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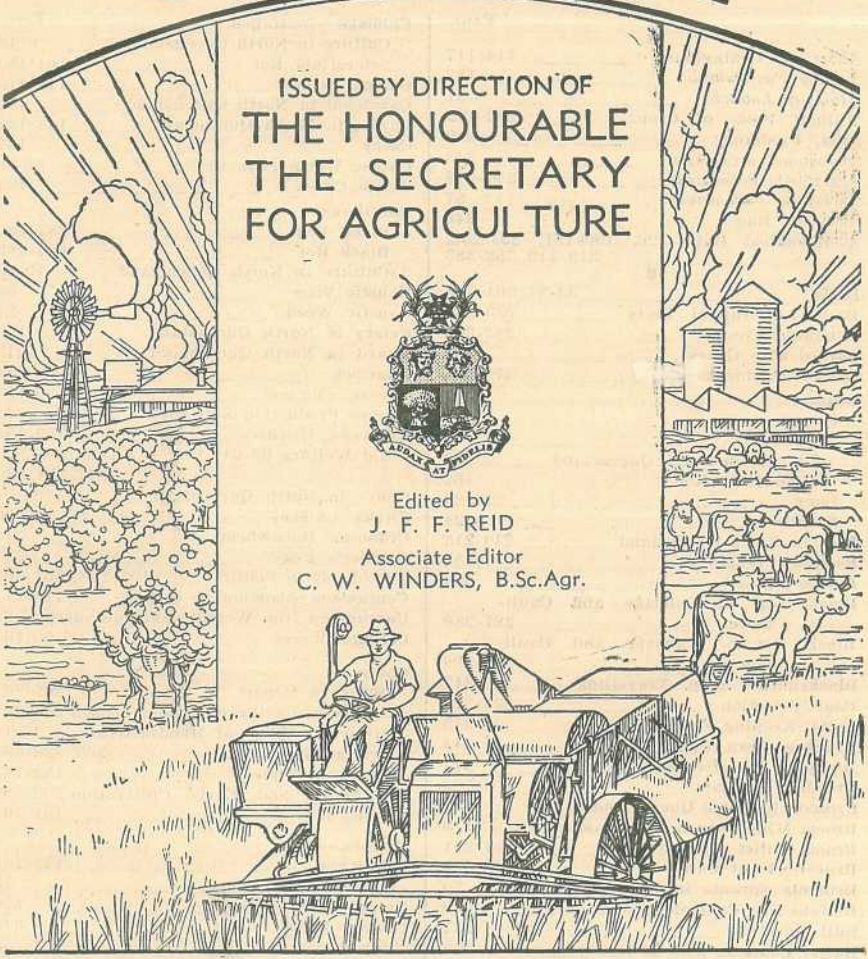
Volume 59

# QUEENSLAND AGRICULTURAL JOURNAL



ISSUED BY DIRECTION OF
THE HONOURABLE
THE SECRETARY
FOR AGRICULTURE

Edited by
J. F. F. REID
Associate Editor
C. W. WINDERS, B.Sc.Agr.

JULY TO DECEMBER, 1944

Vol. 59 Parts 1 to 6

# QUEENSLAND AGRICULTURAL JOURNAL

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Volume 59 Part 1

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## JULY, 1944

Issued by Direction of
THE HONOURABLE T. L. WILLIAMS
MINISTER FOR AGRICULTURE AND STOCK

GOVERNMENT PRINTER, BRISBANE

# Contents

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

# QUEENSLAND AGRICULTURAL JOURNAL

Volume 59 | 1 JULY, 1944 | Part 1

## Event and Comment.

### Food is Part of the Armament of Victory.

ON the free countries of the world still rests the obligation of contributing to the urgent food requirements of countries now regaining some measure of their former liberty as a consequence of the continued success of the Allied attack. It has to be remembered, too, that food has to be taken over every ocean to the Allied armies, and also to the hungry peoples they set free in every mile of their advance to victory. For the people of Britain also, essential food supplies must be kept up. Therefore, the necessity of maintaining food production to the limit of our means and opportunity is as urgent as ever. For us, there is a second *second* front, and that front is marked by the crop land on our farms and the grass land on our pastoral holdings; it is a front on which food producers have been doing splendidly during *all* the years of war and it is a front which must be maintained, for food is definitely part of the armament of victory.

### Our Land and Water Resources.

APPOINTED under the provisions of *The Land and Water Resources Development Act of* 1943, the Bureau of Investigation has under consideration, among other proposals, the possibilities of developing the water resources of the Lockyer and Bremer Catchment Areas. An investigation of the underground water supplies of the Lockyer region has already been made by the Irrigation Department, and a similar investigation is in progress in respect of the Bremer area.

