the farmer, the industrialist, and the man of science in finding new uses for surplus products or waste crop residues—this new branch of science is making great headway in the United States. New markets for farm surpluses are being established through applied industrial science, and these new discoveries are as yet only in their infancy, and they are certainly bound to be of benefit to the farmer.

For example, more than twenty-five important industrial products are now being made from cornstalks, including bedding for stock, building blocks, cellulose, charcoal, diabetic food, dynamite absorbent, guncotton, timber substitutes, oxalic acid, and wallboard.

How the Merino Breed of Sheep got its Name.

The question is often asked—How did the merino sheep get its name? Well, as far as we can find out, the term "merino" comes from the word "moedino," signifying wandering, and is the name of an Arab tribe who wandered from place to place in season with their flocks; and the more a sheep of this particular breed wanders about in quest of pasture, the better and more valuable is the fleece it grows. We usually give the credit for the virtues of the merino to France or Spain, forgetting that in the fourteenth century an English princess, Catherine of Lancaster, was engaged to the heir to the Castilian throne. The dower of a royal bride was a very important matter in those days, so the parents of the English girl, the royal bride to be, gave her as a wedding present a flock of sheep, and it was these sheep which, judiciously mated with the Spanish flocks, produced the now world-famous merino sheep.

The Goat Becomes Respectable.

It has taken a war with a possibility of invasion to give the goat its proper place in rural economy in Britain. We all know what the goat means to domestic menus in parts of Queensland—especially mining centres—where it is not always possible to keep cows.

A movement is growing in Britain to make the goat more popular as a milk and butter producer. For some years much interest has been taken in the keeping of certain noted goat breeds, and they have always formed a numerous, and in many respects, an interesting class at all the principal agricultural and stock shows in the United Kingdom, and the development of goat breeding from a milk-producing standpoint has resulted in some extraordinary milk yields being officially recorded. It is felt in Britain that small landholders might easily supplement their milk and butter requirements by the keeping of a goat whose cost of maintenance has proved to be negligible.

Driving Posts with Dynamite.

When we have to put a pile or a post in water or wet ground and a pile-driver is out of the question, we usually have to do a bit of hard thinking.

The Engineering Division of the United States Forest Service has worked out a new way of doing the job with dynamite. Dynamite, it has been found, can transmit a blow somewhat similar to the dropping of the "monkey" on a pile-driver. The post or pile is stood upright in the position in which it is required and braced in place—usually with a rope. The head of the post should be sawn off square, and then a heavy plate of steel put on top of it. To get the best results, the plate should be an inch to an inch and a-half thick. A stick of dynamite is placed on top of the plate and covered with mud, after the stick has been properly primed with a blasting cap and fuse. When the charge is exploded the force is transmitted to the plate which in turn transmits it to the pile. The pile is driven into the ground sometimes as deep as 14 inches, if the ground is soft. The procedure is repeated until penetration is reduced to an inch with every explosion. It is advisable to have about 4 feet extra length on the post, which can be sawn off after complete penetration is obtained.

There is nothing cheap about the method, especially if a pile drive can be conveniently rigged. Still, in some circumstances, it would be a good wrinkle to know. Of course, dynamite is tricky stuff to handle, and the utmost care should be applied to its use at any time. The experienced man would not want any advice on that score. The inexperienced man had better stick to the pile-driver—whether maul or "monkey."

The Biggest Bullock.

Here is something which will interest cattlemen:—

Recently a bullock was slaughtered at Southend, near London, weighing a ton and a quarter (2,800 lb.) after purchase by the British Government for £70. A claim is made that it was the biggest bullock in the world. That is true to-day, perhaps, but it does not compare with the historic "Durham Ox," which was calved in England in 1796, and which in its prime weighed a ton and a-half, or 3,360 lb. And that is a reminder of more recent instances of great weights of cattle. A Hereford bullock at Maidstone, in Kent, England, in about 1900, weighed 27¾ cwt. or 3,108 lb., while in 1915 a bullock known as Pat the Giant was slaughtered at Leeds and weighed even heavier than the famous "Durham Ox" at 3,558 lb., the carcase weight being 2,128 lb., or nearly 60 per cent. of the live weight. A bush-fed bullock that had never been handled, and which weighed 3,042 lb., was exhibited in Adelaide, South Australia, way back in 1894.

Many a big bullock has been bred in Queensland cattle country—the big-framed heavyweights that used to be yarded on Barambah and trucked at Goomeri will be remembered—and local records would be interesting.

A Word on Kudzu.

Kudzu, a plant which is interesting many Queensland farmers, has so far been rather difficult to grow in this State, although actually not very extensive trials have been made. Probably, if greater attention were given to it, it would grow well. Where it has been established in Queensland it has earned a high reputation as a fodder and as a soil-binder. American experience is entirely in its favour. Kudzu was brought to the United States about fifty years ago. Commonly called a "porch vine" it has been transformed into an important field crop in the south-eastern districts of the States. Since the beginning of erosion control over there, more than 40,000 acres have been planted with this once ornamental plant.

