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Contents

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Event and Comment.

Problems of the Dairy Industry.

IN the course of his address at the inaugural meeting of the State Council of the Queensland Dairymen's Organization, the Minister for Agriculture and Stock (Hon. H. H. Collins) suggested that in seeking to improve the conditions of dairy production the lead given by the sugar industry might well be followed. Facing the problem of falling markets, that industry had investigated economics on the cane farm, the possibility of increasing the yield and quality of its product and the practicability of raising its standard of milling efficiency. As a consequence, cane farmers had increased their production in 20 years by over 50 per cent. and thus had been successful in cushioning the impact of declining sugar selling values. That achievement was a challenge to dairymen to do likewise, beginning with economic factors on the farm.

It had been said that the price of butter was the factor which alone could determine the future of the dairy industry. While that was a very important factor, it had to be remembered that a butter exporting country was usually compelled to meet a competitive market for the commodity which it shipped abroad. Under the butter stabilization scheme, Commonwealth-wide in its application, the Australian consumer paid an Australian price for Australian butter which was higher than the export price of pre-war days. So the limiting factor was the price on the export market and the quantity which could be sold in Australia, plus what the Australian consumer was prepared to pay. It could readily be seen that the price of butter if higher than the family man could afford to give would not help the dairy farmer. The fact that the trade in margarine had developed immensely and was competing with butter on overseas markets should not be overlooked. As a substitute

product, palatable and nutritious and largely derived from other Australian products—such as peanut oil, cottonseed oil, maize oil and animal fats—margarine would definitely remain on the competitive market.

Continuing, the Minister said that drought had to be regarded as part of normal conditions, and experiences in dairying and other districts at the present time provided an example of the enormous loss which occurred in consequence of its periodical visitation. Many other countries in the normal course of events had to provide both feed and housing for their stock for approximately one-third of every year. Surely under more genial climatic conditions it was not beyond the capacity of the dairy industry to provide against recurring dry seasons, and the Queensland Dairymen's Organisation, in co-operation with the Government, could assist in measures for offsetting drought effects. The fact that some farmers got through a protracted dry period without losing any stock showed that it could be done. Although farmers on the Darling Downs were going through a very serious drought, many had reserved stocks of hay, silage and grain to tide them over the period of seasonal severity.

One of the biggest issues in the industry was the pasture problem. Although considerable research work had been done, the problem of better pastures still remained. Soil, rainfall and climate determined what could be grown. As conditions in Queensland were so dissimilar from those of the southern States and of the colder dairying countries, in pasture research it was necessary to depend on our own resources rather than look to other States and countries for guidance.

Concluding, Mr. Collins reminded his audience that the Department he had been called upon to administer existed for the benefit of every primary industry associated with agriculture and stock and invited the dairymen's organization to use its services to the fullest extent. In the Department were men of the highest technical qualifications, skilled in all branches of husbandry and able and willing to co-operate with the farmer in the solution of his problems and assist him generally in the development of his industry.

The British Butter Market.

In his last review (April, 1946) of trade and marketing conditions in the United Kingdom, the Agent-General for Queensland (Mr. L. H. Pike) states that the Ministry for Food continues to control the importation and distribution of all butter supplies, and to regulate the prices and the rationing of the commodity to the consuming public. All imported butter is still marketed under what is termed a "National" brand or grade, irrespective of country of origin. The wholesale price of butter remains at from 159s. 4d. to 166s. 4d. per cwt., the retail price being fixed at 1s. 8d. per lb.

In so far as quality, packing and condition are concerned, Queensland butter has maintained a high standard, and reports to hand also indicate that the grading has been done very efficiently. High-grade margarine is still being used to supplement the butter ration.

"It is interesting to note," the Agent-General reports, "that whereas in 1938 the United Kingdom imported 475,890 tons of butter, this figure declined to 153,200 tons in 1944, and to 190,134 tons in 1945. The average consumption of butter in the United Kingdom for the period 1934-38 was 502,000 tons; this had dropped to 185,000 tons in 1945. On the other hand, the consumption of margarine increased for the same period from 183,000 tons to 435,000 tons."

Dairy Fodder Crops in East-Central Queensland.

O. L. HASSELL, Senior Adviser in Agriculture.

PREPARATION OF LAND.

WHETHER it is intended to plant winter or summer crops, too much stress cannot be laid on the early preparation of land in the Central district, on account of the erratic rainfall. It is a quite common sight in the district to see a winter or summer crop that has germinated well wilting at some stage of its growth, because of lack of subsoil moisture to carry it through until the next fall of rain occurs. The ground should be ploughed and left in the rough, in order to trap as much moisture as possible and also to prevent erosion. Just prior to planting the ground should again be ploughed and worked to a fine tilth, so as to have a well prepared bed to receive the seed. It is no more costly to prepare the land thoroughly than to make a hurried preparation just before planting. Neglect in this way will often mean the difference between a profitable and an unprofitable crop.

SUMMER CROPS.

Lucerne.

The most valuable of all leguminous crops, lucerne once established is a very hardy plant and will do reasonably well on a variety of soils. The most suitable soils on which to grow the crop are the deep alluvials, but there are a number of other types in the district which will produce payable crops, such as the brown clay loams of the softwood scrubs in the Callide and Dawson valleys, and the red clay loams of the Caves, Milman, Rossmoya and Mt. Larcom districts. If well established on these soils, lucerne will last for at least three years under grazing conditions. On the better types of soils the crop will last for six years under proper management.

Preparation of the Land.

Much greater care and attention must be given to the preparation of land for lucerne than for most other crops. Haphazard methods just prior to planting will only lead to disappointment and failure. The land should be well ploughed in the early summer months. On the coastal belt it is advisable to plant a cover crop such as cowpea or one of the millets. When this crop has reached its maximum growth of green material, it should be ploughed in and allowed to rot, and the soil left in a rough state until nearing planting

time, when it should be again ploughed and worked to a fine tilth in readiness for planting. On the drier inland areas it is preferable to bare fallow the land in order to save as much moisture as possible for the ensuing crop. Sheep or cattle may be used to keep down the weeds during the summer months and it may also be necessary to disc harrow the area several times. A final ploughing and harrowing of the land will be required before planting the seed. In order to obtain a firm seed-bed the ground should be rolled.

Planting.

The seed should be planted with the first rains in May or June. On non-irrigated areas 6 to 8 lb. seed per acre is found quite sufficient, while farmers on the irrigated areas around Rockhampton prefer to use from 10 to 15 lb. per acre. As a precaution it is advisable to inoculate the seed before planting. The inoculum with instructions as to its use can be obtained at a small charge from the Department of Agriculture and Stock, Brisbane. On small areas the seed may be sown broadcast. If this method is adopted, half the seed should be sown in one direction across the paddock and the other half at right angles across the first cast. The seed may be covered with a brush harrow or a set of light harrows turned upside down.

Handling the Crop.

The crop should be cut when the first flowers appear or when young shoots are noticed at the crown of the plant. When the crop is well established it should be harrowed after every cut to rid the field of foreign growths, such as grass and weeds. To a large extent the life of a lucerne stand will depend on how it is managed. Constant grazing of a lucerne field will shorten its life considerably.

Cowpea.

A leguminous plant and summer-growing annual, cowpea, although used mainly in Queensland as a green manure crop, is a valuable grazing and hay crop. It is an exceptionally hardy plant and will survive in a dry time when most other fodder crops fail. It should be more widely grown in the Central district, especially on areas not suited to lucerne growing, such as the drier inland areas. On areas as far west as Barcaldine good crops of cowpea have been grown. Cowpea does well on a variety of soils, provided they are well drained. As a grazing crop, stock do not care for it at first, but when forced to eat it they develop a taste for it.

Planting.

If required for hay the crop should be planted in the Central district in December or January, in order to allow the harvesting to take place after the end of the wet season. If required for grazing it may be planted with the first storms in October to November. It is very subject to frost. The seed may be planted in rows or broadcast. If planting in rows, the usual spacing is 30 to 36 inches between the rows, and from 8 to 10 lb. of seed per acre will be required. If planting broadcast, 15 lb. of seed per acre will be needed. With the smaller varieties of seed, such as Poona, a lesser amount of seed will be required. The crop takes from 4 to 4½ months to mature.

Varieties.

Poona pea is one of the most popular varieties in Queensland at the present time, on account of its hardiness and prolific growth. Clay and Black Mammoth are also used to some extent. At the present time the Department is trying out a hay type of crossbred cowpea, which if harvested at the correct stage of its growth may be cut with an ordinary mowing machine and raked with a hay rake.

Haymaking.

The cowpea crop should be cut when the pods have fully developed but before they commence to ripen. On account of the fleshy nature of the stems, the crop should be placed in small stooks after cutting and allowed to remain there until thoroughly dry before placing in a larger stack or shed. The hay is nutritious and is readily eaten by stock.

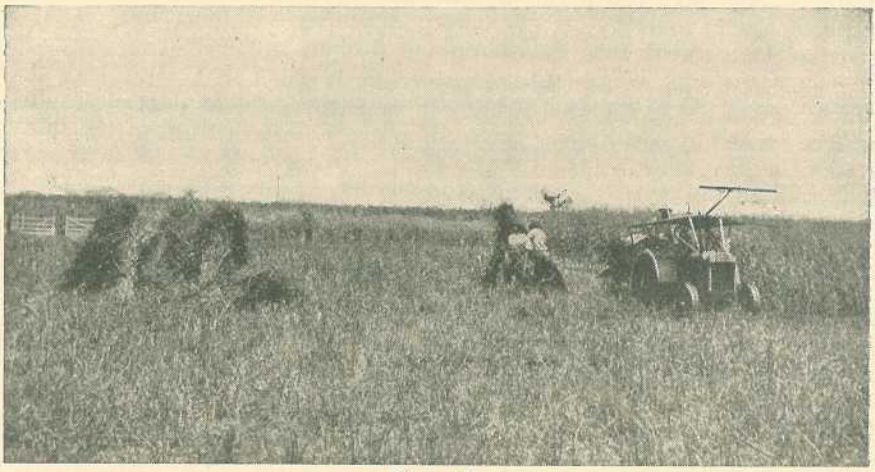

Plate 47.
HARVESTING SUDAN GRASS IN THE CENTRAL DISTRICT.

Sudan Grass.

Because of its ability to withstand long dry spells, Sudan grass is one of the most outstanding fodder crops grown in the Central district. Although the plant is an annual, crops have been known to last for two years during good seasons and mild winters. Sudan grass is mainly grown for grazing purposes, although it makes fair hay and a first class ensilage. It is most unfortunate that this valuable crop is liable to cause prussic acid poisoning during certain periods of its growth. After it has reached the flowering stage and when it has been made into hay it is generally considered safe as a stock food. However, as a grazing crop it should always be treated with caution. Hungry stock should never be turned into a paddock of Sudan grass, but should first be allowed some roughage. It is always a wise precaution to try out a few beasts of little value, before putting the entire herd into the paddock to graze.

The crop reaches maturity very quickly and will reach the flowering stage 8 to 10 weeks after the germination of the seed. Usually two or three cuts can be obtained before the winter. When harvesting for hay it should be cut in the flowering stage. In the Central district a fair average crop of hay in a normal season is 2 tons per acre. Sudan grass

may be sown broadcast, as a row crop, or planted through every grain run of the wheat drill. The last method is preferred, because it ensures a better germination and the production of a finer stemmed plant for grazing and hay making. If planted with the seed drill 10 to 12 lb. of seed per acre are sown; if broadcast, 20 lb. per acre; and if planted in drills 30 to 36 inches apart, 3 to 4 lb. per acre.

White Panicum.

Like most of the millet group, white panicum is a quick-growing hardy annual, and is suitable for grazing as well as haymaking and ensilage. Stock seem to be particularly fond of this crop and there is no risk of poisoning at any stage of its growth. To ensure a continuation of grazing, fortnightly plantings should be made from the commencement of the first storms. Plantings may be made to the end of December. Later sowing may result in short growth. White panicum takes about eight weeks to mature. If cut before reaching the flowering stage a short second growth may be secured for grazing purposes.

The best time to cut this crop for hay is when it has reached the flowering stage. If the seed is allowed to mature, a good deal of trouble will be caused by seedlings to succeeding crops. On account of the thick stalks the hay takes a long time to cure. On large areas the cutting is best carried out with the reaper and binder. The seed may be sown through the wheat drill at the rate of 10 to 15 lb. per acre; if broadcast, 20 lb. per acre.

Japanese Millet.

Japanese millet is a hardy annual, which is used fairly extensively in some districts for hay and grazing. It does not carry as much flag as some of the other millets and in some seasons in the Central district it flowers early. For these reasons it is not as popular as some of the other millets.

It should be cut at the flowering stage. Like white panicum, it is a free seeder. Sowings should be made before the end of December in order to get the best results, at the rate of 10 to 15lb. per acre if drilled and 20lb. if broadcast.

French Millet.

During the past few seasons a large area has been planted to this crop, mainly on account of the shortage of seed of other fodder crops. It makes a good hay and is suitable for grazing. It is not as suitable for use in the Central district as are Sudan grass, giant setaria or white panicum. In some seasons it is liable to seed early, and being a free seeder will give trouble in succeeding crops if allowed to mature. This crop takes from six to eight weeks to mature. The seed may be drilled in at the rate of 8 to 10lb. per acre and if broadcast at the rate of 10 to 15lb. per acre.

Giant Setaria.

This is a summer-growing annual and one of the most popular fodder crops grown in the Central district. It is an excellent grazing crop and makes a first class hay. The stem of this plant is finer than that of either Sudan grass or white panicum. It is perfectly safe to feed at any stage of its growth. Giant setaria matures in about eight weeks. Large areas are best harvested with the reaper and binder. Seed may be sown with the seed drill at the rate of 10 to 14lb. per acre and, if broadcast, at the rate of 20 lb. per acre.

Saccharine or Fodder Sorghums.

This group of sorghums is quite distinct from the grain sorghums on account of the ability of the group to yield a much greater bulk per acre and the sweet succulent nature of the stems. The saccharine sorghums are used widely throughout Queensland as a fodder crop or for making into ensilage. As with all sorghum varieties, there is always a risk of prussic acid poisoning and for this reason caution should be exercised in feeding them. It is not considered safe to feed this crop before it has reached the flowering stage.

Saccharine sorghums will withstand the long dry periods so often experienced in the Central district and will yield a bulk of succulent fodder when most other crops have failed. They are capable of yielding up to 20 tons of green fodder per acre under favourable conditions. Saccharine sorghum is one of the hardiest fodder crops grown in the Central district and takes from 3 to 4 months to mature.

Planting.

Most farmers in the district prefer to plant in drills 3 to 4 feet apart. On large areas an ordinary wheat drill may be used by blocking the drills back to the required width. Unless the ground is very free of weeds it is not wise to broadcast the seed on account of the inability to cultivate the crop. If planted in drills 4 to 5 lb. of seed per acre will be sufficient, and, if broadcast, 15 to 20 lb. will be required. To allow for winter feed the crop is usually planted in December or January.

Varieties.

Although a great number of varieties have been tried, there are only a few which have remained popular and of which it is possible to secure the seed. The most popular variety in the Central district is Saccaline. It will grow to a height of 10 feet under favourable conditions. It carries a large compact seed head, with a good quantity of grain. Other varieties which have shown promise in the district are Italian, White African and Sumac.

Maize.

This crop can well be included amongst the list of summer fodder crops worth planting in the Central district. Although it will not withstand the erratic seasons of the district as well as the members of the sorghum family, it will produce a large bulk of succulent fodder if produced under normal conditions or with the aid of irrigation. As a stock food, green maize is more valuable than the saccharine sorghums, as it has a higher nutritive ratio and there is also the fact that it can be grazed during any period of its growth without any risk of stock poisoning. Green maize makes excellent ensilage and the crop can also be grown and harvested as stover.

Planting.

When planting for fodder purposes it may be either planted in drills or broadcast. To assist in harvesting it is best planted in drills 4 ft. apart, for which purpose from 8 to 10 lb. of seed per acre will be required. If broadcast, 15 to 20 lb. of seed per acre are sown. Although broadcasting is not recommended as a general rule, it may be found more convenient to do so at certain times, especially on badly prepared rough ground or newly broken up pasture land.

Cow Cane.

Cane is a valuable bulk fodder, containing mainly carbohydrates. It produces a tremendous crop of a succulent sweet growth, which can always be used as a standby in a dry time, an acre or two of this heavy yielding fodder being invaluable on most farms to tide over until rain falls. Fed with a small amount of concentrates, cow cane will be found to be a very useful fodder. This crop is very subject to frost; although a light frost may scorch the tops, the main crop will remain unharmed.

Planting.

The crop is planted from October to March. Sets containing at least two eyes should be planted in drills 5 ft. apart and 18 inches apart in the drills. With this spacing, 5,800 sets per acre will be required. The usual method of planting is to run out a furrow and lay the cuttings along the bottom of the furrow, covering the plants at first with only half the soil removed. When the plants commence to grow the remainder of the soil may be moved into the furrow. If the plants are covered too deeply at first a poor strike may result.

Varieties.

For some years prior to the war cow cane varietal trials were carried out in the Central district by departmental officers. In these trials the variety China x Java yielded 48 tons per acre under non-irrigated conditions. This variety is now the most popular grown in certain parts of the district. Cuttings of this variety can generally be secured from farmers in the Mt. Larcom district at a reasonable rate. If it is intended to plant a few acres to this crop, the cheapest way is to purchase a few thousand cuttings, from which sufficient plants could be secured the following year to plant a number of acres.

Pumpkins.

During every hard winter farmers are looking for some bulk crop to back up the supply from the usually meagre dry pastures. For this reason and because of its heavy yield and keeping capacity, the pumpkin can be classed as a valuable fodder. The most suitable soil for this crop is a good friable loam with a high organic matter content. Large areas suitable to the growth of pumpkins can be found on the coastal and inland areas of the Central district. The crop is very subject to frost. Yields of up to 20 tons per acre are quite common in the district. The crop takes from five to six months to mature.

Planting.

No definite time can be set down for the planting of pumpkins, though July to December can generally be considered suitable months. November and December are most suitable for the dry inland areas, in order to avoid the sun scalding the fruit during the hot summer months. On the coastal areas where there is no danger of frosts, some farmers plant as late as March or April, although the results from such late plantings are usually light. Planting is in rows 8 to 10 ft. apart, with 4 ft. between the plants in the rows. It is usual to drop two or three seeds at each spacing. The amount of seed required per acre is approximately 2 lb.

Plate 48.
A Cattle Pumpkin Crop.

Harvesting and Storing.

During dry, cold winters pumpkins will last for many months in the field. However, if it is intended to store them for any length of time great care should be taken in handling them. The fruit should not be harvested until mature, and when doing so care must be taken not to break the stalk close to the fruit, as this will allow entry of decay organisms. It is not wise to stack in heaps, as heating is liable to occur; where possible, pumpkins should be stacked in single layers.

The most popular cattle pumpkins are the Mammoth Cattle, Mammoth Yellow and Mammoth Chili. Seed of these individual varieties is very seldom procurable, but is contained in mixed lots. On account of their ability to yield heavier and keep better, some farmers prefer to plant the table varieties such as the Queensland Blue, Crown and Triamble.

WINTER CROPS.

Wheat.

Preparation of Land.