One important thing about Kudzu is that it is not seriously affected by drought. It will not grow well, however, on poorly-drained areas of acid soils or on low, boggy land. The plant sheds its leaves every year; it is a viney legume which grows rapidly during spring and summer. Kudzu restores fertility to the soil by adding nitrogen and organic matter, and it maintains a stand over long periods without yearly soil preparation and planting. It grows vigorously on eroded land after it is well established and with dense ground cover it protects the soil against beating rains. Not only is Kudzu suited especially for the reclamation of badly-washed slopes in cultivated paddocks, but it also produces a palatable hay and forage of excellent quality; its feeding value is said to be as high as lucerne and it produces heavier yields than most annual plants grown for hay. Kudzu can easily be got rid of; so there is no likelihood of its ever becoming a pest.

The War and Agriculture—What Americans Think About It.

A warning has been issued to the American nations—that is, of both North and South America—that they should start preparing now for adjustments and reconstruction that will follow the war.

The present European war is regarded as of such dimensions that it must be expected to have far-reaching consequences for the farmers of the countries of both North and South America.

On this subject it is well to remember what happened after the last war. Conditions then arose that were, to a great extent, the cause of the gravity of the agricultural depression which set in about twelve years ago. The danger of a similar development during and after the present war must, it is felt, be seriously considered. The dislocation of international trade in primary products that has so seriously affected agriculture the world over in recent years left agriculture in a weakened position at the outbreak of the present deplorable war.

While the war may lead to temporary advantages in certain branches of agriculture, its long-time effects may outweigh the monetary gains and will undoubtedly aggravate social and economic conditions in agriculture. Now is the time to plan post-war readjustments so that whatever happens we shall at least be prepared for altered conditions in international relations.

A Plan for Standardising Agriculture.

A move for the standardisation of Australian agriculture is gathering way in all the States. The need of planned development in the interests of national security is now generally recognised. For a standardised agriculture it is claimed that it would mean extended and better markets at home and abroad and it would be especially valuable to the primary industries supplying the export trade. A nation-wide standardisation plan, it is said, would ensure quality, uniformity of quality, and continuity of supplies.

Planned Production.

A lot has been said lately of planned production, and it is just as well for us not to lose sight of its necessity. There is not the slightest doubt that all the wool, butter, bacon, meat, and other foodstuffs that we can produce will be wanted during the next phases of the war. The facts of the position are as plain as a rate notice. Production has to be maintained and extended at the greatest possible pitch of efficiency. Whatever may be the future policy, it should be possible for us to assess the export requirements of Britain and the facilities for production in this country. The object, as in every other industry, should not be profits, but the greatest benefit to the Empire effort.

In this, as in every other endeavour, our watchword is "All in."

A Word for Old "Bluey."

As every bushman knows the working dog is one of the best helps for anyone looking after stock, whether it be on the station, farm, or stock route.

It is a peculiar thing, but all the most successful dog men are quiet chaps who never get hot, bothered, or bustled when working a dog. They look after their dogs, feed them well, talk to them when they think they need a little attenution—and what dog does not? Lots of them who make their living droving, as well as otherwise working stock, too often neglect to give their dogs a fair spin. How often have stockmen been seen to starve their dogs and then expect them to turn out day after day, mustering and yarding sheep at shearing time, or dipping time, with scarcely a decent feed! No dog can work properly without feeding; the dog that is underfed never has the strength to see the day out at top speed—the stamina isn't there.

Most drovers look after their dogs well, knowing well that half the trouble with dogs will disappear with good feeding. If meat is scarce bread dipped in fat will do for a day or two. And then as to treatment: We all know stockmen who have never given their dogs a hiding in their lives, yet do some amazing things with them when working stock in the paddock or along the road, and it has been done just through kindness and keeping their dogs fit and in good spirits.

To see a good dog at work among stock is a delight; so let us pay for it with a pat on the head for "Bluey" or "Scotty"—and a "banjo" of mutton.

Harmony in the Cowbail.

Believers in the efficacy of musical milking have made another convert. Here is what a farmer writes to *The New Zealand Farmer Weekly*:—

"I used to regard this musical milking theory as almost as much as a fairy story as the good old-time theory about running a billy goat with a dairy herd if you wished to avoid calving troubles. I have found so many practical dairy farmers with radios installed in their milking sheds in recent years, however, that I have come to appreciate that it must be a sound practice. One farmer in a neighbouring district even went as far as to assure me that if the radio were switched off for any reason his cows would miss it and start to play up."

There is a suggestion in that as to how our budding Melbas may become immortal—in the cowbail.

Australian Timbers for War Industries.

The value of Australian timbers is being demonstrated by increasing use in war industries. The milling industry alone produces timber worth about £7,000,000 per annum in peace time, and this is the raw material for industries, products of which are worth many times this sum in war time.

The housing of the troops in camps consumes enormous quantities of timber in the structure of huts. Army transport wagons of all types, artillery wheels, construction of air raid shelters, and numerous other war activities all need timber in great variety and in large quantities.

Rifle stocks alone need an enormous quantity of timber. At one time, walnut was considered the only timber for this purpose, but Queensland maple and scented satinwood of New South Wales have both proved to be quite satisfactory for this purpose.

Again, all munitions have to be transported in boxes, and there is a large factory manufacturing tens of thousands of cases of all shapes, sizes, and colours to meet this army need.

Switching over from peace to war conditions has brought numerous problems in the need to replace imported timbers for special purposes by local timbers, where this is possible. When walnut became scarce, Australia had to find another timber, and, as has been stated, two such timbers have been found suitable.

In aircraft construction, spruce has been practically the only timber used for solid members and birch for the plywood parts. Research at the Division of Forests Products of the Council for Scientific and Industrial Research has already found substitutes for both these timbers, and this work is proceeding at high pressure to find still others so as to ensure plentiful supplies for all aircraft needs. A greatly increased staff is at work two shifts a day to provide all the data necessary for aircraft designers.

It will be realised that the greatest care has to be taken in such work. Tens of thousands of tests are being carried out, and they cover a great number of specimens from a large number of trees for each species tried. Aircraft designers need the fullest data before they dare substitute one timber for another. There are already sufficient data to enable the specifications to be written so that the specially selected timbers which have so far passed the tests can be purchased. A fully equipped small-scale factory has been built to enable the Division to cut its own veneers and make these into plywood for testing.

Another direction in which the Division's work has been carried out is the fireproofing of timbers for naval construction and for certain types of munition boxes. A plant designed by the Division is being erected in Sydney for this purpose.

Innumerable industries all over Australia find themselves in difficulties, because of inability to obtain timbers which they have been used to employ. Many of these have undertaken contracts in connection with munitions supply. They naturally turn to the Division for help in obtaining substitutes, and this frequently needs considerable experimental work.

Timber for match splints, golf heads, egg boxes, tennis racquets, boat decking, wheels for spinning mills, and scores of other purposes all need to be investigated. Very rarely, indeed, does it happen that a suitable Australian substitute cannot be found, although at times it is not easy to find a ready supply for special requirements.

Behind the brief reports setting out in practical terms the results which can be put into immediate use in industry lies an enormous amount of patient investigation by a staff of over 100 trained workers, some of whom are engaged in the more scientific inquiries and others in translating the results into actual factory practice.

Farm Notes

DECEMBER.

EARLY-SOWN crops of sweet sorghums, Sudan grass, millet, and maize, intended for fodder purposes, will now be in an advanced stage of growth where seasonal conditions have been favourable. Every effort should be made, where practicable, to conserve any surplus growth in the form of silage, hay, or stover. Trench, pit, or stack silage is recommended as economical and profitable means of conservation where an overhead concrete silo is not available. However, it is the autumn-harvested crops which usually provide the greatest bulk of conserved fodder, so December sowings of suitable bulky summer fodder crops are best for that purpose.

In localities where lucerne does not make satisfactory growth, the cowpea will often provide an alternative protein-rich fodder, besides being a valuable rotation crop of benefit to the soil. Cattle will not take readily to green cowpea, preferring the fodder in an advanced stage of growth, but once accustomed to it they will graze freely on it.

Sowings of main-crop maize will be continued during the month where conditions are suitable, utilising late-maturing varieties such as Improved Yellow Dent; but in districts where early frosts are experienced, the mid-season or early varieties are preferable.

Buckwheat is recommended as an early maturing alternative fodder crop, or as green manure where it is desired to plough under within six to eight weeks. Besides being a good fodder, buckwheat is valued as a bee plant, while the seed makes excellent poultry feed. Wheat-harvesting will be practically finished this month. Growers are, therefore, advised to give the land a preliminary working immediately after the burning or grazing of stubble in order to conserve succeeding summer rains. Even where the land is too hard for adequate ploughing, a light working with disc cultivator or sundercut will be found very beneficial.

Experience in recent years has proved that adequately summer-fallowed land invariably produces profitable yields.

December is usually a busy month, because of successive sowings of fodder and grain crops and the scarifying of row crops already established.

THE CALL FOR MORE MIXED FARMING.

The necessity of meeting war needs and adjusting our systems of farming to changing conditions—marketing and otherwise—has strengthened a call for the consideration of the advantages of mixed farming. It is extremely hard to forecast what will be the greatest needs of the British Commonwealth, even in a few months' time, but it looks likely that animal products—butter and cheese, bacon and eggs, and, possibly, beef and mutton—will be the most valuable contribution to the Empire effort.

The informed view is that those farmers who are looking for some direction as the best way to use their land would find it most economic and of the greatest service to continue along the lines of production for which they are sure their land is most suitable, and to increase their proportion of live stock. Mixed farming is actually the middle course in present circumstances, and through practising it we avoid to some extent—possibly to a large extent—the risk of either over- or under-production of any specific commodity.

Even before the war broke out there was a definite trend to more mixed farming. Because of low prices, specialised wheat production—particularly in the other States of the Commonwealth—has become precarious economically, and now grain growers, who were one-crop men, are now turning to sheep and are finding out the value of wheat and sheep as a profitable combination.

In Queensland mixed farming is probably more generally practised—proportionately anyhow—but circumstances may compel a much wider extension of the system.