The ground should be ploughed as soon as possible in the early summer months for wheat intended for winter fodder. The soil should be left in this rough state to take in all subsequent falls of rains. If weed growth becomes very troublesome it may be necessary to disc harrow the field on a number of occasions. Just prior to planting the soil should be worked to a fine tilth to receive the seed. At one time it was considered necessary to plough deeply for wheat, but experiments have proved otherwise. It is considered that the most suitable depth is in the vicinity of 5 inches. Deep ploughing for wheat will sometimes cause a failure of a crop, especially in a dry season.

Planting.

Planting is best done with a seed drill, as the seed is placed to the desired depth and into the moist soil. If broadcast, some of the seed will be on the dry surface soil until the next rains occur and that will mean an uneven and sometimes a faulty germination. When the usual planting rains are delayed it is quite a common practice to sow dry. This is often justified when the area is large and the length of time in sowing the seed is likely to be delayed. The depth of planting the grain will depend largely on the type of soil. A fair average depth would be from two to two and a-half inches. On loose soils the depth should be deeper than on clayey soils. It is usual to plant 45 lb. of seed per acre if drilled and 60 lb. if broadcast. Wheat planted from March to late June usually gives the best results.

Grazing.

Wheat should be lightly grazed when the plants are about 12 inches high. To prolong the length of grazing the crop should be alternately grazed, to allow the plants time to recuperate. Constant grazing will shorten the life of the plant.

Varieties.

The most suitable varieties to plant for grazing purposes in the Central district are Clarendon, Florence, Warren and Warchief.

Haymaking.

The best time to cut a wheat crop for hay is not later than eight days after flowering. The grain should not be allowed to mature, as at this stage the chaff is more indigestible. Harvesting is best done with the reaper and binder.

Oats.

The most popular winter grazing crop in Queensland is oats. If sown sufficiently early, three or four grazings can be obtained from a crop of oats assuming that favourable conditions are experienced. Because of its susceptibility to rust, the area planted for hay purposes in Queensland is small. To obtain the best results with a crop of oats, the ground should be early and well worked. Sowings may take place from February to June. As with other grain crops sowings are best made with the seed drill or combine. If it is necessary to sow broadcast, the seed should be scattered after a tine implement has been over the ground, leaving it slightly ridged. After sowing the seed a light harrowing will be sufficient to cover it. The sowing rate is 40 to 50 lb. per acre if drilled and 60 lb. per acre if broadcast.

Varieties.

Although Algerian, one of the slow-growing varieties, is grown largely for grazing in the southern part of the State, it has not proved to be of much value for this purpose in the Central district. Sunrise, Mulga, Belah and Buddah have given good results as grazing oats in this district. Of these, Belah has proved to be the most successful and has given the longest grazing.

Barley.

Compared with wheat or oats, barley has a rather poor rooting system and tends to pull up readily when grazed on loose soils. On the heavy types of soil it can be classed a good grazing fodder. It provides

early green feed and can be grazed off repeatedly. Any moderately rich soil is satisfactory for the crop. The most suitable period for planting is from March to June. May and June plantings are usually made for grain production. The rate of sowing when drilled ranges from 45 to 60 lb. per acre and when broadcast 75 lb. per acre. Cape and Skinless are considered the most suitable varieties for green feed purposes and of these the Skinless has given the best results in the Central district.

Rye.

Although very satisfactory crops of rye have been grown in the Central district, it is not a crop that is generally grown. It is more suitable for fodder production on poor soils than the other cereals. Although it can be used in a rotation with other crops, past experience has shown that it cannot be compared with wheat or oats as a winter grazing crop in the Central district. The best known varieties are Black Winter and Emerald. Rye should be sown at the rate of 40 lb. per acre if drilled and 50 lb. per acre if broadcast. The crop does not make a suitable hay, as the stalk is too hard.

Rape.

Rape is suitable for autumn sown pasturage. It is a very quick grower and will be fit for grazing in 10 to 12 weeks. It will stand grazing longer than the cereals. The crop may be planted in drills two to three feet apart or broadcast. If planting in drills 3 to 4 lb. of seed per acre will be sufficient and 8 lb. per acre if sown broadcast. The most suitable planting time is from March to May. Later plantings in the Central district will be subject to heavy aphis attack in the early spring months. Care should be taken in grazing stock on rape as it is liable to cause bloat and also to taint milk. It is an excellent grazing crop for pigs. The Dwarf Essex variety has given the best results.

Field Pea.

Field pea is a useful nutritious crop in certain coastal districts for the production of green feed and hay. For the successful production of this crop, a fairly high average winter rainfall is required, and for this reason it cannot be recommended as a fodder crop in the Central district. The crop is occasionally tried and at times with success. Pure stands of field pea are not recommended for grazing purposes or for hay; the usual practice is to plant it in conjunction with wheat or oats at the rate of 20 lb. of field pea seed to 40 lb. of wheat or oat seed per acre.

If the crop is grazed a good deal of waste occurs so that it is preferable to cut it and feed in the green state. Field pea makes an excellent hay, although it takes a long time to cure on account of the thick stems.

Mangold.

The roots of this crop produce a heavy crop, which is a valuable winter feed for farm stock in the Central district. Seed should be planted in drills three feet apart. The crop takes a lot of attention, so that large areas should not be attempted unless labour is available. A sowing rate of 5 to 7 lb. per acre is sufficient, and plants should be thinned out to 18 inches in the drill. It takes from six to seven months to mature. The crop will provide a heavy tonnage of succulent fodder during the usual dry months following the winter in the Central district. The most suitable varieties for this district are Yellow Globe and Mammoth Long Red.

Deterioration of Unlimed Vegetable Soils.

G. L. WILSON, Horticulture Branch.

ON intensively cultivated market-garden soils, where heavy fertilizing, irrigation and frequent cultivation are practised, the loss of lime and magnesia is often very considerable, and this loss is accentuated by the removal of an appreciable quantity of these materials in the heavy crops which are taken. Unless the loss of lime and magnesia is made good, marked decline in the productivity of the soil inevitably follows.

Adverse effects due to lack of these substances manifest themselves in a variety of ways. In the first place, the soil becomes more acid or less alkaline, which although not necessarily directly detrimental to the plants themselves in most Queensland vegetable soils is very harmful. In its more advanced stages the soil structure deteriorates to an extent which renders it impracticable to produce that good tilth so essential for small crops. In the second place, lime and magnesium are in themselves plant foods, and an adequate supply of each is essential for normal growth. On certain soil types, especially the red volcanic soils which constitute much of the market garden area in the Brisbane district, an important secondary effect is that the highly acid soil reacts with added phosphates to convert them rapidly to a form which is not available to the plants. The plants are then, in fact, starved of phosphate, resulting in a serious check to normal growth. This process is commonly known as phosphate fixation.

To prevent this soil deterioration, it is necessary then on many soils to include regular limings in the soil management programme. The amount required may be taken as about 30 cwt. to two tons every 2 to 3 years on typical red soils of the Brisbane district. Dolomite should be occasionally substituted for lime, as it supplies magnesia in addition to lime. The lime used must be very fine, otherwise it acts too slowly, and should be spread as uniformly as possible to permit thorough mixing with the soil. It is important that the lime (or dolomite) be uniformly distributed through the soil, otherwise localized patches with the bad effects of the lime deficiency remain. Furthermore, working in of the lime should precede the fertilizing of the land for subsequent crops by at least a few weeks. This allows the lime to neutralize the excess acidity of the soil. Simultaneous application of lime and fertilizer permits some of the phosphate to react with the as yet unneutralised

soil, while the lime itself reacts with the phosphate to form insoluble compounds, representing a further loss. It will be found that the best results are obtained if the liming is carried out prior to, or at the stage of, working in of green manure crops.

It should be noted that many of our best vegetable-growing soils are slightly acid, so that a certain degree of phosphate fixation occurs on them. The more completely the phosphatic fertilizer is distributed through the soil, the greater is the opportunity for this reaction to proceed. Accordingly, broadcasting fertilizer results in a considerable amount of waste, so that it is recommended that the fertilizer be applied in the drill prior to planting. This results in the extending plant roots reaching a concentrated source of phosphate early and, in addition, the fertilizer remains available to the plants for a long period because of the relatively slow loss by fixation. Furthermore, coarsely ground superphosphate is preferable to fine, because it does not mix thoroughly with the soil.

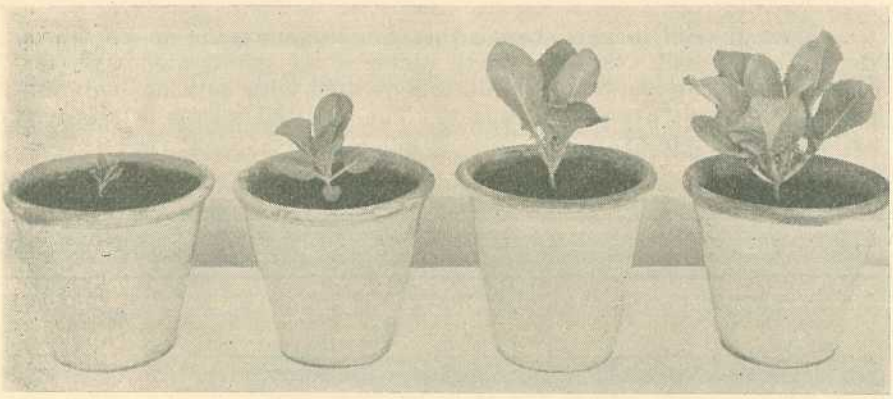

Plate 49.

EFFECT OF DOLOMITE ON SOIL LOW IN LIME AND MAGNESIA.—From left: Untreated soil, dolomite, fertilizer only, dolomite + fertilizer.

The problem continues to exist in the application of top dressings containing phosphate. The only way the dressing is able to reach the roots is by passing down in solution in rain or irrigation water. While nitrogen does this freely, and potash fairly well, phosphate in solution is in an ideal condition for being fixed by the soil, so that on a soil with high fixing capacity much of the phosphate in a dressing never becomes available to the plant, at least under normal watering conditions. Excessively heavy rain or irrigation as the first watering on the dressing would carry it down, but at the same time would cause a large loss of the nitrogen by washing this too deep. Therefore, it is safer to apply the total phosphate in the drill before planting.

Recently two striking examples of this trouble were brought to notice. One was at Victoria Point, where portions of formerly highly productive land supported only mediocre growth of tomatoes. These were followed by maize, for green manure, which did poorly on the corresponding area. At the following ploughing the soil was observed to be much harder than the adjoining satisfactory soil. Carrots were

then planted, germinated uniformly, but fell away on the bad patches, where they eventually became a total loss. Soil analyses showed that the affected soil was extremely deficient in lime and magnesia. Liming had not been carried out for many years, and the onset of the trouble had doubtless been hastened by heavy dressings of sulphate of ammonia on bananas grown on this area prior to the sequence of small crops on which the trouble had been observed. It may be noted that sulphate of ammonia is probably the most important factor in hastening the loss of lime and magnesia from the soil.

The second example came from Tamborine Mountain, where there was a complete failure of cauliflowers on portion of land planted to that crop, and a subsequent green manure maize crop failed on the corresponding area. Analyses showed that the soil was deficient in lime and magnesia and, further, the maize exhibited the typical leaf colouration of severe phosphate deficiency. In the preparation of this soil for the cauliflowers the fertilizer had been broadcast, and when the plants failed to make proper growth several top dressings were applied, but without effect.

A small trial in pots showed that cauliflowers made no growth on the untreated soil. Normal growth occurred on soil treated with fertilizer containing phosphate, while soil treated with both dolomite and fertilizer gave even greater response. The essential results of this trial are shown in Plate 49.

Plate 50.

THE ROAD FROM THE COAST AT WEST PALMERSTON, NORTH QUEENSLAND.

PLANT PROTECTION

Passion Fruit Mite.

W. J. S. SLOAN, Agronomist.*

THE passion fruit mite† is a common, but frequently unrecognized, cause of the unthrifty appearance and premature death of passion fruit vines. The pest has been known in central Queensland and further north for some time, and has recently attracted attention in southern Queensland.

Type of Injury.

Passion vines may be attacked at any age and even young plants show severe injury if growing conditions are unfavourable. The older leaves of the vine turn yellow prematurely. These then die and are shed. The injured surface of the canes becomes covered with a rusty-red corky layer showing small cracks. This injury persists even after the mites have been checked and gives an indication of the extent of previous infestations. Heavy attacks over a long period may cause the shedding of the greater part of the foliage, leaving many canes bare except for the terminals. Buds in the axils of affected leaves may fail to develop or produce only yellowish stunted growth. Not infrequently, the less sturdy laterals die back to the main cane. A moderate attack will bring about a serious loss of vigour, while severe attacks over a prolonged unfavourable growing period may lead to the death of the entire vine. The general picture of a mite-affected vine is that of one suffering from lack of soil moisture.

Injury to the fruit occurs only in heavy infestations and is at first restricted to the stalk end, particularly under and around the calyx. Later, mites may be more freely distributed over the surface and water-soaked areas then disfigure the rind. These later dry out, leaving dull-greyish areas which are sometimes tinged with reddish-brown (Plate 51). The affected fruit may fail to develop fully.

Usually, the mite causes little apparent damage in spring, so long as the vines are making good progress, but injury may become pronounced later in the warmer months, especially if growing conditions are such as to retard growth and if the vines are fruiting heavily. Vines that are heavily infested in the summer and early autumn make a partial recovery during winter and subsequently the growth may proceed normally until mite populations again become high during the following summer.

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* Formerly an officer of the Science Branch.

† *Tenuipalpus californicus* Banks.

The Mite and Its Habits.

The passion fruit mite was first recorded from Queensland some years ago. It occurs on a number of host plants but is an important pest only on passion fruit vines. Other known hosts are citrus, tomato, choko and sweet potato. The adult mite (Plate 53) is approximately one hundredth of an inch in length and bright red in colour. Individual mites are almost invisible and the reddish colour appearing on heavily infested plants is due to the extremely large number congregated together in one place. The mites are normally sluggish and do not move freely over the plants.

Plate 51.

PASSION FRUIT SHOWING MITE DAMAGE ON SURFACE AT RIGHT.

Colonies usually include the pest in all stages of development. The eggs are bright red in colour and almost spherical in shape. These eggs give rise to six-legged nymphs which are less vividly coloured than the adults. The nymphs grow through a number of moults to the adult eight-legged stage, leaving their whitish cast skins on the plant surfaces.

Although cast skins (Plate 52) may be plentiful living mites are rarely found on the older and first injured portions of the vine, which appear to be unattractive to further feeding, nor are they often found on the tips of the growing terminals. Hence, the pest should be sought on that portion of the stem immediately in front of the bare section of the affected cane. Here the mites may be densely congregated in the leaf axils, along the grooves in the canes and

leaf stalks, and along the main veins of the leaves. Passion vines are frequently grown in red soils and mite infestation may be mistaken for dust deposits settling on the plant following cultivation. Identification can be established easily by means of a hand lens. The pests reach their maximum abundance in mid-summer. In late autumn, winter and early spring they are less numerous and destructive.

Plate 52.

BLOSSOM END OF MITE-INFESTED PASSION FRUIT x 6.—Note the innumerable cast skins.

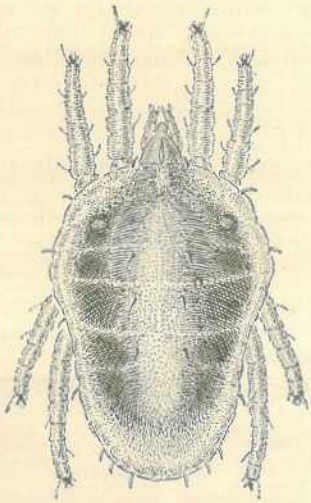


Plate 53.

PASSION FRUIT MITE x 200.

Control.

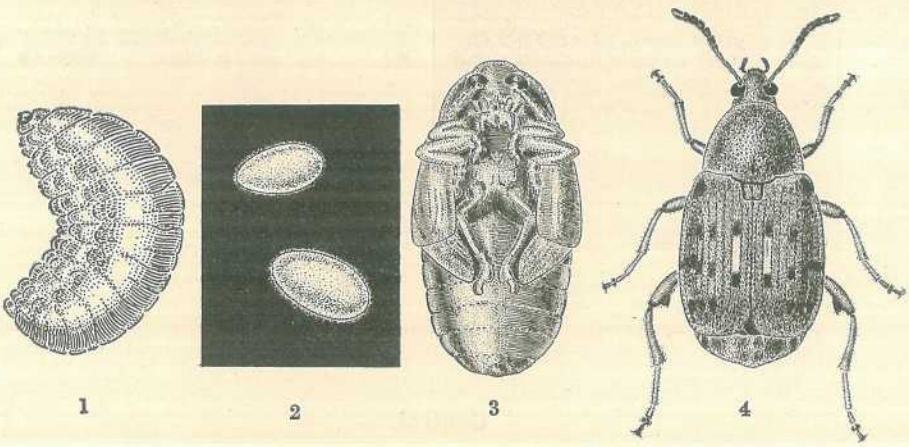
Like many other mites, the passion fruit mite can be checked by the application of sulphur sprays and dusts. Some growers in the Rockhampton district have successfully used lime sulphur sprays at dilutions of 1 in 25 to 1 in 40, the weaker solutions being applied in hot weather. Sulphur dusts containing one part of ground sulphur to one part of hydrated lime also check the pest, but they are less satisfactory than sprays because the dust is not held as well as the spray by the smooth leaves and canes of the passion vine. If possible, the plants should be dusted when they are wet with dew; a fine day following an overnight storm provides good conditions for dusting. Treatment may be required at monthly intervals, from September to February. Applications should be repeated if the sulphur is removed by rain within 48 hours. Some growers also claim to have obtained effective control with a white oil spray emulsion. When copper sprays are being applied for the control of brown spot, sulphur, in the wettable form, can be added to the fungicide.

Protection of Stored Cowpea Seed Against Insect Damage.

R. C. CANNON, Assistant Entomologist.

THE principal insect pest of stored cowpeas is a small weevil (Plate 54), technically known as a Bruchid, which may be responsible for considerable wastage if the seed is stored for any length of time without taking suitable precautions to protect it.

Adult Bruchids are broadly-built weevils, measuring about one-sixth of an inch in length, brownish to reddish-brown in colour, with hind wings which do not quite cover the tip of the abdomen. The elongate-oval, white eggs are laid singly and firmly attached to the seed-coat. From these emerge small white grubs which immediately bore into the seed, leaving little trace of their points of entry. They feed voraciously, often completely devouring the contents of the seed and leaving only the outer skin intact. The pupal, or resting, stage of the insect is spent within the seed and the adult later escapes through a circular hole, about one-twelfth of an inch in diameter, which it cuts in the seed-coat. Often these holes are the first indication to the grower that his seed is damaged.



[*Drawings by William Manley.*

Plate 54.

BEAN BRUCHID.—Fig. 1, Larva × 10; Fig. 2, Egg × 25; Fig. 3, Pupa × 10; Fig. 4, Adult × 10.

Infestation may commence in the field before the seed is harvested, but as this is usually only slight, control measures are not recommended at this stage. However, once the seed has been harvested, prompt action is required to protect it in storage. Treatment must be such as to afford protection against insect attack without interfering with the germinating capacity of the seed. Three methods of treatment are open to the grower, viz.:—(1) treatment with paradichlorobenzene or naphthalene; (2) dusting with an "inert" mineral dust, such as magnesite; and (3) dusting with D.D.T.