As has been said frequently that after the war there is certain to be intensified competition in world markets, which will compel restriction of Australian exports to products of uniformly high quality with guaranteed continuity of supply. For one thing, that means, of course, general conservation of fodder, for if our animal products are to be of the desired quality fodder must be kept up to producing stock.

Orchard Notes

DECEMBER.

THE COASTAL DISTRICTS.

PLANTING of pineapples and bananas may be continued, taking care that the ground is properly prepared and suckers carefully selected, as advised previously in these notes. Keep the plantations well worked and free from weeds of all kinds, especially if the season is dry. New plantations require constant attention, in order to give young plants every chance to get a good start; if checked when young, they take a long time to recover and consequently the fruiting period is considerably retarded.

Citrus orchards require constant attention; the land should be kept well worked and all weed growth destroyed. Spraying for scale insects should be done where necessary.

Early grapes will be ready for cutting. Handle carefully, and get them on to the market in the best possible condition. A bunch with the bloom on and every berry perfect will always look and sell well, even on a full market, when crushed and ill-packed lines are hard to quit.

Peaches, plums, papaws, and lemons will be in season during the month.

Examine potatoes and tomatoes for Irish blight, and melons and kindred plants for downy and powdery mildew. Use bordeaux or burgundy mixture for Irish blight and downy mildew and sulphur dust or lime sulphur spray for powdery mildew.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

EARLY-ripening apples, plums, apricots, peaches, and nectarines will be ready for marketing during the month. They are unsatisfactory lines to handle. The season of any particular variety is so short that it must be marketed and consumed as quickly as possible. All early ripening deciduous fruits are poor carriers and bad keepers, as their flesh is soft and watery, deficient in firmness and sugar, and cannot, therefore, be sent to any distant market. Early ripening fruits should be carefully graded for size and quality, handled and packed with great care, and nothing but choice fruit sent to market.

Orchards and vineyards should be kept in a state of perfect tilth, especially if the weather is dry, so as to retain the moisture necessary for the development of the later-ripening fruits. Where citrus fruits are grown, an irrigation should be given during the month if water is available for this purpose, unless, of course, there is a good fall of rain in the meantime.

Codling moth and fruit-fly regulations should be observed strictly in order to keep these pests under control, otherwise the later-ripening fruits are likely to be attacked severely by these pests.

AN INTERESTING ORCHARD TOOL.

A three-row disc furrower, fitted with a power lift, is now in use in Californian orchards. The double discs throw the loose earth to either side, making the furrow in the firm soil deeper than the usual furrow. It is said that this practice helps to prevent the small particles from settling to the lower limits of cultivation, rendering a hard "pan" under the ploughed surface of the soil less likely.

A feature of this new implement is the direct vertical lift. Ratchet bars engage the idler wheels, thereby making a quick and positive lift. A similar tool equipped with skids, which trail in furrows to prevent sliding when furrows are being made on hillside orchards, has also been devised.

Plate 125.

AMID PLEASANT SURROUNDINGS.—Cane farmers listening to a lecturer at a field day at the Meringa Sugar Experiment Station.

Plate 126.

BRAZILIAN LUCERNE, SHOWING PROMISE AS A PASTURE LEGUME.

Maternal and Child Welfare.

Under this heading is issued each month an article, supplied by the Department of Health and Home Affairs Maternal and Child Welfare Service, dealing with the welfare and care of mother and child.

THE CARE OF YOUR CHILD.

VOMITING AND ITS CAUSES.

Last month in our article on "Your Child and the Approach of Summer" we mentioned the danger of the onset of diarrhœa. We dealt with its causes, prevention, and treatment. This month we are going to speak to you about vomiting.

ONSET OF AN ILLNESS.

Vomiting is a common symptom of illness in childhood. It may occur at the onset of any fever, such as measles or even the common feverish cold.

POSSETTING.

By this is meant the returning of a little of the food without effort shortly after feeding. This occurs in a normal healthy breast-fed baby and means that the amount of food taken is slightly in excess of the baby's needs. It may be due to the expulsion of a little "wind" resulting from the air which baby has swallowed while feeding. Possetting is not really vomiting. Babies who are possetting are often thriving well.

VOMITING DUE TO FAULTY METHODS OF FEEDING.

Over-feeding..

In vomiting, the contents of the stomach are expelled with some force. While in natural feeding the amount taken at each feed by the normal baby varies, the child who persistently overfeeds is liable to suffer from a digestive upset sooner or later, particularly during the hot weather. The greedy baby may take not only more than he needs, but he may gulp his food. In some cases the stomach is unable to deal with the excess, its walls become irritated, and vomiting occurs. Once an upset of this sort occurs the stomach may take a little while to recover, boiled water may require to be substituted for one or two feeds and less food will

require to be given for a time. Signs of overfeeding may be evident before an actual upset occurs. If the baby seems uncomfortable, is gaining weight rapidly, and is passing large, firm curds in the motions, often accompanied by slime, it is well to shorten his feeds at least temporarily. If you are in doubt seek the advice of a Child Welfare nurse.

In regard to the artificially fed baby, the hole in the teat may be too large allowing the child to feed too quickly. In some cases, even when a teat with small holes is being used, a greedy child may get his food too quickly. In the early months a baby often requires twenty minutes to take his food, as he becomes older and stronger he may get what he needs in half this time.

Under-feeding.

Vomiting occasionally occurs as the result of underfeeding. The child is hungry, and in his attempts to satisfy himself he sucks in air. This may be expelled later with some food. In this case although the motions may be frequent they are very small.

Sudden Change of Food.

Changing food suddenly may cause vomiting whether it be changing from one food to another or from one strength to another. All changes should be made gradually.

Faulty Composition of Food.

There may be excess of one or other of the food constituents. Excess of fat in the food of the artificially fed infant may cause vomiting. Excess of sugar also may cause vomiting, but more frequently it causes diarrhœa.

Feeding with Stale or Sour Milk.

Milk which is slightly sour will readily cause vomiting in an infant. Souring of milk is brought about by the action of germs which produce lactic acid. These develop more rapidly in hot weather. They are killed by boiling, therefore boiled milk does not sour. Boiled milk may be contaminated by disease producing germs, hence, the importance of exercising the care about which we told you in our article last month.

Vomiting Due to Infection.

Vomiting may occur as the result of the child's swallowing milk or other food which has become infected by germs of disease, such as in dysentry and other forms of infectious diarrhœa.

Careless Handling of the Child.

Vomiting may be caused by careless handling, such as jogging or patting the baby after his meal. After sitting him up in order to allow him to "bring up the wind," he should be allowed to lie quietly after feeding.

Vomiting Due to Over-excitability.

This type of vomiting usually occurs in the first few months of life in infants who are in a state of nervous irritability and unrest. The infant is usually thin, over-exciteable, and precocious. He cries a great deal and sleeps less and more lightly than the average child. The mother herself is often "highly strung," but if she is not she tends to become hypersensitive, worried, and irritable as the result of trying to manage this type of child. Vomiting of this kind occurs irrespective of the kind of food and is often seen in breast-fed infants. It may occur after every meal, and is prone to follow any nervous upset. Owing to the mother's state of anxiety and worry, her milk supply may be diminished and the infant may fail to gain weight. The motions appear normal, but they may be frequent and small if the child is underfed. In managing a child of this sort, attention must be directed not so much to the vomiting as to the underlying nervous state. Any form of excitement must be avoided. The child should be fed in a quiet room away from others in the household. Sometimes it is advisable to darken the room. It may be necessary to compose the child before feeding is commenced. Breast feeding should be continued. As the child's power of concentration and sustained effort is diminished, it may be advisable in some cases to give shorter feeds more frequently, say, at two-hourly intervals. It is the amount of food which is retained which is important, not the amount taken. There is no need for anxiety while the infant is gaining weight. The mother should not undertake the

weighing herself, but should attend, if possible, a Child Welfare Centre, or obtain the services of a "welfare trained nurse" for her own sake, as well as for the sake of the baby. With patience and skilled management the infant will eventually recover. His nervous, over-excitable state may require careful handling for a long time after the vomiting ceases.

Projectile Vomiting.

There is a type of vomiting which occurs most frequently in a baby boy when he is about three to six weeks old. It is due to an obstruction to the passage of the stomach contents into the bowel. Often the child is breast-fed, and the vomiting sets in suddenly without other signs of illness. The vomiting in this case is of a particular character. The vomited material is expelled with considerable force and may come through the child's nostrils. If he is lying on his back it may lie in a pool beside his head, or if his face is turned to one side it may be projected on to the floor some feet away. The nature of the vomiting is usually sufficiently alarming to make a mother seek medical advice. We recommend her not to delay, for by early treatment the condition may be prevented from developing into a serious one.

You may obtain information on all matters concerning infant and child welfare by visiting the nearest Maternal and Child Welfare Centre (Baby Clinic), or by writing to the Sister in Charge, or by communicating direct with the Maternal and Child Welfare Centre (Baby Clinic), Alfred street, Fortitude Valley, N.1, Brisbane.

IN THE FARM KITCHEN.

PEACHES FROM STANTHORPE.

Peaches may be delicious additions to any meal, and here are some new ways of serving them:—

Peach Junket.

Take 3 ripe peaches, 1 quart milk, ¼ lb. sugar, 1 junket tablet.

Soak and remove the skins from the peaches and place them in a glass dish. Dissolve a junket tablet in a tablespoonful of cold water. Put a few tablespoonfuls of milk in a saucepan, add the sugar, and stir till dissolved. Add the remainder of the milk, and heat till blood warm—no more. Take at once from the fire, add the dissolved tablet, and pour quickly over the fruit. Do not disturb till the milk has set, then put in a cool place. Serve with custard and whipped cream heaped on top. Ripe yellow peaches (slipstone) should be used for this dessert.

Peach Blancmange.

Take 3 oz. castor sugar, ½ pint milk, ½ lemon, ½ oz. gelatine, cooked peaches.

Rub sufficient peaches through a sieve to give about half a pint of pulp. Dissolve the gelatine in a saucepan with half a gill of peach syrup and strain it into the peach pulp. Stir in the juice of the lemon, then add the milk very carefully and sugar to taste. Leave until beginning to set, when stir up and pour into a wet border mould to set. Turn out, heap the remainder of the peaches in the centre, and pour the syrup round. A little cochineal may be added to the syrup before being poured round the mould.