Fumigation with carbon bisulphide is normally reserved for the treatment of seed stocks already heavily infested and, as it has no lasting value, it is not strictly protective.

Paradichlorobenzene and Naphthalene.

Paradichlorobenzene and naphthalene are slowly-evaporating crystalline materials which can be conveniently used for the treatment of small quantities of seed. The cost of these two fumigants is considerably higher than that of other protective materials and this tends to make their use on large quantities of seed uneconomic. If the seed is stored in reasonably airtight containers either of these fumigants may be used at the following rates:—Paradichlorobenzene, 4 oz. per bushel; naphthalene, 8 oz. per bushel. The fumigant should be thoroughly mixed with the seed when it is placed in the containers. If suitable airtight containers are not available, and the seed is to be stored in bags, it should first be treated with a mixture of both fumigants at the rate of 8 oz. of each per bushel.

Magnesite.

Recently, an "inert" mineral dust, magnesite, has come into prominence for the control of pests of stored grain. Magnesite is not poisonous in the usual sense of the word, but kills by removing water from the body of the insect. It may be mixed with the cowpea seed at a rate of 4 oz. per bushel. Unfortunately magnesite loses some of its efficiency when the seed is stored in a humid atmosphere, and it is doubtful whether it would effectively control the cowpea Bruchid during the wet summer months. For this reason, its use is not favoured in northern Queensland.

D.D.T. Dusts.

Recent investigations indicate that D.D.T. dusts are of value in controlling Bruchids in cowpea seed. Two ounces of a dust containing 2 per cent. D.D.T. should be sufficient for the treatment of each bushel of seed. Seed treated with a D.D.T. dust may be stored in bags, as this insecticide gives permanent protection against reinfestation. Treatment must be carried out before the cowpeas are damaged to any extent, as insects within the seed may not come into contact with the insecticide until they reach the adult stage.

Method of Applying Dust.

The quantities of dust required are relatively small and care should be taken to ensure that each seed receives a uniformly fine coating of dust. This can be achieved by transferring the shelled seed from one container to another before bagging. A suitable container is a kerosene tin holding approximately one-half bushel of cowpea seed. One-quarter of the quantity recommended per bushel (1 oz. magnesite or ½ oz. D.D.T. dust) should be placed in the bottom of the kerosene tin and the seed poured in. An equal quantity of the dust is added when the tin is nearly full. The contents should first be poured rapidly into another tin and finally into the bag in which the seed is to be stored.

Carbon Bisulphide.

When cowpea seed already shows signs of infestation, further deterioration can best be prevented by fumigating the seed with carbon bisulphide and then treating it with a D.D.T. dust. The fumigant will destroy adult, larval and pupal stages of Bruchids while the dust will protect it from any reinfestation from outside.

Carbon bisulphide was one of the earliest fumigants used in the treatment of stored seeds. It evaporates rapidly and forms explosive mixtures with air, so that it must be handled with extreme care and

must not be exposed to lighted matches or cigarettes. The seed to be treated should be placed in an airtight container, such as a tank with a tightly fitting lid, and carbon bisulphide added at the rate of 4 to 5 lb. per 1,000 cubic feet capacity. After the container has been filled with seed the carbon bisulphide should be poured into shallow containers, or poured on to folded hessian placed on top of the seed, and the lid placed in position. Being heavier than air the gas will diffuse through the contents and the fumigation will be completed within 24 hours. Contact with this fumigant for a longer period may impair the germination of cowpea seed, so that after 24 hours the container should be opened and the seed removed, aired, treated with a D.D.T. dust, and then placed in fresh containers, or bags, for storage.

ANSWERS.

(Selected from the outgoing mail of the Government Botanist.)

Ringworm Bush.

T.G. (Ayr)—

The specimen is Ringworm Bush (*Cassia alata*), a native of tropical America, but now widely spread over most tropical countries. It is naturalized in parts of North Queensland. The leaves are used as a remedy for skin diseases, especially for ringworm, hence the local name.

Gomphrena Weed.

H.A.C. (Jackson)—

The specimen is Gomphrena Weed (*Gomphrena decumbens*), a native of tropical America, which made its appearance in Queensland about Townsville. It is now spread as far south as Brisbane, is quite common in parts of the Brisbane Valley, and as far west as Hughenden. Your specimens are the first from the Downs.

The plant is not known to possess any poisonous or harmful properties. Stock have not been observed eating it to any extent. This seems strange, as some allied plants in Queensland are freely eaten and are quite good fodders. Gomphrena Weed seems to thrive on rather light soils, but is not restricted to them.

Josephinia Burr.

Inquirer (Surat)—

The specimen is Josephinia Burr (*Josephinia Eugeniae*). This burr has a fairly wide distribution over the Central West, but your specimen is the first from your locality. The burrs become entangled in wool, and are thus spread by sheep from one place to another.

Feather Top.

H.M. (Cooyar)—

The specimen is Feather Top, sometimes known as Feather-top Rhodes Grass (*Chloris virgata*). This grass is very abundant in parts of Queensland. It has over-run much of the lucerne-growing country, and reduced the earning capacity of the fields. It is a luscious-looking grass of robust growth, but so far as our experience goes, stock do not take readily to it; where it grows, ordinary Rhodes Grass can generally be grown. Although stock do not eat it in its green state, they seem to eat it when drying-off or made into hay.

Oleander is Poisonous.

R.W. (Barcaldine)—

The Oleander is poisonous to all classes of stock, as proved repeatedly by feeding experiments. Humans have sometimes been poisoned by chewing the flowers and leaves.

Black Rot and Black Leg of Cabbage and Cauliflower.

F. W. BLACKFORD, Pathologist.

BLACK rot is the most frequently encountered disease of the cabbage and cauliflower in Queensland. It is a bacterial trouble which is particularly severe in summer-grown crops of cabbages. The second disease, black leg, is a fungous disease which is also sometimes present in both these vegetables. Because of the similarity of the control measures recommended for the two diseases, they can appropriately be discussed together.

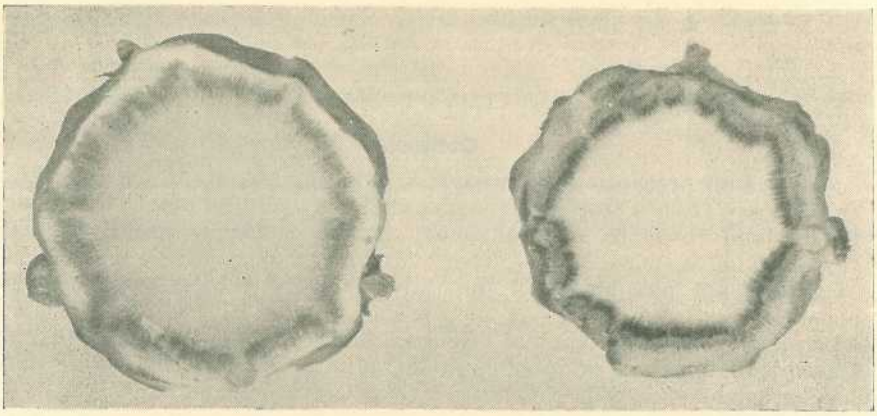


Plate 55.

BLACK ROT OF CABBAGE.—Cross section of the stems of a healthy plant (left) and a diseased plant (right) to show the blackened water-conducting vessels.

The most characteristic symptom of black rot is the discolouration of the water-conducting vessels in the stem of an affected plant. These vessels become black in colour and if the stem is cut across they appear as black pin points or, in advanced cases, as a black ring. (Plate 55.) If the stem is split longitudinally they appear as black streaks. The bacteria* which cause this disease gain entrance to the water-conducting vessels through the leaves, where, at the point of infection, which is usually near the margin, patches of the leaf-blade dry out and turn brown and papery. Severely affected plants are somewhat stunted and, especially in wet weather, other organisms gain entrance to the heads and a foul-smelling, slimy rot ensures.

The black rot bacteria may infect the seed both internally and externally and infection of the leaves may take place in the seed-bed by the splashing up of drops of water from the soil which has become contaminated from infected seed. Refuse from previous cabbage or cauliflower crops rotting in the soil may also harbour the parasite for twelve months or more.

In the case of the second disease, black leg, the first symptom noticed by growers is generally the failure of certain individual plants to keep pace in growth with the rest of the crop. Close examination of such plants reveals the presence of a black shrunken area on the stem at ground level. This lesion may extend sufficiently to girdle the stem,

* *Pseudomonas campestris.*

in which case the plants die. An examination of the seed-bed from which such plants were taken frequently discloses the presence of the lesion on at least some seedlings and these may be stunted, yellow and occasionally wilted. If seedlings which are only slightly affected—and slight infection is easily overlooked—are planted out, the stems may become severely infected later and an uneven, unsatisfactory crop is the result.

The disease affects the leaves and also the seed-heads, if the crop is allowed to seed, and produces, brown, dead spots studded with black pin points. The latter are the spore-bearing bodies of the fungus* causing the disease. The individual spots on the leaves may be up to half an inch in diameter and on the seed-heads the disease appears as elongated, shrunken areas on the stems and pods. The seed may be infected from these spots, the fungus even penetrating the outer seed-coat to lie dormant in the internal tissues until the seed is sown. Rotting plant debris in the soil from a diseased crop may also harbour the fungus.

Control.

The first precaution to be adopted in an endeavour to exclude these two diseases from a crop is in the choice of the seed-bed site. This should be on land that has not previously grown cabbages, cauliflowers or turnips, and at some distance from land which has produced these crops. If this is not possible, then the soil should be sterilized by heat or chemical treatment. The next step is the adoption of some form of seed treatment in order to eliminate the possibility of introducing the disease through the medium of infected seed, for in both cases the disease may be carried by the seed.

In the case of black rot, the bacteria causing the trouble are mainly carried externally on the seed-coat and these external bacteria can be dealt with by dipping in a corrosive sublimate solution at a strength of one in one thousand by weight. Corrosive sublimate may be obtained from a chemist in tabloid form together with directions for making up a solution of this strength. The seed is enclosed in a loosely-tied cheese-cloth or muslin bag and immersed for half an hour, the bag being agitated to dislodge any air bubbles. The seed is then rinsed for five or ten minutes in several changes of clean water, dried in the shade and sown without delay.

This dipping, however, will not dispose of such black rot infection as may occur inside the seed, and as the fungous parasite which causes black leg is carried within the seed the corrosive sublimate dipping will be quite ineffective in the case of the latter disease. Hence, although black leg is much less frequently encountered than black rot, growers may prefer to use the hot water treatment in order to obtain a complete control of seed infection in the case of both diseases, even although this method requires more care than the corrosive sublimate dipping.

The hot water treatment requires suspension of the seed in hot water for half an hour, the water being kept at 122 deg. Fahrenheit or 50 deg. Centigrade. This treatment kills the infection without harming the seed unduly, provided the seed had high vitality originally. Care must be taken to maintain the exact temperature for the stated time because too low a temperature will not kill the parasitic organism, while too high a temperature will kill the seed. For this purpose, an easily read thermometer, costing approximately 5s., is required.

* *Phoma lingam.*

The main difficulty with this method of treatment is maintaining a steady temperature. It has been found that as large a bulk of hot water as is convenient to handle is of great assistance in this respect. One-and-a-half to two gallons is a convenient amount for quantities of seed up to 2 lb.

There are several ways in which the temperature of the water may be kept constant and a grower may be able to devise some method to suit himself. One which can be used is to have a kerosene tin half full of water at the required temperature and then as the temperature shows signs of falling the tin is placed for a very short time over a very slow fire or small flame such as a kerosene light. There is a disadvantage in this method in that it is quite easy to raise the temperature too much and kill the seed. To some extent this may be overcome by having a quantity of boiling water handy and, as the temperature falls, adding small amounts to the water in which the seed is steeped, sufficient to raise the temperature again to the required figure. Care, however, must be taken not to pour the boiling water on the seed or some loss in germination will result.

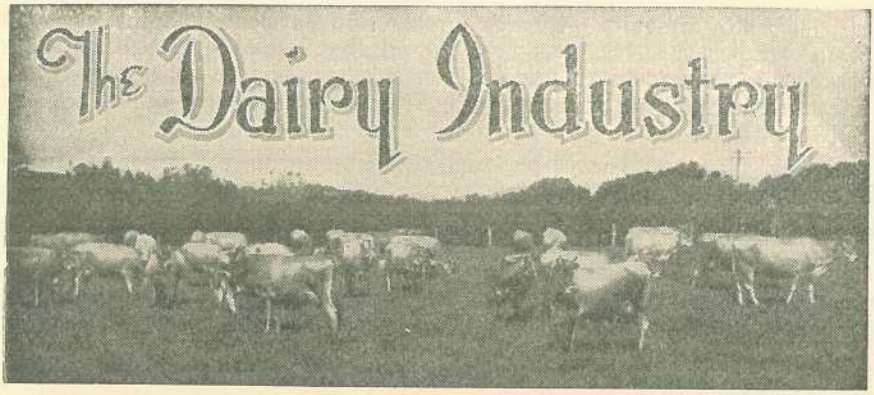
The method which has been found to be most convenient on the farm is to use the largest saucepan or preserving pan three parts full of water warmed to the required temperature on the wood stove in the kitchen. The best time of day to treat the seed is when the hot meal is being cooked. The top of the stove is then hot and the recess warm and, if the saucepan or preserving pan of water is placed on the stove towards the edge away from the fire-box, the temperature will remain constant for a considerable period. It is a good plan, however, to have small quantities of hot and cold water readily available in case the temperature falls or rises. If the temperature begins to rise then it can be checked by adding cold water and the container moved further away from the fire to the cooler part of the stove or *vice versa* if the temperature shows signs of falling.

The seed is best held in a cheesecloth or muslin bag, as is the case with the corrosive sublimate treatment. When placed in the water the mass of seed should be well poked a few times with a stick to remove all air bubbles, making sure that all the seed is wetted. The water should be kept well stirred and the thermometer held in the water the whole of the time the treatment is in progress.

When the full thirty minutes of treatment have elapsed the seed is plunged into one or two changes of cold water, spread out to dry in the shade and sown without delay.

Any diseased plants which may appear in the seed-bed in spite of the adoption of the above precautions should be discarded when transplanting, and, if infection is serious—a development which should not occur if the seed-bed precautions have been properly observed—consideration should be given to discarding the whole bed because even such plants as may appear healthy in a heavily infected bed are nevertheless likely to be infected with the disease-producing organisms.

As both diseases will remain in infected leaves, stalk butts and other debris left in the field after a crop has been harvested, all such debris should be gathered up and burned. Any diseased material unavoidably left unburned should be given an opportunity to decompose—thus allowing the disease producing organisms to die out—by planting cabbages, cauliflowers, turnips or allied crops on the same land only once in every three or four years.



Observations on Dairy Production in New Zealand.

E. B. RICE, Director of Dairying.*

THE economy of New Zealand is mainly dependent on primary production. Animal production, especially sheep and dairy cattle, is the main source of agricultural wealth. This dominance of animal production is accounted for by the system of grassland farming which has developed in the Dominion primarily because of the climatic influence.

Soils and Pastures.

The soils in the chief dairying districts are obviously of high fertility. In some districts the soil is naturally fertile, while in others fertility has been built up by topdressing with lime and superphosphate, coupled with heavy stocking. To assist farmers in improving their pasture, agricultural lime is carried free up to 100 miles on the railways. Lime is applied at the rate of up to 10 cwt. per acre annually; in some districts, in which the lime content of the soil is naturally adequate, liming is not practised. Superphosphate is also now generally used, the rate of topdressing being about 4 cwt. an acre annually.

Topdressing of pasture lands with lime and superphosphate, which has been most marked since 1920, has greatly improved pastures with a consequent increase in dairy production. This is clearly shown by the comparative figures for 1921-22 and 1940-41—

Year.	Cows in Milk.	Production of Butter.	Production of Cheese.
1921-22	1,015,000	62,881 tons	63,427 tons
1940-41	1,780,000	167,753 tons	122,371 tons

It is recorded that after the opening of certain lands for dairying in the Rotorua district, although apparently pastures had become well established, stock did not thrive or produce and calves were incapable of being reared. The cause became known as "bush sickness" and the localities where it occurred was called "bush sick" country. The trouble was traced to cobalt deficiency in the soils. It was completely rectified by the use of 4 oz. of cobalt to the acre, included in the topdressing material.

To conserve superphosphate in wartime, the use of serpentine superphosphate in the North Island was made compulsory. This fertilizer is manufactured by combining 25 per cent. of serpentine rock, of which there are large deposits in New Zealand, with 75 per cent. of superphosphate. The resultant magnesium phosphate is claimed to be superior to ordinary superphosphate, inasmuch as it is less "fixed" in the soil.

* In a report of a recent official mission to New Zealand.

Departmental and other opinion was unanimous that the fertility of dairying lands in the Dominion is improving. This is attributed to topdressing and the nutrients returned to the soil in the dung of stock concentrated for rotational grazing in the pasture paddocks.

Climate.

The climate of the North Island, so suitable for dairy production, is characterized by an adequate, evenly distributed rainfall throughout the year, moderate temperatures and long sunshine. Stock can always be kept in the open and pastures grow almost throughout the year. There is, too, little seasonal change in the appearance of the vegetative cover; it is almost constantly green. The South Island has a lower rainfall and cooler climate, with a fairly severe winter, and consequently a shorter pasture season than the North Island.

Dairying is concentrated in districts of safe and sufficient rainfall and this, together with moderate temperatures and abundant sunshine, is conducive to grassland farming probably unsurpassed in the world. High dairy production off pastures is maintained in the North Island for eight or nine months of the year. During the remaining months (mid-May to mid-August), when pasture growth is at its lowest, almost the whole dairy cow population, exclusive of cows in herds supplying city milk requirements, is dry. This almost complete cessation of dairying for about three months contrasts sharply with Queensland conditions, where there is a longer "off" season, with a low trough for three months, but not an almost complete stoppage of milking.

The even rainfall in New Zealand also prevents the wide fluctuations in dairy production from month to month and season to season characteristic of dairying in Queensland and other Australian States. It is stated that the maximum seasonal influence in New Zealand would not affect production more than 10 per cent.

Dairy Cattle and their Products.

In the Dominion in 1943-44 there were 1,700,000 dairy cows in milk, with an average yield of 224 lb. of butterfat. Approximately 87.5 per cent. of the dairy cows are on the North Island and 12.5 per cent. on the South Island.

Dairy farms total 70,000, but a feature of New Zealand dairying is the large number of small herds of fewer than 25 cows. Many owners of smaller herds do not depend entirely on dairying for a livelihood and the cows are kept to augment family earnings.

As in Australia, dairy farming in New Zealand is conducted largely by family labour, with only limited dependence on hired labour. The tendency on large farms appear to be to build another cottage on the property and to employ a married couple.

The total amount of butterfat produced was 374,000,000 lb., which was estimated to have been put to the following uses:—

Butterfat Used for (figures quoted in million lb.)				
Butter.	Cheese.	Milk and Cream Consumed.	Other Dairy Products.	Calves, &c.
263	81	17	5	8

Comparative Australian and New Zealand butter and cheese outputs in the year recorded were:—

	Butter.	Cheese.
Australia	154,000 tons	35,000 tons
New Zealand	140,000 tons	92,000 tons

The area of sown grass was 17,500,000 acres, of which 3,370,000 acres were topdressed. The area of grasses and clovers cut for hay and silage was 528,000 acres, and 46,000 acres of lucerne were cut for hay or silage.

Some interesting data are available from the report of the New Zealand Dairy Industry Commission. Although its investigations were made in 1933-34 the information is still applicable. From its survey of 550 farms on North Island, milking 31,636 cows, the following information emerged:—

Average butterfat per acre	117.7 lb.
Average yield of butterfat per cow	254 lb.
Average number of cows per 100 acres ..	46.4 lb.
Average butterfat per labour unit	5,380 lb.
Average area per farm	124.1 acres

The carrying capacity of dairy farms is about two milking cows to three acres with an additional 20 per cent. of young stock, although naturally there is a divergence in different districts. The minimum carrying capacity of land used for dairying is about one cow to three acres.

The Guaranteed Price Committee in its report of 1938 considered that a dairy farm is efficiently capitalized at an average of £75 per cow. This amount is said to be made up as follows:—£60 per cow for land and improvements, plus £15 for stock and implements.

Inquiries elicited the information that farms in the best dairying districts would cost £60 an acre to purchase.

The Jersey is numerically strongest among the breeds of dairy cattle, now representing about 85 per cent. of all dairy cattle. Other breeds, in order of importance, are Ayrshire, Friesian, Milking Shorthorn. The Australian Illawarra Shorthorn has not been introduced into New Zealand.

The Jersey is a larger framed animal than its Australian counterpart. Jersey herds have been largely graded up from foundation stock of milking shorthorns. Incidentally, the production of grade cows is now equal to that of pedigree stock.

Investigations on the growth rate of cows in its Jersey and Friesian herds have been carried out at Massey College, from which institution the following information on average weights was obtained:—

Age.	Friesian.	Jersey.
One year	600 lb.	400 lb.
Two years (just after calving) ..	850 lb.	600 lb.
Mature cow at calving	1,250 lb.	900 lb.

Originally the Milking Shorthorn was the leading dairy breed, but the rapid swingover to the Jersey breed is reflected in the undermentioned table:—

Breed.	1921. Per cent.	1938. Per cent.
Jersey	29·6	75·0
Shorthorn	56·0	5·6
Friesian	11·4	7·9
Ayrshire	3·0	7·8

The popularity of the Jersey is attributed to its economy of production in the New Zealand environment because of the following factors:—

1. The ability to carry a larger number of effective milking cows per unit area, because of lower body weight and hence lower maintenance requirement;
2. The higher butterfat percentage in the milk, which economises in energy requirements in food per lb. of butterfat.

It is in the intensive dairying districts of the North Island where the Jersey predominates. In the South Island other breeds are in favour.

The productivity of dairy cows was almost doubled in the period 1901-02 to 1939-40, the figures for the respective years being:—

1901-02	125 lb.
1939-40	236 lb.

The use of topdressing became firmly established about 1920 and the major factors responsible for this improvement are considered to be:—

1. Better feeding of stock through improved methods of pasture management;
2. The rapid change in breed composition of herds.

A technical subcommittee estimated the influence of different factors to be:—

	Per cent.
Better feeding	57·4
Breed change	26·2
Culling low producers	13·1
Selection	3·3

Pastures and Pasture Management.

The influence of grassland on dairy production in New Zealand has already been mentioned. Dairy farming is carried out on an intensive grassland system in contrast with the extensive pastoral dairying or arable dairying so common in Queensland. In the Waikato district, the most intensive dairying district in the Dominion, the farms vary in size from 80 acres to 150 acres. The average dairy farm of about 100 acres is capable of carrying a herd of 50 milkers, together with the necessary complement of approximately 20 other dairy stock, such as yearlings, heifers and calves.

Dairying is so dependent on grass that in the intensive dairying districts there is practically no cropping at all. The surplus pasture growth in the late spring and early summer is conserved as both hay and silage for tiding the herd through the winter period, from May to September. About one quarter to one third of the farm area is so conserved, the average yields being 8 tons of silage and 2 tons of hay to the acre. Both stack and pit silage are made, though the former kind is more common; both types are frequently made on a farm. Silage and hay making were both in progress at the time of my visit. Ensilage is usually made late in November and hay in December. It is generally considered desirable to conserve one acre of hay for carrying every three to four cows through the period of hand feeding.

Professor Riddet, Director of the Dairy Research Institute, expressed the opinion that a dairy farmer should aim to conserve 12-15 cwt. of grass hay and 2 tons of grass silage per cow yearly for feeding off in the winter.

The use of the pick-up baler and side delivery rake for haymaking is increasing and it was estimated that about 15 per cent. of hay is now baled by this means. The baling of hay is often done by contractors.

An investigation to find the loss in silage stacks disclosed the wastage to be about 25 per cent., in addition to which the loss of dry matter as a result of bacterial action amounted to approximately 30 per cent. Total losses are, therefore, probably in the vicinity of 50 per cent. It is probable that about equal loss occurs in haymaking. These losses are under investigation at research institutes with a view to their reduction by developing improved methods of hay and silage-making.

The New Zealand Dairy Research Institute has carried out investigations on the use of molasses in silage-making but proved no economic benefit. The feeding value of the resulting ensilage was enhanced only by an amount equivalent to the nutriments added in the molasses.

Where any crops for supplementary feeding are grown on specialized dairy farms, chou mollier (narrow stem kale) is the main crop. Because of its relatively high protein content (15 per cent. in the dry matter), capacity to withstand a dry spell, and its high yield of up to 35 tons per acre, it is used on many farms for autumn and winter grazing. This crop is planted in October, grazed heavily in January or February, and then allowed to remain for regrowth and feeding-off in winter.

Some interest is being taken in growing pampas grass for winter feed. Opinions on its merits varied. Its nutritive value is, however, only about that of poor grass hay.

Rye grass-clover pastures predominate, although in the northernmost part of North Island paspalum is often the dominant pasture species. Cocksfoot is another common constituent of pastures, especially in the South Island.

Typical pasture seeds mixture are—

1.	2.
20 lb. perennial ryegrass.	17 lb. permanent pasture biennial rye.
6 lb. Italian ryegrass.	8 lb. Italian ryegrass.
6 lb. cocksfoot.	4 lb. No. 1 white clover.
2 lb. red clover.	3 lb. red clover.
2 lb. white clover.	2 lb. prairie grass.
2 lb. Timothy grass or crested dogtail or meadow fescue.	2 lb. paspalum (in north of North Island only).
	2 lb. Akaroa cocksfoot.
	2 lb. Timothy grass.

This seed (cost, £4 per acre) is sown at the rate of about 40 lb. per acre and at the time of sowing 2 to 5 cwt. superphosphate and lime of varying amounts are applied. As previously stated, on the North Island superphosphate must be replaced by serpentine superphosphate under the existing *Fertilizer Control Order*. Top-dressing practices have already been described.

Dairy farms are usually well subdivided to permit of the pastures being evenly and completely grazed in rotation, but although a strict rotational grazing system is pursued successfully on many farms, they are apparently in the minority.

Higher carrying capacity and average production were noted on the farms of progressive pasture-conscious farmers visited. On such properties, the pastures are completely eaten off at their maximum nutritive stage of 6 inches to 8 inches high by concentrating the milkers at the rate of up to twenty cows per acre during grazing-off for, say, twenty-four hours in each paddock. The paddocks are refertilized with the dung voided and the even rainfall ensures quick recovery of the pastures. The individual paddocks on a closely subdivided farm may be only 3 acres in area. If the grass gets away from the cows during the flush growth the mower is used for pasture control.

Farms on which the principles of grassland rotation are well applied have average productions of up to 400 lb. per cow and 250 lb. per acre, entirely off grass.

The electric fence is used to some extent for temporary fencing in subdivision of paddocks for rotational grazing and the feeding-off of chou mollier in "breaks." In the experience of some, the electrically charged fence is unsuitable for permanent use, as bulls and cows in season will break through and in the flush grass season short circuits occur.

The Fresh, Green "Bite."

A method of utilizing the young "bite" of grass in the winter as a protein concentrate to supplement the low protein silage and hay then fed was demonstrated by Professor Riddet at the Massey Agricultural College. Preferably, paddocks with a wide face (not a long, narrow paddock) are used. The sward is grazed bare in March or April and shut up until it is grazed again from June to August. When feeding off commences, an electric fence is put across the paddock about 1 chain in depth. The stock (up to forty) are turned in to the wide, shallow area and completely graze it down. Next day the hay and silage are put out on the area grazed the day before, the electric fence removed back another chain, and the cows turned into the paddock. They first eat the hay and silage and then the young grass in the new area available for grazing. One quarter-acre of grass is allowed per cow per month in full milk. If, therefore, three paddocks are to be shut up for this purpose and grazing will extend over three months, three-quarters of an acre is needed per cow. Since the stocking rate is heavy and 90 per cent. of the constituents of the feed are voided in the dung and thus returned to the soil, the method assists not only in the better nutrition of the stock but in the refertilization of the paddock. This system seems worthy of trial in the coastal paspalum pasture districts of Queensland. The paddocks used would need to be mowed, or preferably grazed, late in the summer or early autumn, shut up from May to July, and grazed in August and September. The grass would not become fibrous and could be allowed to grow up to 12 inches high, but not higher.

Investigations on the feeding of dairy stock entirely off grass or its products, hay and silage, have demonstrated that well-managed, rotationally grazed pastures supply adequate nutrients for the maintenance and milk production of dairy cattle in commercial herds. Thus, the feeding of concentrates is not economically justifiable on well-managed dairy farms in New Zealand. A further factor militating against the use of concentrates is the high cost of grains and protein-rich foodstuffs in the Dominion.

Lucerne is grown for feeding to dairy stock only in the areas of lesser rainfall. In the high rainfall districts with their assured pasture growth it was rarely seen.

Herd Management.

Pedigree bulls are used, it is said, on 80 per cent. of farms. Furthermore, 75 per cent. of all bulls are estimated to be of the Jersey breed. There is a growing appreciation of the importance of the sire in herd improvement. On progressive farms visited the bulls were not allowed to roam with the herd, but were confined to bull paddocks in order to control their services. One bull is kept for every 30-35 cows in the herd. Yearling bulls are allowed to serve up to twenty cows.

The annual bull sales, held just before the season commences, are a characteristic of the dairy industry in New Zealand. One herd

improvement association, which tests 100,000 cows yearly, also operates a bull procuration service through which buyers and sellers among its members may be brought into contact.

Dehorning of dairy herds is practised widely, the treatment being mainly carried out by the caustic potash method in the first few weeks of the calf's life.

It is the usual practice to rear all female herd replacements on the farm, calves amounting to 20 per cent. of the herd being retained each season. Calves not needed for the herd are disposed of as bobby calves, and, through an efficient organisation built up in recent years for the collection of the calves, this trade now treats 1,000,000 calves annually. The Dairy Board controls the scheme, but the actual treatment of the calves is done at the various freezing works. All vells are supplied by the freezing works to the New Zealand Co-op. Rennet Co. at Eltham, which produces rennet for all New Zealand cheese factories. The factory of the rennet company, besides rennet, now manufactures cheese colour, processed cheese and silver nitrate.

Calf Rearing.

Calf rearing is on a simple system, the calves mainly being fed on separated milk and pasture. Calf meals are not used to any appreciable extent and, in any case, are not needed if rotationally grazed young pastures are available to supplement the skim milk. The calf is weaned at about four and a-half months.

It is usual for Jersey heifers to calve down for their first lactation at two years of age, and the heifers of larger breeds about six months older. Sterility, even amongst first calvers, seems to be a problem of some magnitude. This differs from Queensland experience, which is that sterility in heifers is not a major problem.

Although the orthodox method of drying off cows by intermittent milking is still in general practice, it was ascertained that the herds on research stations and on some farms are dried off simply by ceasing milking when the daily yield has declined to one gallon. No adverse effect on health or production in the subsequent lactation ensues.

Pig Raising.

Pig raising is carried on in conjunction with dairying and, as with calves, the pigs are chiefly dependent on separated milk and pasture. As cereals are not grown extensively in New Zealand, their use in pig raising is limited: they are usually in short supply and too costly for this purpose. Electrically operated skim milk pumps are widely used for pumping separated milk from the dairy shed to the piggery.

[TO BE CONTINUED.]

Low Butter Content of Late Winter Milk.

During the late winter and early spring, milk from many suppliers received at the milk depots is below the standard butterfat test of 3·3 per cent.

The following suggestions are offered to assist producers to raise the butterfat content of their milk:—

1. Regulate your milking times so that intervals between milkings are as equal as possible (e.g., not more than 14 hours between evening's and morning's milkings, and not less than 10 hours between morning's and evening's.)

2. Heaviest yielding cows should be milked last in the evening and first in the morning.

3. When the intervals between milkings are uneven, strip thoroughly in the mornings only. Include the strippings in the milk supply.

4. In view of the fact that milk contains the lowest percentage of fat during the first two to three months after calving, it is advisable to regulate calvings to avoid having too many cows freshening at the one time.

5. Discard the first drawn milk. This milk is very low in butterfat, and is also heavily contaminated with bacteria.

6. Cattle should be fed with concentrates, if procurable, when pastures are inadequate for full feeding, as the composition of milk is affected if the cows are under-nourished.

7. Test cows for butterfat and if milk is retained for calf or pig feeding, utilize milk from the lowest testing cows. Replace low testing cows as opportunity presents itself.

—S. E. Pegg and C. R. Tummon, Division of Dairying.

Plate 56.

A NAVY BEAN CROP NEAR MEMERAMBI, SOUTH BURNETT.

ANIMAL HEALTH

Contagious Bovine Pleuro-Pneumonia.

C. R. MULHEARN, Divisional Veterinary Officer.

CONTAGIOUS bovine pleuro-pneumonia, commonly known as "pleuro," is a highly infectious disease of cattle affecting the lungs and chest cavity. It is caused by a minute germ which is present in the "virus" and certain organs in natural cases of the disease. This germ is used in the preparation of vaccines for inoculation purposes.

The disease can only be spread by contact or the mixing of diseased with healthy cattle. The infective material or germs are passed out from the lungs of a sick animal and they are taken into the lungs of susceptible animals in the act of breathing, become established in the lung tissue and set up new cases of the disease. It is therefore easy to understand how one diseased animal when introduced into a healthy mob can rapidly give rise to a serious outbreak of the disease.

All types and ages of cattle are susceptible, but generally the most severe outbreaks are encountered in travelling stock when their natural resistance is lowered because of exposure to unusually severe conditions. Experimental cases have been produced in sheep and goats, although there is no record of the disease in these animals under natural conditions.

Symptoms.

The susceptibility of individual animals varies, and generally most affected animals show obvious evidence of sickness; however, occasional cases may pass through a mild attack of the disease without showing noticeable symptoms.

In travelling cattle one of the first signs of the disease is an inclination of the acected animals to drop to the rear of the mob, whilst with dairy cattle there is a marked falling off of the milk supply. If temperatures were taken at this stage they would be found to be abnormally high, ranging from 103 to 106 degrees.

The sick animals seek the shade and show evidence of thirst. The appetite is diminished and cudding is restrained and eventually ceases. The coat becomes ruffled, the ears drop, and the beast has a generally dejected appearance. Intermittent coughing may be noticed, and this is particularly evident after exertion.

A common method of detecting the disease is to race the suspected animals around for a few minutes, when the positive cases show fits of coughing. This, of course, is not diagnostic of contagious pleuro-pnuemonia, but it is a useful method of picking out suspicious animals for closer observation. As the disease advances the respirations become quickened and a normally docile animal, when disturbed, will often charge the attendants. At a later stage the animal stands with its head extended, its forelegs wide apart, its back arched, and its flanks heaving owing to respiratory distress. In fatal cases death usually follows in

from four to seven days after the onset of obvious symptoms. In cases that recover the animal gradually regains a normal appearance and recommences feeding, but it will cough following exertion during the convalescent period.

Post-mortem Findings.

The most noticeable changes in the dead animal are associated with the lungs and surrounding tissues. On opening up the chest cavity a quantity of fluid commonly known as the "virus" may be found therein. The virus may vary in amount from less than a cupful to 1 gallon or more. It also varies in colour from a clear amber to that of a port wine. The darker colours are usually due to the presence of blood. The fluid may be quite clear or it may be slightly turbid, and it usually contains jelly-like masses. The name "dry pleuro" is sometimes applied to those cases in which very little virus is present, and some stockmen consider it is a different disease. However, this is a fallacy, as there is only one contagious pleuro-pneumonia.

The lungs are usually found attached in various places to the chest wall, and both the covering of the lungs and the lining of the chest wall are considerably thickened. Portion of the wall of one or both lungs may be involved. On inspection it will be found that the diseased portion of the lung is considerably swollen and much firmer than normal. In consistence it resembles liver rather than lung tissues. The cut surface of the lung in most cases presents a typical picture, and it somewhat resembles a piece of marble, the veins being of a whitish colour and formed by the greatly thickened connective tissue which separates the reddened areas of lung issue. The degree of marbling may vary, being more noticeable in some cases than in others, but in all cases there is some thickening of the connective tissue which separates the areas of diseased lung. In the typical cases a small quantity of virus frequently flows from the cut surface of the lungs. The mediastinal and bronchial lymphatic glands (between the two lungs) are often enlarged, and may show pronounced changes.

The Carrier Problem.

Contagious pleuro-pneumonia is a highly fatal disease and in some outbreaks a large percentage of the susceptible cattle become affected, with up to 50 per cent. mortality. In every outbreak a certain number of the affected animals recover, and undoubtedly a large number of these retain diseased tissue within their lungs, although to outward appearances they look perfectly healthy. These animals are known as "carriers" and they are responsible for fresh outbreaks often widely separated from the centres in which they originally contracted the disease. Under normal circumstances the carriers may remain healthy, for the diseased tissue is encapsuled, but conditions such as starvation, overdriving, &c., lower their resistance and the disease may reassert itself. It is for this reason that outbreaks are frequently encountered in travelling stock. The relapsing animal may not suffer from a severe attack of the disease—it may not even be detected as being diseased—but it passes the germs from its lungs to the exterior and so acts as a constant source of infection to the surrounding animals.

The disease is constantly present on many of the large cattle stations of Northern Australia, and unfortunately it is impossible to eradicate it from these areas. Consequently, each year numbers of

apparently healthy animals, which are carriers, are moved into the more closely settled areas and they are responsible for fresh outbreaks from time to time. If all the infected animals and carriers could be detected and destroyed the disease could be eradicated from Australia, as it has been from other countries, within a few years. However, this is not possible under the present grazing conditions of the large cattle stations, but the elimination of carriers will play a very important part in the control of the disease in the more closely populated areas of Queensland. It is now possible to detect carriers by means of a blood test and this test is being used to eradicate the disease following outbreaks in dairy herds.

Prevention and Control.

It is generally unwise to consider treatment of diseased animals unless they are very valuable, for there is always a risk that when they recover they may become "carriers" and be responsible for a serious outbreak of the disease at some later date. Recovered animals should be sent for slaughter at the first opportunity.