Peach Souffle Pudding.

Take 1 tin peaches, 1 pint milk, 1 heaped tablespoonful custard powder, 2 eggs, about 12 almonds, 1½ to 2 tablespoonfuls sugar, flavouring.

Mix the custard powder to a smooth paste with some of the milk. Boil the remainder and stir into it. Return to the pan and boil for two or three minutes, keeping the mixture well stirred, then draw aside and cool slightly. Drain the syrup from the peaches and cut six halves into small pieces, reserving half a peach. Blanch and cut up the almonds, and add them to the custard, with the sugar, peaches, and half a gill of the syrup. Separate the eggs, beat up the yolks, and stir them in. Flavour with a few drops of flavouring, then whisk egg-whites to a stiff froth and fold in lightly. Turn into a piedish, dredge the top of the mixture with castor sugar, and bake slowly for about forty minutes, being careful not to let it boil. Serve cold with cream and place half a peach in the centre.

Peach Gateau.

Take 3 eggs, 1 pint milk, vanilla flavouring, 1 tablespoonful sugar, 2 tablespoonsful desiccated coconut, 4 sponge cakes, peaches.

Beat the eggs, and add the heated milk, sugar, coconut, and crumbled sponge cakes and a few drops of vanilla flavouring. Turn into a buttered mould and cover for about thirty to forty-five minutes, or until set, or else bake gently until set. When cold, turn out, pour peach syrup round, and heap some peaches on top. Serve with cream.

Empress Peaches.

Take 4 oz. rice, 4 fresh peaches, 2 oz. castor sugar, 4 spoonfuls red currant jelly, 1½ pints milk, vanilla flavouring.

Cook the rice in the milk in a double boiler, adding the sugar till the rice is soft and the milk has been absorbed; then add flavouring to taste. Peel and halve the peaches, remove the stones, and place the fruit in a baking tin. Cook for two or three minutes in the oven. Heap the rice in a hot dish and arrange the cooked peaches on top. Put the jelly in the baking tin, and, when it is dissolved, pour it over the peaches. This sweet can be served hot or cold.

THE PICNIC SANDWICH.

The first secret of a good sandwich lies in the bread. Any kind can be used that combines well with the desired filling—white, brown, wholemeal, raisin, or nut—but it should be of close, firm texture, and one day old to give the best results.

The second secret of a good sandwich lies in the treatment of the butter. It should always be creamed before spreading.

When your sandwiches are made, the problem of keeping them moist presents itself. Nothing is more disappointing than a dry sandwich. If for picnic use, each should be wrapped in waxed paper. Moistness is more assured if wet butter muslin is wrapped about the whole pile of paper-wrapped sandwiches, and then a thick wrapping of paper tied in place.

Of all sandwiches, those made with chicken are usually considered the most delectable. Chicken lends itself best to combination wtih other delicately flavoured foods, and to use with white bread.

Creamed Chicken Sandwich.

Chop the chicken (a small amount will go a long way), add a little chopped parsley and celery salt, add chopped olives, and mix with a small amount of white sauce. Cool and spread on buttered wholemeal bread.

Chicken and Almond Sandwich.

Mix one cupful chopped chicken and one cupful blanched almonds (chopped).

Blend them with eight tablespoonfuls cream and season with three-fourths of a teaspoonful salt, one quarter teaspoonful paprika, and a dash of pepper. Use with either white or wholemeal bread.

Chicken and Nut Sandwich.

Take 1 cupful cold chicken, ¼ cupful pecan nut meats, ½ cupful celery mayonnaise.

Chop the chicken and nuts finely and add the celery, cut in thin slices. Mix with the dressing and spread on rounds or fingers of unbuttered bread, laying a lettuce leaf on the mixture. Top with a buttered round or finger.

Egg Yolk Sandwich.

Rub the yolks of hard-boiled eggs to a smooth paste, adding melted butter, salt, and pepper, and spread on wholemeal or white bread. To vary, add a little chopped celery.

Devilled Egg Sandwich.

Boil three eggs hard; cool, peel, and halve. Mash the yolks with two tablespoonfuls soft butter, half a tablespoonful French dressing, half a teaspoonful Worcester sauce, and half a teaspoonful onion juice.

Work in one teaspoonful chopped olives. Spread between lightly-buttered slices of white bread.

Egg White Sandwich.

Chop the whites of the eggs used in devilled egg sandwiches fine, and add pepper, a minced gherkin, and enough mayonnaise to make a spreading paste. Use between wholemeal bread.

Anchovy and Cheese Sandwich.

Mix one tablespoonful anchovy paste and one cream cheese, a teaspoonful of olive oil, and a teaspoonful of horseradish. Spread between slices of brown bread.

Fried Oyster Sandwich.

Place two fried oysters on a leaf of lettuce and lay between slices of thinly buttered bread. These are good cold. Boiled salad dressing may be added if desired. Thick creamed oysters may also be used in a sandwich.

Cheese and Mint Sandwich.

Mash cream cheese to a paste with a little cream, adding a pinch of salt. Put a layer on bottom slice of bread and a layer of mint jelly over it. Bread should be cut thin and buttered. Cover with another slice. Cut in fingers.

Devilled Cheese Sandwich.

Take ¼ cupful grated cheese, 1½ tablespoonfuls devilled ham, 1 tablespoonful cream, 4 slices white bread, Worcester sauce to taste.

Mix all to a smooth paste and spread between thin slices of buttered bread.

Banana and Lettuce Sandwich.

Cut slightly stale white bread thin and spread lightly with butter. Mix shredded lettuce with mayonnaise and spread on one slice of bread, putting thinly-sliced bananas on top of the lettuce. Cover with another slice of bread and cut into triangles.

Banana and Pineapple Sandwich.

Mix equal parts, about half a cupful each, of banana pulp and finely-chopped pineapple with two tablespoonfuls honey, a little grape-juice, and the juice of one lemon. Cut bread thin.

Fig Rolls.

Put 3 figs through a mincer, add 2 tablespoonfuls chopped nuts and enough orange marmalade to spread. Remove crusts from soft fresh bread and cut in thick slices, using a very sharp knife. Spread with creamed butter, then with fig mixture, and roll. Place close together and cover with a damp cloth until rolls stay in shape, or fasten with toothpick.

Nut Bread Sandwich.

Cream orange or lemon juice into butter and spread on nut bread. Sprinkle on a little sugar.

Peach and Cheese Sandwich.

Take 2 cupfuls peaches, ½ cupful sugar, cream cheese, salt, cream.

Cut the peaches very fine and add sugar. Mash a fresh cream cheese, adding salt and enough cream to soften. Mix with peaches and use as sandwich filling. Brush the top of each sandwich with cream and sprinkle with chopped salted almonds.

Open Tomato Sandwich.

Put a thin slice of firm tomato on a slightly larger round of buttered white bread. Sprinkle with salt and place a little mayonnaise in the centre. Put a slice of stuffed olive on the mayonnaise.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1940 AND 1939, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of years' records.	Sept., 1940.	Sept., 1939.		Sept.	No. of years' records.	Sept., 1940.	Sept., 1939.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	0·73	39	0·34	0·41	Gatton College	1·49	41	0·69	0·14
Cairns	1·65	58	0·38	0·58	Gayndah	1·52	69	1·11	0·05
Cardwell	1·50	68	0·49	0·28	Gympie	2·07	70	1·88	0·05
Cooktown	0·55	64	0·83	0·30	Kilkivan	1·64	61	0·96	..
Herberton	0·54	54	0·20	..	Maryborough	1·88	69	1·39	..
Ingham	1·55	48	0·15	0·05	Nambour	2·40	44	0·31	0·50
Innisfail	3·52	59	1·11	3·69	Nanango	1·77	58	0·91	0·16
Mossman Mill	1·64	27	0·63	0·91	Rockhampton	1·26	69	0·28	..
Townsville	0·47	23	0·02	..	Woodford	2·09	53	1·29	0·42
Central Coast.					*Central Highlands.*				
Ayr	1·26	53	..	..	Clermont	0·97	69	0·86	..
Bowen	0·78	69	..	..	Gindie	1·01	41	..	..
Charters Towers	0·77	58	0·01	..	Springsure	1·26	71	0·82	..
Mackay P.O.	1·63	69	0·04	0·34	*Darling Downs.*				
Mackay Sugar Experiment Station	1·41	43	0·08	0·07	Dalby	1·64	70	1·53	0·01
Proserpine	1·99	37	0·32	0·38	Emu Vale	1·71	44	0·83	0·54
St. Lawrence	1·22	69	..	..	Hermitage	1·54	33	..	..
South Coast.					Jimbour	1·42	52	1·50	..
					Miles	1·31	55	0·92	0·07
Biggenden	1·47	41	0·27	..	Stanthorpe	2·26	67	1·09	1·17
Bundaberg	1·52	57	0·55	0·11	Toowoomba	2·06	68	0·96	0·14
Brisbane	1·97	88	0·75	0·45	Warwick	1·80	75	1·22	0·48
Caboolture	1·76	53	0·63	..	*Maranoa.*				
Childers	1·71	45	0·42	..					
Crohamhurst	2·61	47	0·42	0·35	Bungeworgorai	0·90	26	0·27	..
Esk	2·03	53	0·40	0·27	Roma	1·38	66	0·35	..

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—SEPTEMBER, 1940.

COMPILED FROM TELEGRAPHIC REPORTS.

Divisions 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	30·04	80	69	82	21, 22, 23, 24, 30	60	10	83	3
Herberton	..	72	51	84	29	39	1	20	2
Rockhampton	30·14	81	58	91	28	51	3	28	3
Brisbane	30·17	75	55	82	28	49	6	75	4
Darling Downs.									
Dalby	30·17	78	48	86	27	35	3	153	3
Stanthorpe	..	71	40	81	27	27	3	109	4
Toowoomba	..	71	49	81	27	42	4	96	5
Mid-Interior.									
Georgetown	30·05	89	59	95	27, 28	50	8	..	..
Longreach	30·11	87	54	96	27	42	1	..	..
Mitchell	30·14	79	45	91	27	34	15	31	5
Western.									
Burketown	30·06	87	61	94	17, 23, 28	53	2, 3	..	..
Boulia	30·07	86	55	98	26	46	1, 18, 30	..	..
Thargomindah	30·12	80	51	94	26	43	4, 14	..	..