If the value of a recovered animal warrants its retention for breeding or any other special purpose it should be held in isolation until it has been blood-tested and proved to be free of the disease. If the blood test indicates that the animal is a "carrier" it should not be retained under any circumstances, as it would be a potential source of infection to other animals in the herd.

The most satisfactory methods of dealing with an outbreak of "pleuro" are to destroy the diseased animals and to keep the "in-contact" animals well under control. All "in-contact" animals should be inoculated to give them an immunity so that no fresh cases, other than those already infected, will occur. As the period of incubation, or the latent period between infection and obvious symptoms, is considerable and may vary from a week to two months or more, a large number of animals may have become infected and be incubating the disease before the outbreak is discovered and inoculation is carried out. It is for this reason that a number of cases occur for a varying period following successful inoculation, and consequently it is necessary to hold "in-contact" animals in quarantine for long periods to ensure that all the latent cases will be detected before the suspected animals are released from quarantine. Under normal circumstances an outbreak cleans up in from two to four weeks after inoculation.

Preventive inoculation is also carried out amongst healthy animals to render them resistant in case they are exposed to infection. This is a very wise procedure and is carried out as a normal routine practice when cattle are mustered for branding on several North Queensland properties.

The inoculation of travelling store cattle immediately prior to commencement of movement is now looked upon as a normal and necessary procedure. The extension of air services to the cattle-breeding country of North and North-western Queensland has greatly assisted the distribution of contagious pleuro-pneumonia vaccine for this purpose. Very few mobs of cattle are now travelled from these areas without being inoculated and outbreaks of "pleuro" in these mobs are seldom recorded.

Methods of Inoculation.

Inoculation as practised in Queensland consists of introducing a small quantity of vaccine containing "pleuro" germs under the skin towards the tip of the tail. When this is carried out a mild reaction is produced at the site of inoculation, and the animal gains a resistance to the disease. The area towards the tip of the tail is selected for inoculation because it is far removed from the centre of circulation and because if the local lesion following inoculation becomes extensive it can be controlled by cutting off the tail. If inoculation were carried out on other parts of the body the lesions could not be controlled and they would spread extensively, causing heavy losses.

A vaccine for contagious pleuro-pneumonia inoculation has been evolved by the Council for Scientific and Industrial Research and this product has been widely tested and has given good results. More than two million doses of this vaccine have been distributed by the Department of Agriculture and Stock and used for the inoculation of Queensland cattle during the past 10 years and it has given very satisfactory results.

The fluid which collects in the chest cavity in active cases of the disease and which is known as "natural virus" is still occasionally used for inoculation. This fluid gives good results when used in the fresh state—that is, when it is only a few days old—but its keeping qualities are uncertain and it should not be used after it has been stored for long periods. It is also essential to ensure that the animal from which this "natural virus" was obtained was otherwise healthy, for it is possible to transmit diseases such as tuberculosis to the animal being inoculated if the virus is contaminated with tubercle germs.

For these and other reasons natural virus is not as satisfactory as the specially prepared vaccine and it is unwise to use it when the vaccine is available. Contagious pleuro-pneumonia vaccine can be obtained from the Animal Health Stations at Yeerongpilly and Oonoonba.

The most satisfactory method of inoculation is to inject one-fifth of a cubic centimetre (that is, three to five drops of vaccine) under the skin about one inch above the tip of the tail. A special syringe of 1 to 2 c.c. capacity, preferably with an adjusting screw on the plunger, is most suitable for this purpose. Special strong 19-gauge hypodermic needles are also required. This equipment is in short supply at the present time but it should become readily available in the near future.

Another method of inoculation is the seton method, which consists of introducing a piece of wool, saturated with vaccine, under the skin of the tail. Special needles are required for this purpose. A third method consists of introducing the vaccine by means of a special spoon-shaped needle.

The syringe method of inoculation has advantages over the other methods in that it is easier and quicker to carry out, an exact amount of vaccine can be delivered under the skin and there is less injury to the tissues. However, no matter what method is used it is essential to practise strict cleanliness in carrying out the operation.

It is the usual practice to bang-tail animals immediately after the operation to indicate that they have been inoculated. Under normal circumstances a mild reaction occurs at the site of inoculation about four

to six days after the inoculation is carried out. This consists of a slight swelling and thickening, which usually extends a few inches up from the tip of the tail. Sometimes an excessively severe reaction occurs in from seven days to a month after inoculation and this reaction is usually referred to as a "bad tail."

The vaccine is specially standardized to give as strong and lasting immunity as is possible without causing a severe local reaction in the tail. However, the resistance of the animal to the inoculation varies and occasionally a severe reaction may result. A limited number of severe reactions—for example, one or two per 1,000 head—should be looked upon favourably, as it indicates that the vaccine is potent.

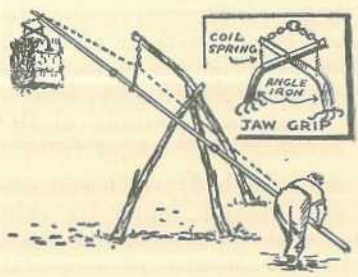
Another form of "bad tail" is encountered, particularly when contaminated natural virus or dirty methods are used. In such cases foreign germs are introduced at the time of the inoculation and the tail becomes "pussy" and putrid and it may drop off. In any such cases tails should be amputated.

The inoculation gives a solid immunity in the majority of animals treated, but on some occasions this may be broken down and a few cases of the disease may occur. If, however, the inoculation has been successful it will prevent the disease spreading through the mob. The immunity takes about two weeks to develop and usually lasts about 12 months, therefore it is advisable to inoculate animals which may be exposed to infection at least once a year.

A SIMPLE HOME-MADE HOIST FOR BALE HANDLING.

Hay and straw are being baled more and more on many farms as this method of fodder conservation not only assists storage, but greatly assists the proper proportioning of food to stock, etc.

In many cases, the stacking of baled hay and straw may have its difficulties, especially if labour is a bit short, but this simple device should be of assistance as it is a simple but effective method of handling the bales. The loading tool is also quite a good one, simply constructed and easily made to serve its purpose.



The device consists of a 24 ft. length of 1½ in. piping or other material, swinging from a suitable point as shown in the sketch. In this instance, strap-iron is used, suspended from a pole or tripod as indicated.

The piping is strengthened by a chain supporting each end on the cantilever principle. Into one end is fitted a short length of 1 in. piping to form a handle grip.

To the other end is attached a jaw grip for holding the bales.

This consists of two pieces of angle-iron loosely bolted together and cranked towards one another at their lower ends, to which are attached the working ends of two old dung forks with the tynes bent inwards.

Two coiled springs, attached from the end of each angle-iron to the bend of its opposite keep the jaws open. A small amount of pressure enables them to be closed into the bale, and the weight of the bale when suspended keeps them in position. A jerk on unloading is usually sufficient to make the springs open the jaws.

—*From "Handy Farm and Home Devices and How to Make Them."*
(T. V. Bartlett for War Blinded Association, Adelaide, S.A.), 1946.

The Brisbane Exhibition.

IN spite of severe seasonal adversity, the 1946 Brisbane Show attained a record in attendance if not in farming exhibits, and in the livestock sections quality grades were at least equal to those achieved in pre-war years. The beef and dairy cattle particularly provided impressive evidence of the brains which go into the breeding of such fine animals.

This year's Show was further proof of the high standards Queensland farmers and stockowners generally have reached in every branch of their respective industries. Whether it was in the splendid stock paraded for judgment or in the quality of the district exhibits—the prolonged dry weather had, unfortunately, limited pavilion representations—the results of science and practice were made manifest. In the manufactured and processed exhibits was also seen how closely and strongly country and town are linked in interest and in industry.

THE COURT OF AGRICULTURE.

Among the big pavilion displays was that contained in the Court of Agriculture of the Department of Agriculture and Stock. In every section of this display it was shown that the application of technical knowledge to farm practice is more necessary now than ever it has been, and how trained and experienced men are available to assist those engaged in every branch of rural industry in Queensland. Quality in every farm activity, quality in every product, raw or manufactured, will strengthen our hold on export markets—that was the lesson demonstrated so convincingly in the Court of Agriculture.

The Division of Plant Industry in a mosaic of seed in contrasting colours told the story of the productivity of our great grain lands. Cotton in boll and bale, tobacco in golden leaf and an array of other field products illustrated the importance of them all in our rural and urban economy.

Soil conservation methods were demonstrated in well-set-up landscape models which presented in sequence creation, exploitation, devastation and conservation as an effective object lesson on the causes of erosion and how the principles of soil management can be applied. Correct cultivation as a measure of prevention of the wearing away of land by wind and water was the theme, and the scale models were there to exemplify how it is doue.

There were also models of pit, trench, tower and hillside silos, made to scale, to illustrate modern means and methods of stock food storage. In no district are grazing conditions constantly good, and when pastures dry off silage will provide the succulent feed to keep the milk tide high in the dairy shed. Silage has no insect or rodent enemy and will keep indefinitely.

In another part of the Court there were sheaves of useful grasses, both native and introduced, and rows of potted poisonous plant to demonstrate many grazing hazards.

Bananas of many varieties were among the chief exhibits of the Horticulture Branch and they included Mons, Ceylon, Finger, Sugar, Blue Java, Ducassis, Cavendish and some hybrids. There also was a contrast in banana packing cases—the new short case and the familiar longer box. For the shorter case, it is contended that it is lighter and easier to handle for transport, is less liable to damage in transit, and, by its use, "squirter" and associated troubles are less likely to develop in southern consignments.

The main idea of the Chemical Laboratory was expressed in samples of soil types with varying degrees of fertility value. Examples of fluorosis in water, causing mottled teeth and permanent damage and abnormal bone formation, were also included in a highly educational exhibit.

There can be no let-up in the war against vegetable pests and diseases, as was demonstrated by the Science Branch in its display of its laboratory and field activities. The effectiveness of new insecticides, including D.D.T., in various fields of use was illustrated, showing that science is alert and on guard against insect and unseen enemies.

The theme of the display by the Animal Industry Division was stock diseases from diagnosis to cure. Queensland is one of the healthiest stock countries in the world, but parasites and other pests can and do take a heavy toll of our flocks and herds. Knowing a cause, measures of prevention can be devised and this section of the Court conveyed the message of applied veterinary science.

The departmental wool exhibit this year was made up largely of fine and medium-strong fleeces from Bowen Downs. In one other row the effects of copper deficiency in pastures were shown as evidence of the importance of mineral sufficiency in our pastoral country. As set out in the agricultural chemistry section, mineral deficiency in pastures is a very serious matter. For instance, if there is not enough calcium and phosphorus in their food animals may take to bone chewing or develop rickets or other disorders.

Both the Pig and Poultry Branches were represented in model and in maxim. Well planned farm layouts complete with accommodation and equipment were displayed as guides to effective farm design.

In the display of the Division of Dairying, the nutritive value of milk and its derivatives was demonstrated by comparison with other foods. Pyramids of processed products proved that there is wealth as well as health in the dairy industry.

The Division of Marketing had a section with samples of grower-controlled commodities within the scope of primary producers' organization and co-operative legislation, illuminated with facts and figures relating to the economic side of agriculture.

As a whole, the Brisbane Show yielded abundant evidence of the energy, enterprise, skill, ability and organizing capacity of the people who are doing the real work of the nation.

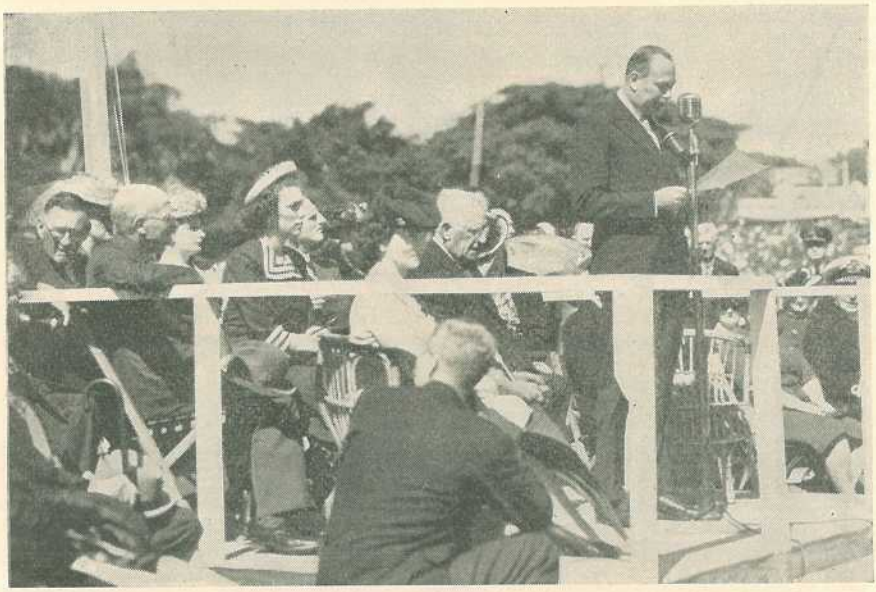


Plate 57.

The Governor-General (His Royal Highness the Duke of Gloucester) Opening the 1946 Brisbane Exhibition.

Plate 58.

The Brisbane Show.—Section of the Grand Parade.

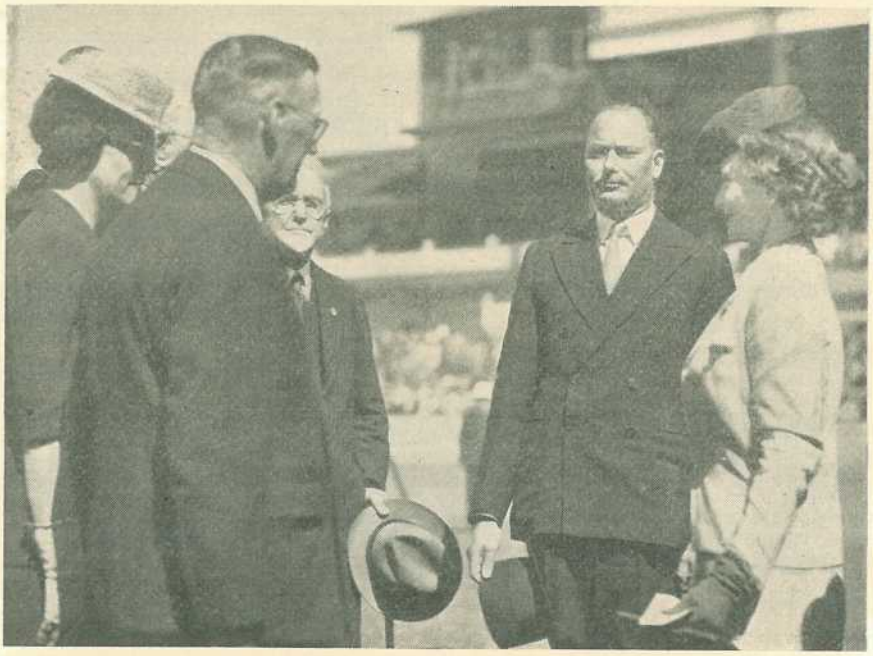


Plate 59.

AT THE BRISBANE SHOW.—T.R.H. the Duke and Duchess of Gloucester (right) and H.E. the Lieutenant-Governor the Hon. F. A. Cooper and Mrs. Cooper, and Senator the Hon. J. S. Collings.

Plate 60.

THE ECONOMICS OF AGRICULTURE ILLUSTRATED.—Telling Facts and Figures were presented by the Division of Marketing.

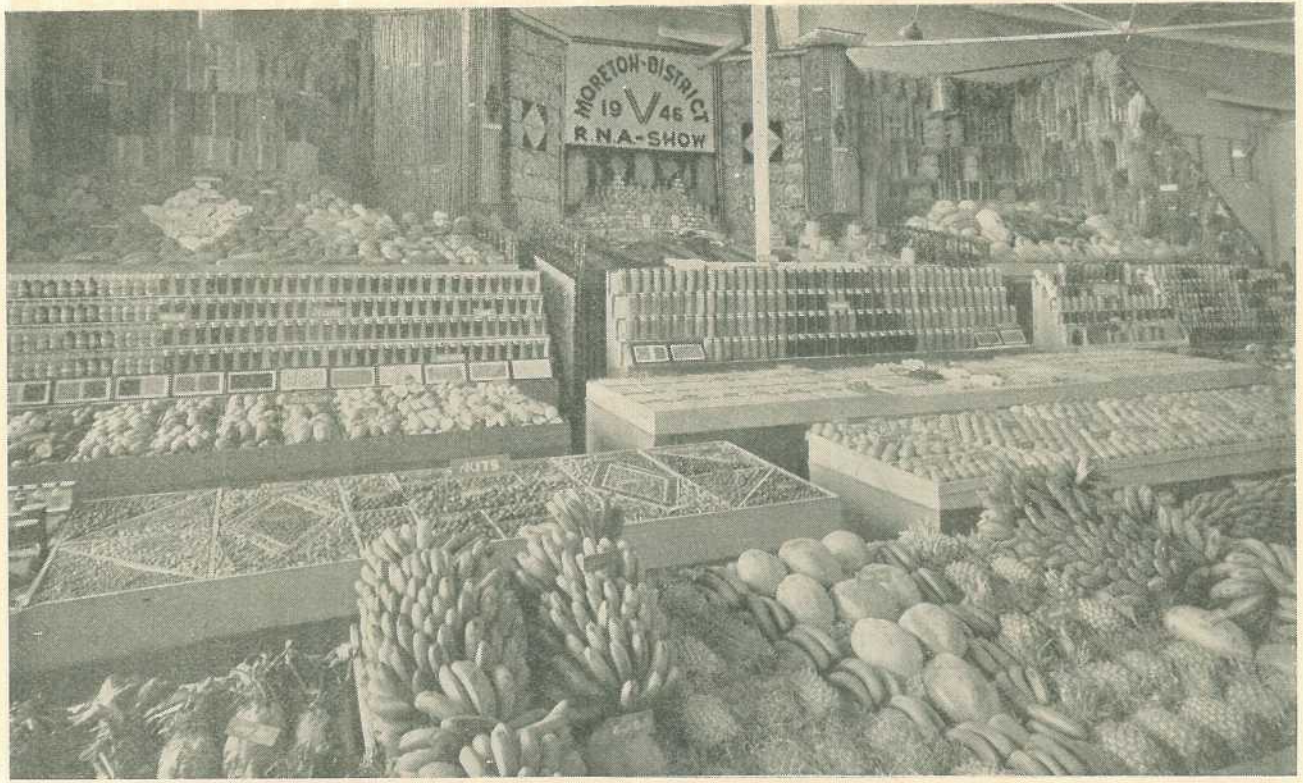


Plate 61.
THE MORETON DISTRICT'S FINE WINNING DISPLAY.

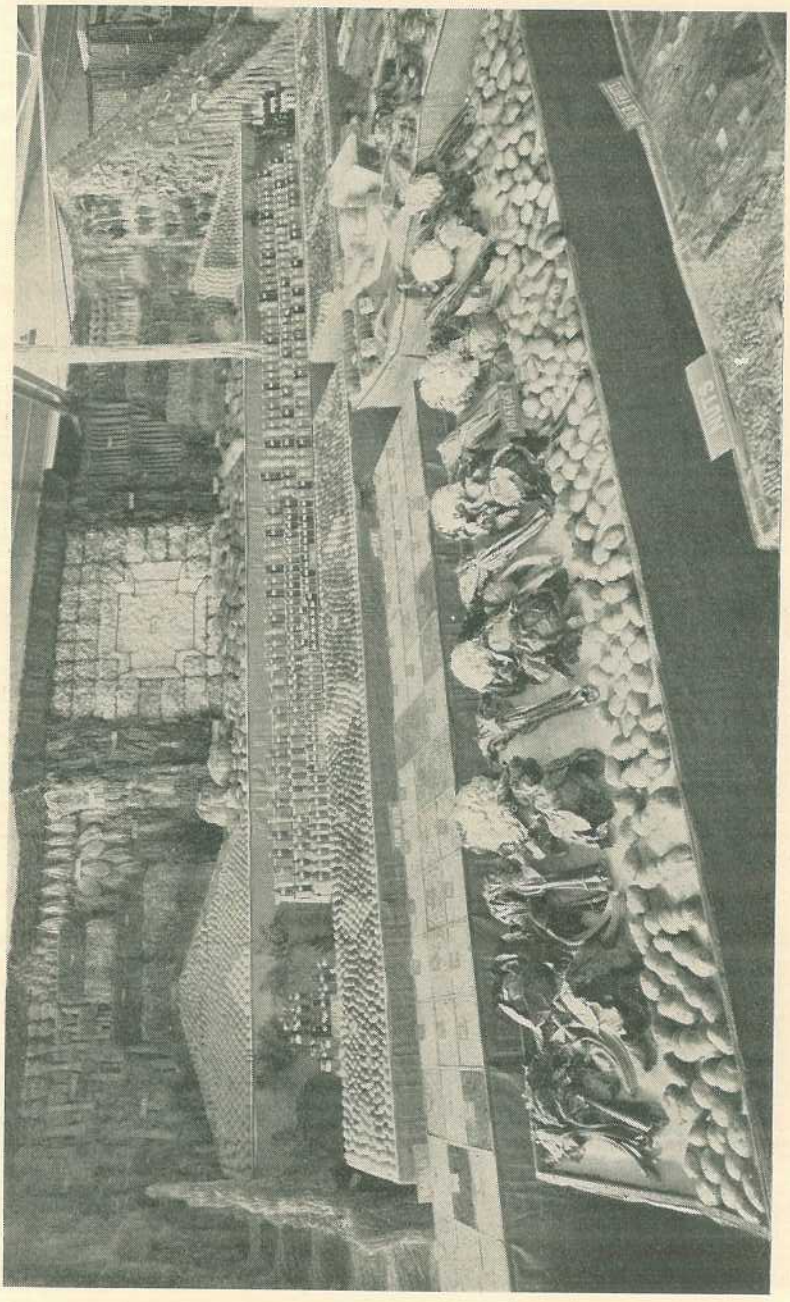


Plate 62.
THE DARLING DOWNS DISTRICT EXHIBIT.

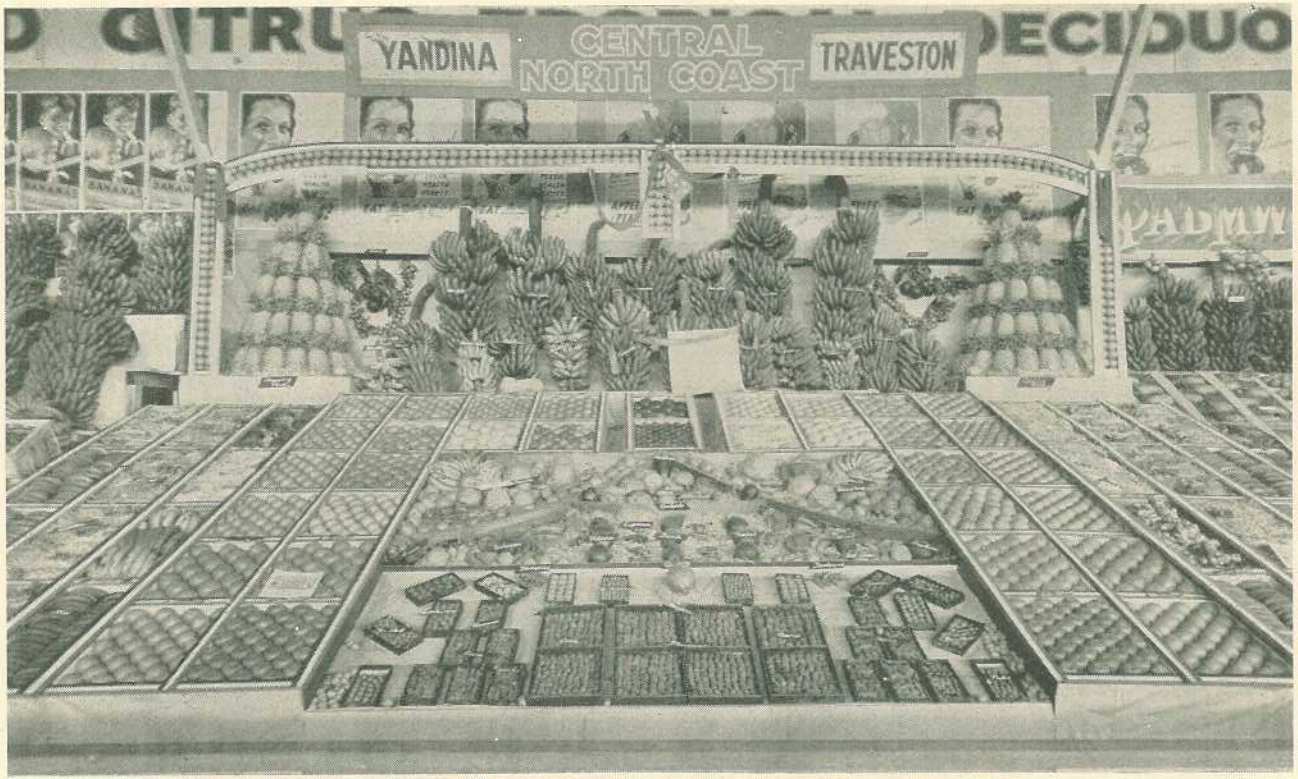


Plate 63.

FRUITS FROM THE COASTAL COUNTRY IN COLOURFUL CONTRAST.

Plate 64.

PRODUCTS OF THE FRUITFUL GRANITE BELT.—The Stanthorpe Exhibit.

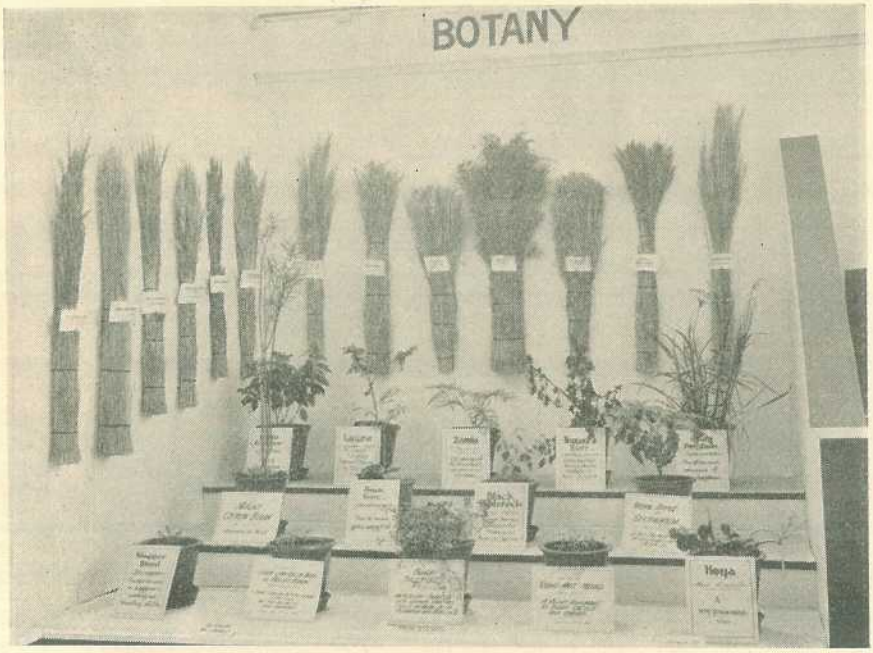


Plate 65.

NUTRITIOUS GRASSES AND NOXIOUS PLANTS IN CONTRAST IN A CORNER OF THE DEPARTMENTAL COURT.

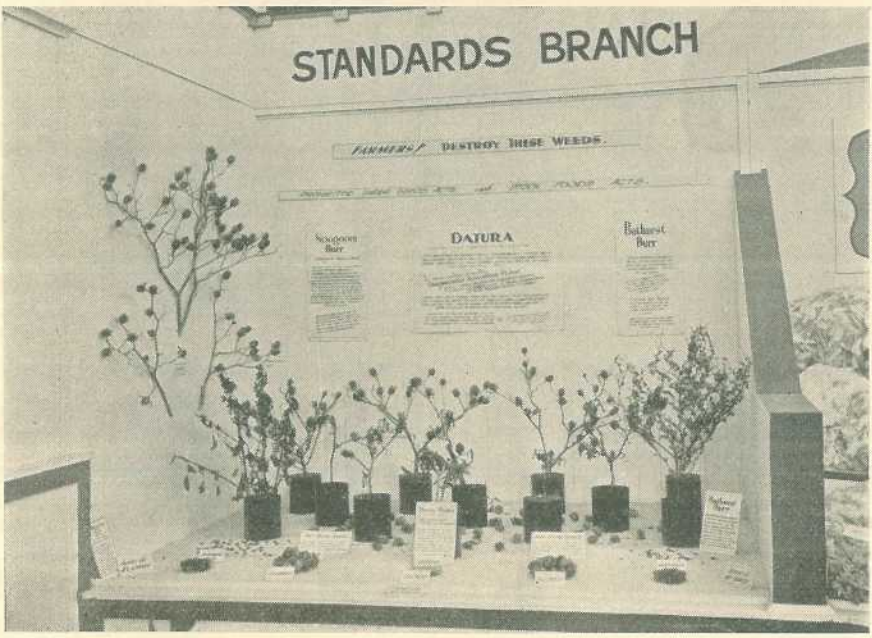


Plate 66.

HOW THE FARMER IS PROTECTED BY THE MAINTENANCE OF STANDARDS OF PURITY IN FARM CROP SEEDS WAS SHOWN IN THIS EXHIBIT BY THE STANDARDS BRANCH OF THE DIVISION OF MARKETING, WHICH ALSO ENSURES THAT FERTILIZERS, PEST DESTROYERS, VETERINARY MEDICINES AND STOCK FOODS ARE TRUE TO LABEL IN ACCORDANCE WITH QUALITY TESTS.

Plate 67.

A MOSAIC OF CEREAL SEEDS IN CONTRASTING COLOURS TOLD THE STORY OF THE PRODUCTIVITY OF GREAT GRAIN LANDS, WHILE COTTON IN BOLL AND BALE, TOBACCO IN GOLDEN LEAF AND AN ARRAY OF OTHER EXAMPLES OF FARM YIELD AND FERTILITY ILLUSTRATED THE IMPORTANCE OF THEM ALL IN QUEENSLAND'S RURAL ECONOMY.

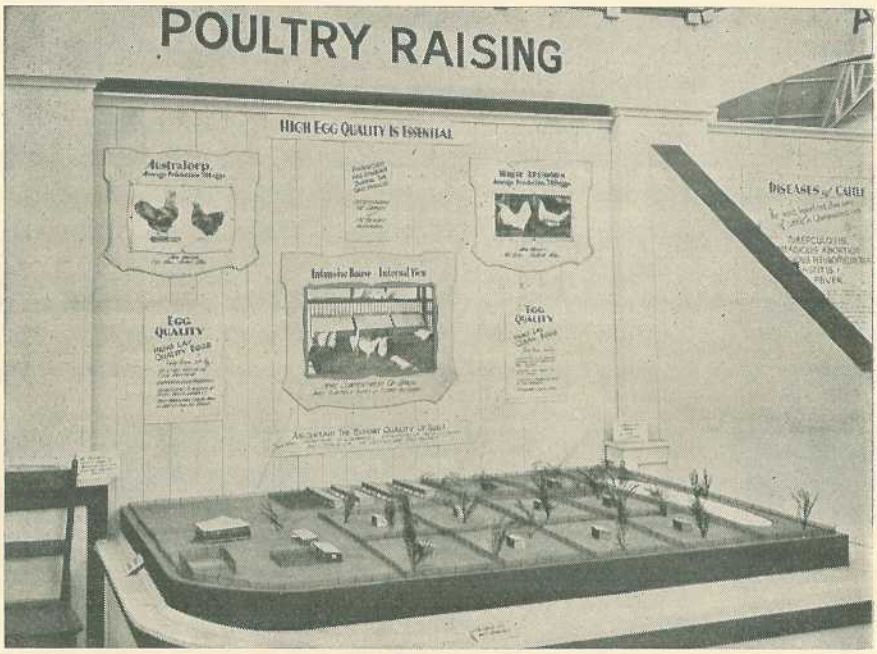


Plate 68.

A MODEL POULTRY FARM LAYOUT ATTRACTED ATTENTION TO THIS SECTION OF THE DEPARTMENTAL COURT.

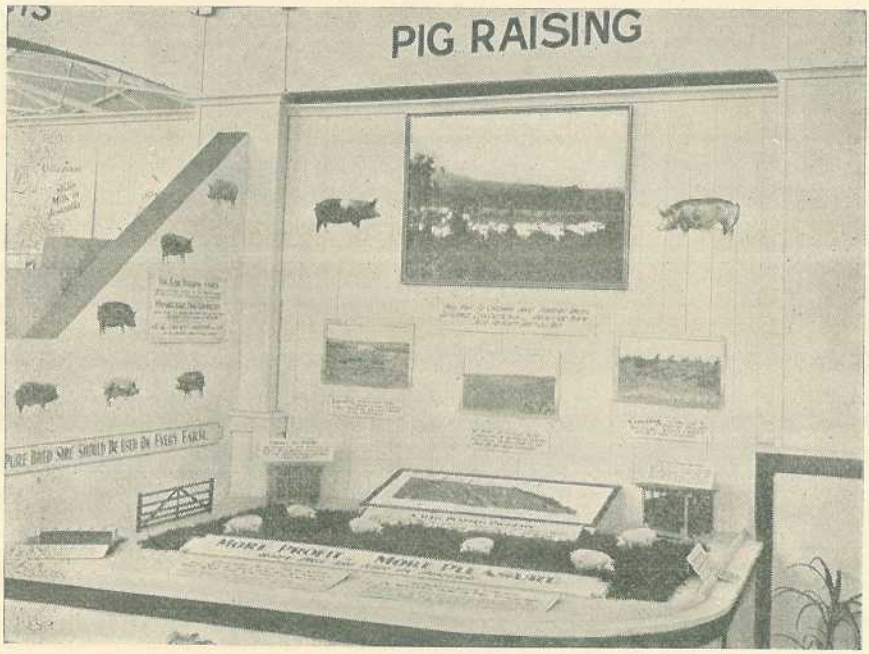


Plate 69.

POINTS IN PIGGERY MANAGEMENT WERE FITLY ILLUSTRATED.

Plate 70.

FRUIT DISPLAY IN THE DEPARTMENTAL COURT.—Banana varieties represented included Mons, Ceylon, Finger, Sugar, Blue Java, Ducassis, and Cavendish. There was also a contrast in cases—the new short case and the familiar longer box.

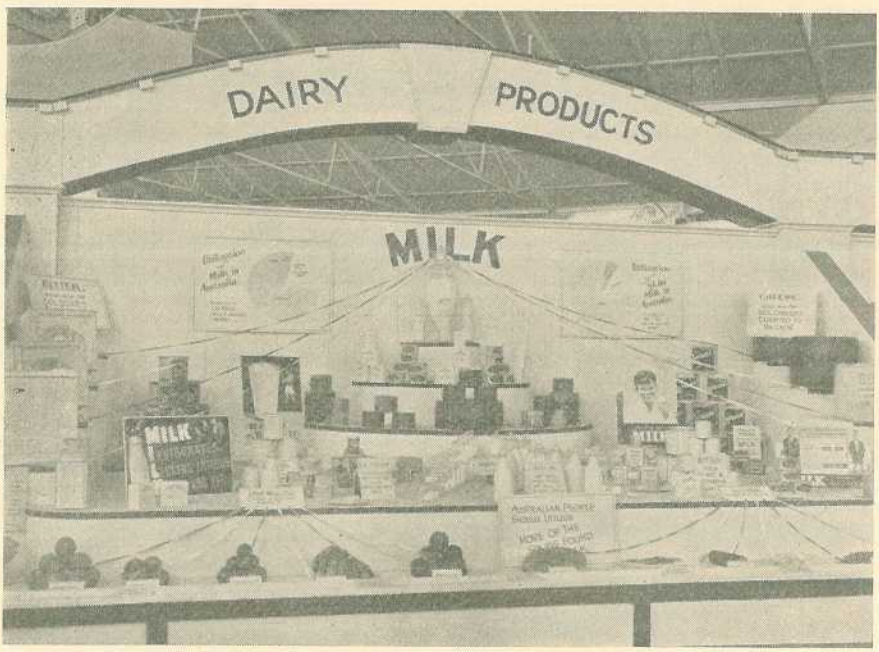


Plate 71.

THE NUTRITIVE VALUE OF MILK PRODUCTS WAS THE CENTRAL THEME OF THIS DISPLAY BY THE DIVISION OF DAIRYING.

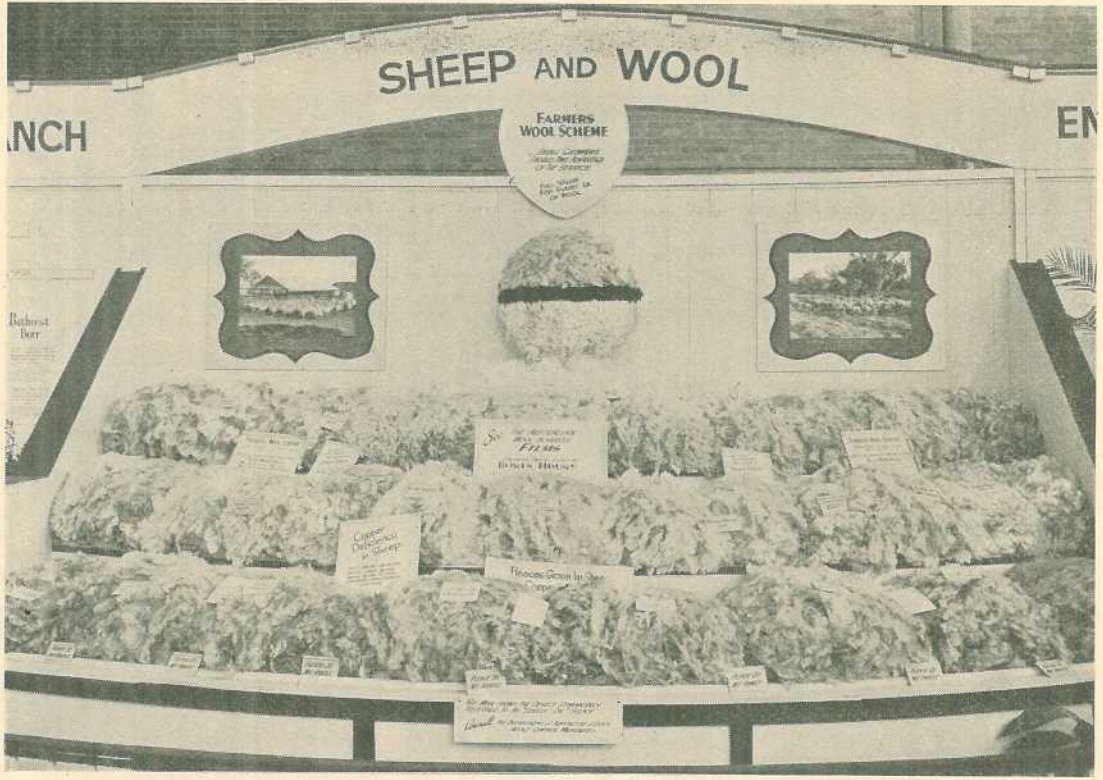


Plate 72.