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	November, 1940.		December, 1940.		MOONRISE. Nov., 1940.	Dec. 1940.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	5·0	6·11	4·49	6·34	6·0	6·29
2	..	6·11	4·49	6·35	6·53	7·27
3	..	6·13	4·48	6·35	7·49	8·25
4	4·59	6·14	4·48	6·36	8·46	9·22
5	4·59	6·14	4·48	6·37	9·43	10·17
6	4·58	6·14	4·48	6·38	10·40	11·11
						p.m.
7	4·57	6·15	4·49	6·39	11·34	12·2
					p.m.	
8	4·56	6·15	4·49	6·39	12·27	12.53
9	4·55	6·16	4·49	6·40	1·19	1.44
10	4.55	6·17	4·49	6·41	2·10	2·35
11	4·55	6·18	4·50	6·41	3·0	3·27
12	4·54	6·19	4·50	6·42	3·51	4·18
13	4·53	6·19	4·50	6·43	4·42	5·11
14	4·53	6·20	4·50	6·44	5·33	6·4
15	4·52	6·21	4·51	6·44	6·26	6·56
16	4·52	6·22	4·51	6·44	7·18	7·47
17	4·52	6·23	4·51	6·45	8·10	8·35
18	4·51	6·24	4·52	6·46	9·1	9·21
19	4·51	6·25	4·52	6·46	9·50	10·5
20	4·51	6.25	4·53	6·47	10·37	10·47
21	4·50	6·26	4·53	6·48	11·21	11·28
22	4·50	6·27	4·54	6·48	..	..
					a.m.	a.m.
23	4·50	6·28	4·54	6·48	12·4	12·9
24	4·50	6·28	4·55	6·49	12·47	12·52
25	4·49	6·29	4·55	6·50	1.28	1·37
26	4·49	6·29	4·56	6·50	2·11	2·26
27	4·49	6·30	4·56	6·50	2·57	3·17
28	4·49	6·31	4·57	6·51	3.45	4·12
29	4·49	6·32	4·57	6·51	4.36	5·10
30	4·48	6·33	4·58	6·51	5·31	6·8
31			4·59	6·51		7.7

Phases of the Moon, Occultations, &c.

7th	Nov.	☽ First Quarter	7 8	a.m.
15th	,,	○ Full Moon	12 23	p.m.
23rd	,,	☾ Last Quarter	2 36	a.m.
29th	,,	● New Moon	6 42	p.m.

Perigee, 27th November, at 10.0 p.m.
Apogee, 12th November, at 2.0 a.m.

Jupiter and Saturn passed from the morning to the evening sky in August. Since then the brilliant planet with the smaller companion has attracted attention. Both planets rise earlier each evening until on 3rd November they rise about 6 p.m., climbing the eastern sky until at midnight they are in the meridian. This opposition to the sun and the triple conjunction of Jupiter and Saturn which keeps them together for eight months (a phenomenon which has not occurred for more than two and a-half centuries) was mentioned on this page in August. On 3rd November the planets will be at their nearest to us, Jupiter being 371 million miles and Saturn being 763 million miles. Jupiter could hold 1,300 earths within its mighty globe, and Saturn 760. About this time they are much photographed by giant telescopes to see what changes have taken place since last opposition, for Jupiter is always enshrouded in turbulent belts of dense cloud. Looking down upon this chaotic scene are four pale-faced moons, which can be seen in small telescopes. There are cloud belts on Saturn also, but, owing to its great distance they are difficult to see. The system of flat rings, stretching like a mighty platform 48,500 miles wide round the planet, makes this world unique in the solar system.

Another distant planet, Uranus, is in opposition on 16th November. In order of distance from the sun Uranus is next to Saturn and at opposition will be 1,725 million miles distant. Uranus is not far from the Pleiades and for a short time when near opposition it comes within naked eyesight as a 6th magnitude star. The trouble is, however, to know which of the myriad tiny stars is Uranus.

Quite a rare event is a transit of Mercury. On the morning of 12th November, about ten minutes to seven, those with small telescopes, properly shaded with very dark glass, may see a tiny black dot on the edge of the sun. During the morning, this spot will appear to travel across the sun's disc, passing off before noon. This tiny spot is Mercury; its size will serve to show the huge proportions of the sun compared with a planet. A transit was last seen here in 1927, and the observer noted how much blacker and distinct was Mercury than sunspots visible at the time.

7th	Dec.	☽ First Quarter	2 1	a.m.
15th	,,	○ Full Moon	5 38	a.m.
22nd	,,	☾ Last Quarter	11 45	a.m.
29th	,,	● New Moon	6 56	a.m.

Apogee, 9th December, at 6.0 p.m.
Perigee, 25th December, at 4.0 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.