A REPRESENTATION OF THE WOOL WEALTH OF THE WEST.—This display was made up largely of fine and medium-strong fleeces from Bowen Downs. In one row the effects of copper deficiency were shown, illustrating the importance of mineral sufficiency in pastures.

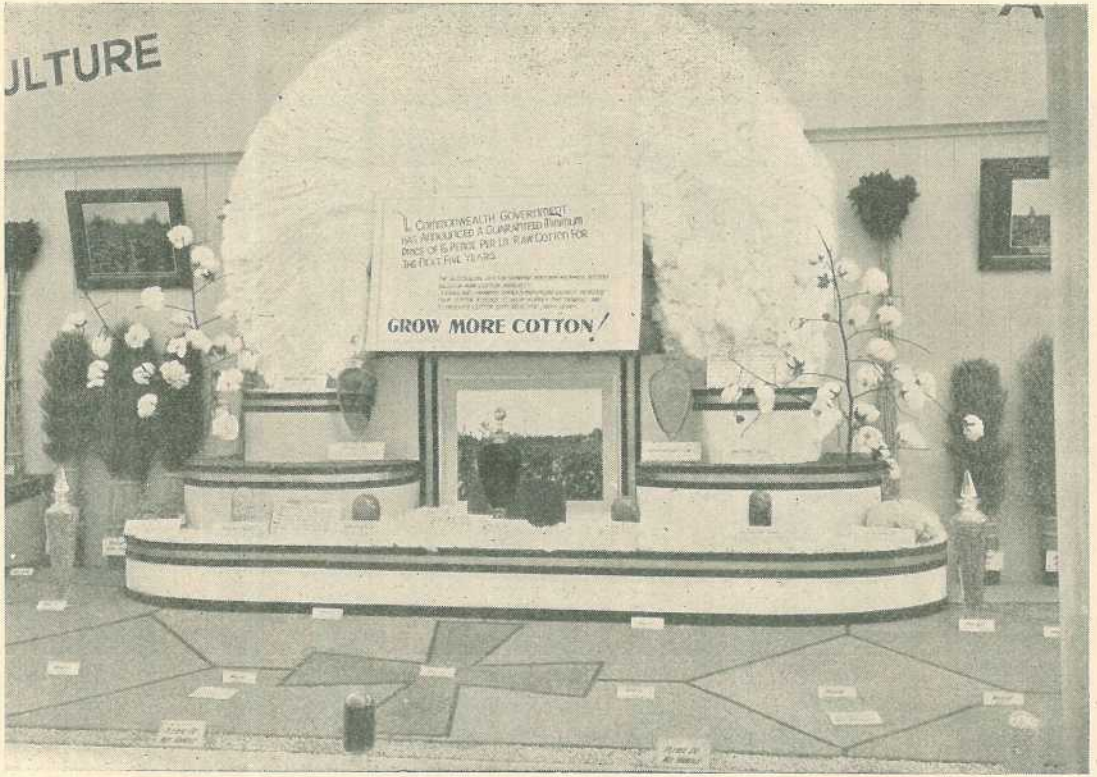


Plate 73.

CENTRAL FEATURE IN THE COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK, BRISBANE SHOW.

Plate 74.

SOIL CONSERVATION METHODS WERE DEMONSTRATED WITH A GROUP OF LANDSCAPE MODELS IN THE COURT OF AGRICULTURE.

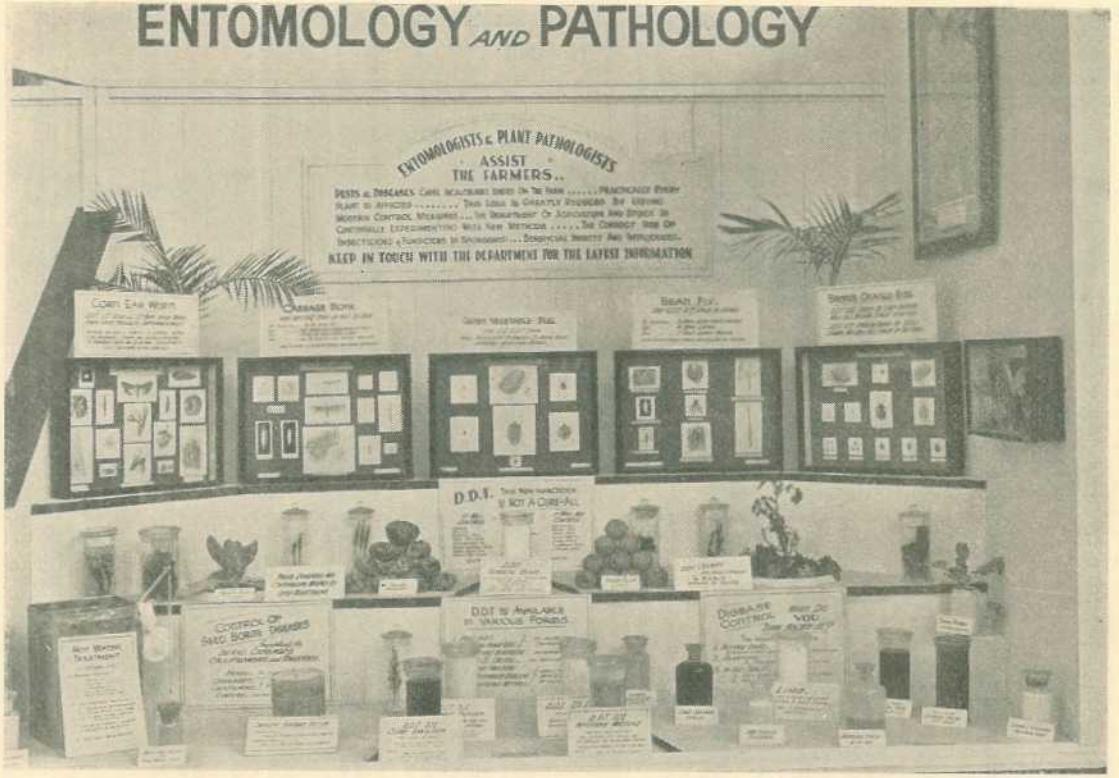


Plate 75.

How Science assists Agriculture by the control and treatment of vegetable pests and diseases was the text of this display by the Science Branch of the Division of Plant Industry.

Plate 76.

FODDER CONSERVATION.—Modern practice in stock food storage was the lesson of this display, which included scale models of tower, pit, trench and hillside silos, by the Agricultural Branch.

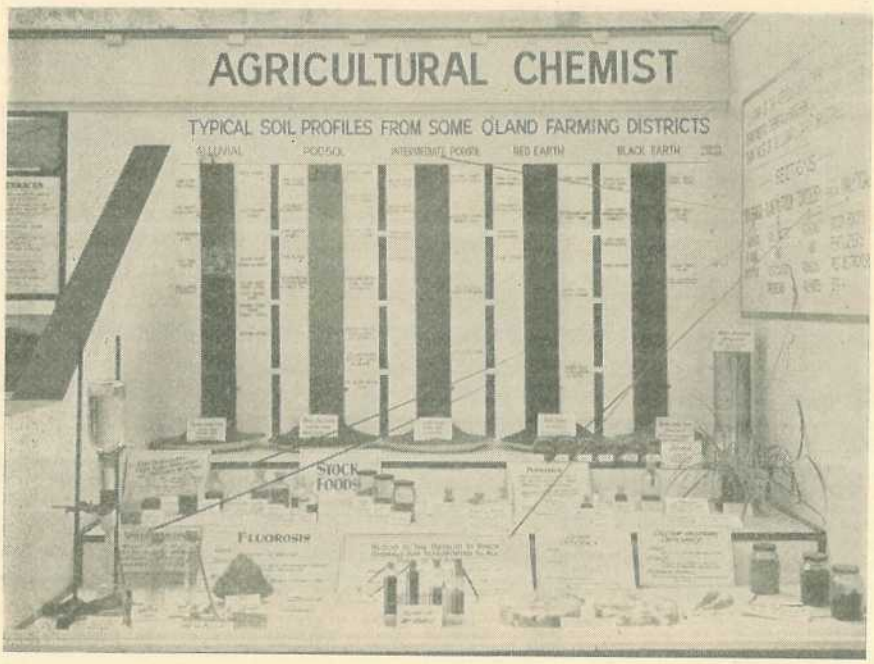


Plate 77.

AGRICULTURAL CHEMISTRY.—An Interesting and Educational Exhibit.

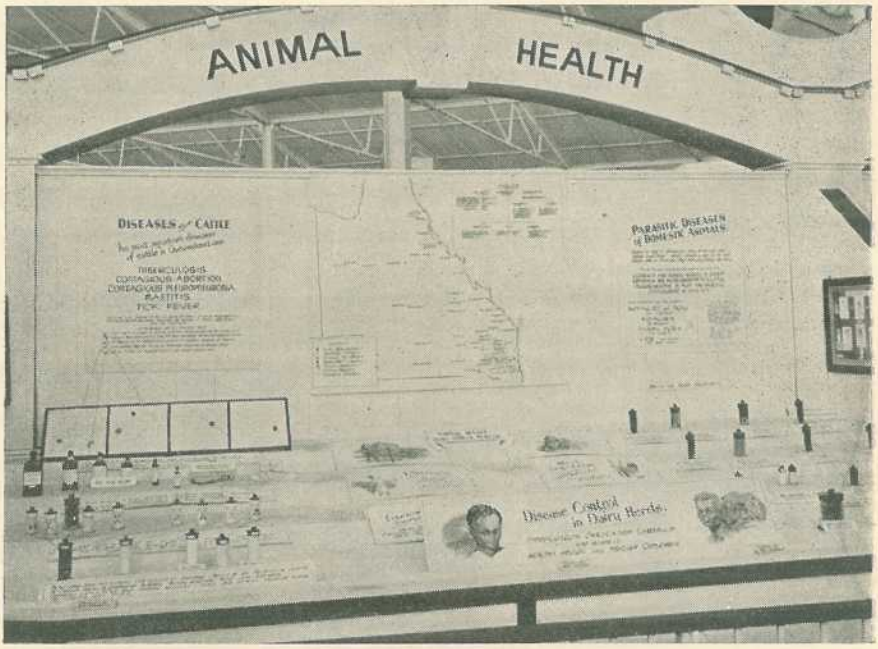


Plate 78.

DISPLAY OF THE ANIMAL HEALTH BRANCH, WITH STOCK DISEASES FROM DIAGNOSIS TO CURE AS THE MAIN THEME.

Plate 79.

THE JOURNAL CORNER.—A well-organized and efficient information service for farmers at the Show was provided by the Department of Agriculture and Stock in association with the Queensland Agricultural Bank. Messrs. E. Matthews (left) and W. Rutherford (right) were among the representatives of the Department and Bank, respectively.

GENERAL NOTES

Excess Moisture in Chaff.

The Minister for Agriculture and Stock (Mr. H. H. Collins) stated recently that complaints had been received by the Department of Agriculture and Stock that consignments of chaff were being received in very bad condition because of overwetting the hay before chaffing it. In such cases, not only is the buyer paying for water but the chaff deteriorates rapidly because of the formation of mould and, therefore, becomes unfit for use as fodder. The loss of fodder is particularly serious in this drought period in addition to the monetary loss sustained by the buyers.

The Minister explained that the *Stock Foods Acts and Regulations* provide that the amount of moisture (water) allowed in chaff must not exceed 12 per cent. by weight. Any person selling chaff which contains moisture above that percentage renders himself liable to proceedings under those Acts.

Assessment on Milk in South Coast Area.

The extension of tuberculin testing operations to dairy herds in the South Coast area from which milk supplies are drawn for consumption or use in the towns of Southport and Coolangatta, and that portion of the area of the Nerang Shire east of the South Coast railway line, has been announced by the Minister for Agriculture and Stock (Hon. H. H. Collins).

In pursuance of the provisions of the *Diseases in Stock Acts*, the Minister has levied an assessment of one-farthing (¼d.) on every gallon of milk supplied for consumption or use in such area, which shall be payable from the 8th July.

An *Order in Council* and *Regulation* making provision for the collection of the levy in the area in question and its payment to the Under Secretary, Department of Agriculture and Stock, on milk supplied during each period of three calendar months ending respectively on 31st March, 30th June, 30th September, and 31st December, have received the approval of the Executive Council.

Hitherto, said Mr. Collins, testing operations which have been in progress for some time in the South Coast area have been restricted to the herds from which milk supplies are drawn for the Brisbane market. The extension of the levy provisions of the *Diseases in Stock Acts* to the South Coast and the testing of all herds in that area is in furtherance of the Government's policy of a pure milk supply in this State.

BROOM MILLET SEED FOR SALE.

To growers desirous of obtaining a pure and reliable strain of White Italian Broom Millet seed, the Department is offering a limited supply of seed raised from a specially selected strain.

Applications for seed, with accompanying remittance, should be addressed to—

The Under Secretary,
Department of Agriculture and Stock,
BRISBANE.

Postal address and name of railway station should be given.

Price.—The seed is being retailed at **6d. per lb.**, freight paid to purchaser's nearest railway station. Each applicant is limited to 10 lb.

Care of Mother and Child.

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

CARE OF THE EXPECTANT MOTHER.

THE objects of the care of the expectant mother are so to conduct the mother and child through pregnancy as to ensure that both are healthy and strong and ready for the birth of the baby, with the assurance of a successful confinement, a living child, and a prompt recovery by the mother, while the newly born infant is given a good start in life.

In order to obtain these results it is necessary to build up the mother's health by making sure that she has the right kind of food. Some mothers think they must overeat, thinking they must feed two. This is not so. It is not *how much* the mother eats but *what* she eats that matters. To supply the needs of her growing baby and herself, an expectant mother requires more body-building material, and particularly more lime, iron, and vitamins than does a woman who is not pregnant. These can be supplied in the diet without adding to its bulk. Without a sufficient supply of these substances, both the mother and the child suffer. The child may be born anaemic or have defective teeth or have rickets, or be unable to resist illnesses, while the mother is more prone to anaemia or haemorrhages if these substances are lacking.

Foundation foods—which are milk, meat, the dairy products, fruit, vegetables, and wheatmeal bread—should form the basis of the diet. An expectant mother should take 2 pints of milk, one or two substantial helpings of green vegetables, an apple or orange, 1 oz. of butter, and 5 oz. of cheese, 6 oz. of potatoes, 4 oz. of meat, wheatmeal bread, and wheatmeal or oatmeal porridge in her daily diet. Fish should be had twice weekly, and liver (preferably calf's) twice weekly also. In addition, the mother should take 2 teaspoons of cod liver oil daily. Milk should be pasteurized, and if this is not procurable all milk should be boiled. If mothers cannot obtain fresh milk a good brand of full-cream dried milk should be used. If, for any reason, the mother is not able to get any of the above-mentioned articles of diet, she should consult her doctor or ante-natal clinic and they will, by the addition of concentrated vitamins and minerals, make up for any deficiency.

By keeping strictly to this diet the child has a good start before he is born and while he is being fed by his mother, and will have the power to respond to treatment when overtaken by illness; but, if the diet has been neglected, the child will be born puny and with less power to resist disease; and even if he is well fed during childhood he will be handicapped, both in development and in the power to resist infection, for many years.

Attention should be given to the general health of the mother, and this is most important. Long walks in the cool of the evening are helpful by promoting sleep, aiding digestion, and keeping the muscles in good condition. Violent exercise of any

kind must be avoided. An expectant mother should have at least eight hours sleep daily, and a rest in the middle of the day, with the feet elevated, should be taken where possible. Sitting on a high stool to iron, peel vegetables, and do other tasks, and putting the feet up while mending or sewing, will help the busy mother to get the necessary rest. Tepid plunge baths may be taken until the last two months, when a shower should replace the plunge. The teeth should be cleaned after every meal, and decayed teeth should be extracted at once. Alcohol and tobacco are definitely injurious to the growing baby and should be prohibited.

The breasts should be washed daily with warm water and soap, gently dried, and massaged. Constipation is common with pregnancy, and fluids, fresh fruits, green vegetables, wholemeal brown bread, porridge, and a glass of hot water immediately on rising or just after, all have a laxative effect. If an aperient is necessary the doctor or ante-natal centre should be consulted. All clothing should hang loosely, and tight garments and round garters should not be worn. Patterns for maternity corsets can be obtained at the *Maternal and Child Welfare Office*, 184 *St. Paul's Terrace, Brisbane.* High-heeled shoes should not be worn.

An important duty of the doctor and nurse is to prepare the mother for her approaching confinement, and this cannot be done unless she visits her doctor or ante-natal centre regularly. By so doing she will be educated to approach her confinement with a quiet, confident, and untroubled mind, and much invalidism and wretchedness will have been prevented.

In her own interests the expectant mother is, therefore, urged to co-operate with her doctor or centre by attending regularly, and if she cannot do so she can enrol with the *Ante-natal Correspondence Service at* 184 *St. Paul's Terrace* and advice will be freely and willingly given.

Any further information may be obtained by communicating personally with the *Maternal and Child Welfare Information Bureau*, 184 *St. Paul's Terrace, Brisbane*, or by addressing letters "Baby Clinic, Brisbane." These letters need not be stamped.

IN THE FARM KITCHEN.

Our Daily Bread.

Buttermilk Bread.

Any light loaf of the scone type is quickly made, but this one that makes use of buttermilk can be mixed and baked in next to no time. Served with butter it is delicious either hot or cold—and useful when the bread supply is low: 1 lb. either wholemeal or white flour, 1 teaspoon cream of tartar, 1 teaspoon carbonate soda, 1 level teaspoon salt, ½ pint buttermilk (about). If sweet milk is used, half the quantity of carbonate soda. Sift flour, salt, and rising powders into a bowl. Add buttermilk, and with a pliable knife mix to a fairly soft dough. Turn on to a floured board, knead lightly and quickly, and shape into a round flat cake or a long roll. Place on a floured oven tray and bake in a hot oven for 20-30 minutes—according to thickness. The appearance is improved by glazing with beaten egg or milk before baking.

Currant Bread.

Three pound flour, 3 teaspoons salt, 1 oz. yeast, 2 teaspoons sugar, 3 oz. lard, 10 oz. currants, 1 pint milk, ½ pint water. Spices may be substituted for currants. Add the salt and currants to the flour and warm. Cream the yeast with the sugar. Melt the lard in the milk, add the water and make lukewarm. Add a little to the yeast, make a hole in the centre of the flour, pour in the yeast, and mix to a light dough with the liquid. Knead well, set to rise till double the size. Knead down, form into loaves, place in greased tins, allow to rise to top of tin. Place in a hot oven and bake half an hour.

Brown Health Loaf.

This is tasty and wholesome, and can be made and baked in an hour. Take 2 cups wholemeal flour, 2 cups bran, 1 cup plain flour, pinch of salt, 2 teaspoons cream of tartar, 1 teaspoon carbonate soda, 1 tablespoon brown sugar, 2 tablespoons treacle, 1 cup fruit (dates, raisins, or sultanas). Mix to a soft dough with milk, and bake in a baking dish about three-quarters of an hour.

Brown Bread.

Take 2 cups flour, 1 cup wholemeal, 1 teaspoon each carbonate soda and cream of tartar, 1 tablespoon treacle, about 2 cups buttermilk. Method—Bake for an hour.

QUEENSLAND WEATHER IN AUGUST.

During the third week of August some light, scattered and mostly unimportant showers and local thunder were reported in parts of the Central Highlands, East Downs, and Moreton districts. Apart from this retricted area, August completed a four-months practically rainless period over most of the State, and in many inland areas the dry spell commenced after the useful January distribution. District average aggregate rainfall figures for the four months, as shown in the table below, are either the lowest or near lowest records for the specific four months. Soaking relief rains, followed by mild conditions, are required in practically all pastoral, agricultural, and dairying districts. With cold dry air and cloudless skies, persistent frosts have also been widespread during the winter, adverse affects on growing crops, fruit, and cane being reported over the south-east quarter and well north through the Central Coast tropical section.

Pressure.—The steady sequence of dry cold air continental anticyclones was maintained, centres moving slowly across inland Australia. As in the previous month the excessive low pressure activity over waters south of the Continent did not penetrate inland. There was a complete absence of any tropical air flow or useful trough formations. Between the 24th and 28th, a slight dip formation brought isolated showers and thunder between the Central Highlands and the south-east corner of the State, but the Moreton district averaging only 39 points was easily the best distribution.

Temperatures.—Average maximum temperatures were again above normal, from 0.1 deg. at Boulia to 4.5 deg. at Mitchell. Minimum averages were mostly considerably below, from 0.4 deg. at Longreach to 6.5 deg. at Palmerville. Boulia and Urandangie recorded five consecutive days over 90 deg.

Frosty Nights.—Herberton, 1; Tambo, 14 (extremes 30 deg./20 deg., 1st); Stanthorpe, 23 (extremes 17 deg./8 deg., 5th); Mitchell, 26 (12 consecutive, extremes 24 deg./15 deg., 20th). Local frosts also affected South and Central Coast districts.

Dust and smoke haze periods accompanied a more than usual number of *local bush fires* in the south-east quarter of the Staee. In the metropolitan and adjacent areas many calls were made on the fire brigade, especially about the middle of the month. Brisbane 3 p.m. average relative humidity of 36 per cent. for the month was 12 per cent. below normal.

The rainfall position is summarised below:—

Division.	Normal Mean.	Mean 1946.	Departure from Normal.	Aggregate 4 mths. total May, June, July, and August.	Average May, June July, and August.
	Points.	Points.	Per cent.	Points.	Points
Peninsula North	20	2	90 below	183	257
Peninsula South	7	Nil	100 ,,	Nil	126
Lower Carpentaria	10	Nil	100 ,,	3	119
Upper Carpentaria	25	Nil	100 ,,	1	208
North Coast Barron	114	20	82 ,,	397	733
North Coast Herbert	167	6	96 ,,	306	1,065
Central Coast East	77	Nil	100 ,,	68	550
Central Coast West	50	Nil	100 ,,	13	326
Central Highlands	84	12	86 ,,	28	486
Central Lowlands	48	Nil	100 ,,	15	334
Upper Western	16	Nil	100 ,,	1	175
Lower Western	32	Nil	100 ,,	Nil	225
South Coast Port Curtis	118	23	81 ,,	103	750
South Coast Moreton	169	39	77 ,,	141	1,042
Darling Downs East	131	19	85 ,,	88	651
Darling Downs West	88	4	95 ,,	29	531
Maranoa	91	1	99 ,,	14	533
Warrego	75	Nil	100 ,,	13	428
Far South-west	49	Nil	100 ,,	19	316

Commonwealth Meteorological Bureau, Brisbane.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

AUGUST RAINFALL.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of years' records.	Aug., 1945.	Aug., 1946.		Aug.	No. of years' records.	Aug., 1945.	Aug., 1946.
North Coast.	In.		In.	In.	*South Coast—cont'd.*	In.		In.	In.
Atherton	0·84	42	0·72	0·12	Gatton College ..	1·08	44	1·08	0·42
Cairns	1·65	61	0·37	0·13	Gayndah	1·12	72	0·26	0·52
Cardwell	1·22	71	0·16	0·12	Gympie	1·65	73	0·16	0·50
Cooktown	1·17	67	0·52	0·33	Kilkivan	1·35	62	0·17	0·46
Herberton	0·61	57	0·33	0·15	Maryborough ..	1·61	72	0·42	0·64
Ingham	1·44	51	0·67	0·03	Nambour	1·88	47	0·22	0·04
Innisfail	4·85	62	1·24	0·14	Nanango	1·29	61	0·88	0·57
Mossman	1·34	19	0·32	0·10	Rockhampton ..	0·82	72	0·01	0·01
Townsville	0·50	72	Nil	Nil	Woodford	1·61	55	0·51	0·45
Central Coast.					*Darling Downs.*				
Ayr	0·58	56	0·09	Nil	Dalby	1·16	73	1·37	0·03
Bowen	0·72	72	Nil	Nil	Emu Vale	1·06	47	1·26	0·30
Charters Towers ..	0·50	61	Nil	Nil	Jimbour	1·10	64	0·82	0·20
Mackay	1·09	72	0·09	Nil	Miles	1·08	58	1·53	0·07
Proserpine	1·45	40	0·78	Nil	Stanthorpe	1·73	70	2·85	0·30
St. Lawrence ..	0·79	72	0·48	Nil	Toowoomba	1·58	71	2·15	0·58
South Coast.					Warwick	1·40	78	2·28	0·05
Biggenden	1·04	44	0·04	0·35	*Maranoa.*				
Bundaberg	1·27	60	Nil	0·13	Roma	0·86	69	0·76	Nil
Brisbane Bureau ..	1·89	94	0·87	0·40	St. George	0·91	62	1·11	Nil
Caboolture	1·62	67	0·42	0·67	*Central Highlands.*				
Childers	1·21	48	0·03	0·48	Clermont	0·70	72	Nil	0·03
Crohamhurst	2·17	50	0·50	1·37	Springsure	0·99	74	0·03	0·61
Esk	1·39	56	0·48	0·42					

CLIMATOLOGICAL TABLE FOR AUGUST.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Atmospheric Pressure Mean at 9 a.m.	Shade Temperature.		Extremes of Shade Temperature.				Rainfall.	
		Mean Max.	Mean Min.	Max.	Date.	Min.	Date.	Total.	Wet Days.
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Pts.	
Cairns	..	80	52	87	15	49	3	13	1
Herberton	..	73	50	81	15	33	3	15	1
Townsville	..	79	66	88	19	47	3	Nil	..
Rockhampton	30·12	80	48	89	14	38	16, 20, 21	1	1
Brisbane	..	76	49	91	14	42	21, 22	40	1
Darling Downs.									
Dalby	..	75	38	90	13	28	31	3	1
Stanthorpe	..	68	20	85	13	17	5	30	1
Toowoomba	..	71	38	86	13	21	17	58	1
Mid-Interior.									
Georgetown	30·05	85	51	90	11	46	2, 3	Nil	..
Longreach	30·15	82	46	92	12	40	17, 20	Nil	..
Mitchell	30·16	75	34	92	13	24	20	4	1
Western.									
Burketown	..	85	56	92	10	49	2	Nil	..
Boulia	30·10	79	47	93	13	39	20, 21	Nil	..
Thargomindah	30·13	73	43	95	13	37	5	Nil	..

A. S. RICHARDS, Divisional Meteorologist.

Commonwealth of Australia,
Meteorological Bureau, Brisbane.

ASTRONOMICAL DATA FOR QUEENSLAND.

Supplied by the Astronomical Society of Queensland.

OCTOBER.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES.					
Day.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	5.29	5.47	Cairns	37	20	Longreach	39	31
6	5.23	5.49	Charleville ..	28	26	Quilpie	34	36
11	5.18	5.52	Cloncurry	55	44	Rockhampton ..	14	7
16	5.13	5.55	Cunnamulla ..	29	30	Roma	18	16
21	5.07	5.58	Dirranbandi ..	18	20	Townsville ..	31	18
26	5.03	6.01	Emerald	23	15	Winton	44	35
31	5.00	6.04	Hughenden ..	40	29	Warwick	3	4

TIMES OF MOONRISE AND MOONSET.

At Brisbane.		
Day.	Rise.	Set.
	a.m.	p.m.
1	9.00	11.06
2	9.42	11.59
3	10.29	..
		a.m.
4	11.19	12.51
	p.m.	
5	12.14	1.40
6	1.12	2.25
7	2.11	3.07
8	3.11	3.46
9	4.12	4.22
10	5.14	4.58
11	6.18	5.33
12	7.23	6.11
13	8.31	6.51
14	9.39	7.35
15	10.47	8.25
16	11.51	9.20
17	..	10.21
	a.m.	
18	12.49	11.24
	p.m.	
19	1.41	12.28
20	2.25	1.30
21	3.04	2.30
22	3.39	3.28
23	4.11	4.24
24	4.43	5.19
25	5.14	6.14
26	5.46	7.08
27	6.20	8.03
28	6.57	8.58
29	7.38	9.52
30	8.22	10.44
31	9.11	11.33

MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).

Charleville 27 ; Cunnamulla 29 ; Dirranbandi 19 ;
Quilpie 35 ; Roma 17 ; Warwick 4.

MINUTES LATER THAN BRISBANE (CENTRAL DISTRICTS).

Day.	Emerald.		Longreach.		Rockhampton.		Winton.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	28	11	44	26	19	1	52	29
6	27	12	43	26	18	1	51	29
11	17	20	32	36	8	11	37	42
16	10	29	26	44	0	20	28	52
21	14	23	29	39	4	14	33	45
26	24	14	40	29	15	4	46	33
31	29	10	45	25	20	0	52	28

MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS)

Day.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	51	5	65	34	49	20	42	7
3	53	4	67	34	50	20	44	6
5	52	5	66	34	50	20	43	7
7	45	10	61	38	45	23	37	11
9	35	19	54	44	39	29	29	18
11	23	32	46	52	31	37	21	27
13	13	42	39	58	24	44	13	35
15	6	50	36	63	20	49	7	42
17	5	52	35	65	20	50	6	44
19	8	48	37	62	21	48	8	40
21	15	39	41	57	26	42	15	33
23	26	30	48	50	33	35	22	25
25	36	19	55	44	40	29	30	18
27	45	10	61	38	45	23	37	11
29	51	4	65	34	49	20	42	6
31	53	4	67	34	50	20	44	6

Phases of the Moon.—First Quarter, October 3rd, 7.53 p.m.; Full Moon, October 11th, 6.40 a.m.; Last Quarter, October 17th, 11.28 p.m.; New Moon, October 25th, 9.32 a.m.

On October 16th the sun will rise and set 10 degrees south of true east and true west respectively, and on October 10th and 24th the moon will rise and set at true east and true west respectively.

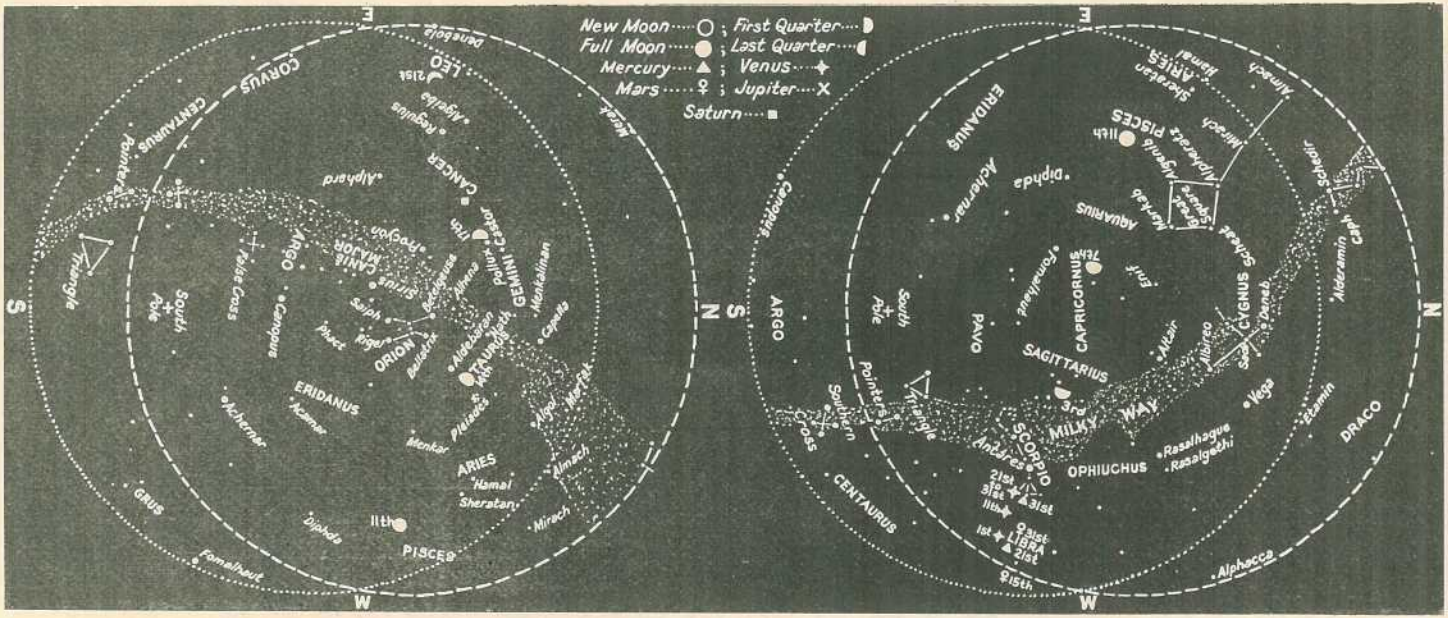
Mercury.—At the beginning of October, not far from Spica, Mercury will set about 1 hour after the sun. Throughout the month the interval of setting after sunset will increase until the 31st, when it will be at its greatest angle east of the sun, and will set about 2 hours after sunset. It will then have reached "the head" of Scorpio.

Venus.—On October 13th reaches greatest brilliancy, and on October 28th will be stationary, after which it will appear to retrace its path among the stars. It will set between 9.10 p.m. and 10.15 p.m. on the 1st and between 8.10 p.m. and 9.15 p.m. at the end of the month. It, too, will be in "the head" of Scorpio at the end of the month.

Mars.—At the beginning of the month, near Jupiter, will set between 7.50 p.m. and 8.50 p.m., but by the end of the month, not far from Scorpio, may be difficult to be seen in the glow of the setting sun, when it will set between 7.30 p.m. and 8.30 p.m.

Jupiter.—Will set between 7.30 p.m. and 8.30 p.m. on the 1st, but later in the month it will be too close in line with the sun for observation, being in conjunction with the sun on the 31st.

Saturn.—At the beginning of the month will rise between 2.15 a.m. and 3.30 a.m. about 23 degrees north of true east, and at the end of the month will rise about midnight.



Star Charts.—The chart on the right is for 7.15 p.m. in the south-east corner of Queensland to 8.15 p.m. along the Northern Territory border on the 15th October. (For every degree of longitude we go west, time increases 4 minutes.) The chart on the left is for 9 hours later. On each chart the dashed circle is the horizon at Cape York and the dotted circle the horizon along the New South Wales border. When facing north hold "N" at the bottom; when facing south hold "S" at the bottom, and similarly for the other directions. Only the brightest stars are included, and the more conspicuous constellations named. The stars which do not change their relation to one another, moving east to west, arrive at any selected position about 4 minutes earlier each night. Thus, at the beginning of the month the stars will be in the positions shown above 1 hour later than the time stated for the 15th, and at the end of the month about 1 hour earlier than that time. The positions of the moon and planets, which are continually changing in relation to the stars, are shown for certain marked days. When no date is marked the position is for the middle of the month.

AUSTRALIAN WOOL REALIZATION COMMISSION

Notice to Exporters of Wool

The Commonwealth Government has directed that the prohibition on the export of wool unless the export be with the permission of the Minister for Trade and Customs is to continue, and the prohibition is to be administered by the Department of Trade and Customs in collaboration with the Australian Wool Realization Commission.

The following procedure will apply to shorn wool (greasy or scoured) and wool derived from sheepskins, but it will not apply to wool consigned by a grower for sale by auction in the United Kingdom; to wool on the skin; to manufactured wool, including wool tops, wool noils, or manufacturer's wool waste.

1. Collectors of Customs will not permit the export of SHORN WOOL OR WOOL DERIVED FROM SHEEPSKINS (not being wool consigned by a grower for sale by auction in the United Kingdom) unless the exporter produces a certificate from the Commission to say that he is an exporter approved by the Commission.

2. **A Certificate of Approval will be granted by the Commission only on the condition that the exporter does not export any shorn wool, whether greasy or scoured** (not being wool consigned by a grower for sale by auction in the United Kingdom), **which has not been purchased at an auction approved by the Commission.**

3. The Certificate should be presented by the exporter to the Collector of Customs in the State concerned, who will retain it and record the exporter as an exporter of wool approved by the Commission in terms of the Certificate.

4. A duplicate of the Certificate will be supplied for the exporter's own records.

5. The Commission's approval of an exporter will be withdrawn should that exporter export or attempt to export shorn wool not purchased at an auction approved by the Commission.

6. Wool appraised under the National Security Wool Regulations which has not since been purchased by public auction will not be covered by the Certificate and, as at present, the Collector of Customs will require the endorsement of the Australian Wool Realization Commission (State Office) on applications for licences to export such appraised wools.

7. The serial number of the Certificate must appear on all applications for licenses to export shorn wool which has been purchased at auction or wool derived from sheepskins, but not on applications for licences to export wool which is not covered by the Certificate.

Exporters who wish to export shorn wools or wool derived from sheepskins under the conditions determined by the Government and who have not received a certificate of approval as an exporter from the Australian Wool Realization Commission should make application to the Commission at the address below.

Merchants. dealers, repackers, and country buyers who desire to buy direct from growers may do so, but before the export of the wool so purchased will be possible it will be necessary to submit that wool to auction in Australia in the normal way. Persons desiring to fulfil orders received from overseas clients will have full opportunity to purchase their requirements at auction.

Growers who wish to continue their prewar practice of consigning wool to their brokers in the United Kingdom for sale by auction there may do so without application to the Commission for an approval to export, but under the Contributory Charge legislation such growers must complete an approved arrangement with the Commissioner of Taxation for purposes of ensuring the collection of the correct amount of Contributory Charge.

H. B. LEIGH, Secretary,
540-542 Lt. Collins Street, Melbourne.

31st August, 1946.