Lockyer Creek, with its principal tributaries—Buaraba, Laidley, Tent Hill, Ma Ma, and Flagstone Creeks—drain an area of 1,132 square miles, above its confluence with the Brisbane River north of Lowood. The aggregate area now under irrigation from both open water and well

supplies in the valleys of these streams is 11,000 acres. Irrigated cultivations in this and the contiguous Bremer Catchment Area are cropped mainly for vegetables and green stock feed, and their importance as sources of supply to metropolitan markets is considered by the Bureau to warrant close examination of the potentialities of water conservation in each district. The relationship between open and underground waters in both valleys has yet to be determined, but that will be established when practicable so that appropriate measures may be taken to conserve sufficient water to provide for future extension by farmers of areas now under irrigation.

Weiring projects in the Lockyer Valley have already engaged the attention of the Irrigation Department. One weir is complete and two more are under construction on Lockyer Creek between Gatton and Lowood, and the Bureau proposes to investigate the problem as to whether the weiring of the streams will stabilise the underground waters in the water-bearing sands and silts along the valley flats, in addition to providing open water storage.

In the course of a recent tour of inspection by the members of the Bureau, many farms along the Lockyer and Bremer, on which irrigation plants are in operation, were visited and potential weir sites along the several watercourses were inspected.

Investigation of several other regions where soil and water resources, rural amenities—including good roads and availability of electric power—are similar to those of the Lockyer and Bremer Valleys is also claiming the close attention of the Bureau. Co-ordination between the Bureau and the Department of Agriculture and Stock has been established, and matters relating to soils, crops, methods of cultivation, application of water, measures taken to attain high production and maintain fertility are discussed with field officers of the Department on the ground.

## The Soy Bean in Queensland.

REFERRING recently to the remarkable development of the soy bean industry in the United States, the Minister for Agriculture and Stock (Hon. T. L. Williams) predicted the early establishment of this crop on a substantial scale in Queensland, as a result of departmental trials now in progress. It was hoped, he said, to conduct more extensive trials with several varieties which have shown promise as a crop in general cultivation under Queensland conditions.

The Department of Agriculture and Stock has had many varieties of soy bean under trial for several seasons past, and some promising varieties of both grain and fodder types have been selected for further field tests. Shortage of staff and the wartime necessity of concentrating on increased production of established food crops has, naturally, limited experiment work. To establish soy bean production on a sound basis, it will be obviously necessary to select a type, or types, which will prove suitable under local conditions, but also which can be harvested mechanically, so that the crop may be grown at a cost which will attract the attention of both producers and consumers.

It should be distinctly understood, however, that *no seed stocks are at present available for distribution to farmers* by the Department of Agriculture and Stock, and that the small quantities of several varieties now held are required exclusively for trial purposes.


# Growing Maize for Grain.*

C. J. McKEON, Director of Agriculture.

THE demand for locally-grown grain for stock-feeding and other purposes is so heavy that many farmers will, during the coming summer, attempt to produce all or most of their own requirements of maize or other grains. In the drier agricultural districts, grain sorghums will be largely favoured, but where rainfall is adequate maize will be planted extensively. Provided the land is well drained, maize can be grown on any good-quality soil in the coastal and adjacent districts and on the eastern Darling Downs, the alluvial flats along river and creek banks and deep volcanic soils being particularly suitable for its growth.

## Preparation of Seed-bed.

To obtain the best results, the crop requires a good soil in which a plentiful supply of plant food is available; early and thorough preparation of the land before planting, and strict attention to the young crop and to the eradication of weeds during the early stages of growth are also essential to success.

The land should be ploughed to a depth of at least 9 inches during the winter, and allowed to lie in the rough until the early spring. The action of the rain and frost will have a sweetening effect on the soil and will leave it in a mellow condition. In the early spring, the land should receive a second ploughing which, if possible, should be a cross-ploughing. This should not be as deep as the first and should be immediately followed by a harrowing and cross-harrowing to work the surface soil into fine condition.

If a crop of weeds is turned under during the second ploughing, sowing should not be carried out for some weeks in order to allow decomposition to take place. On the lighter soils, but more particularly on those which are inclined to dry out readily, this will be greatly assisted by rolling, as the rolling will consolidate the soil and thereby accelerate decomposition of the weeds which have been turned under. Rolling should always be followed by a light harrowing.

The preparation of the seed-bed is one of the most important operations in the production of maize, and no amount of after-cultivation will undo the damage that has been caused by sowing on badly prepared land. The crop should be given a chance to become

* A comprehensive bulletin on maize growing is obtainable from the Department of Agriculture and Stock, Brisbane.

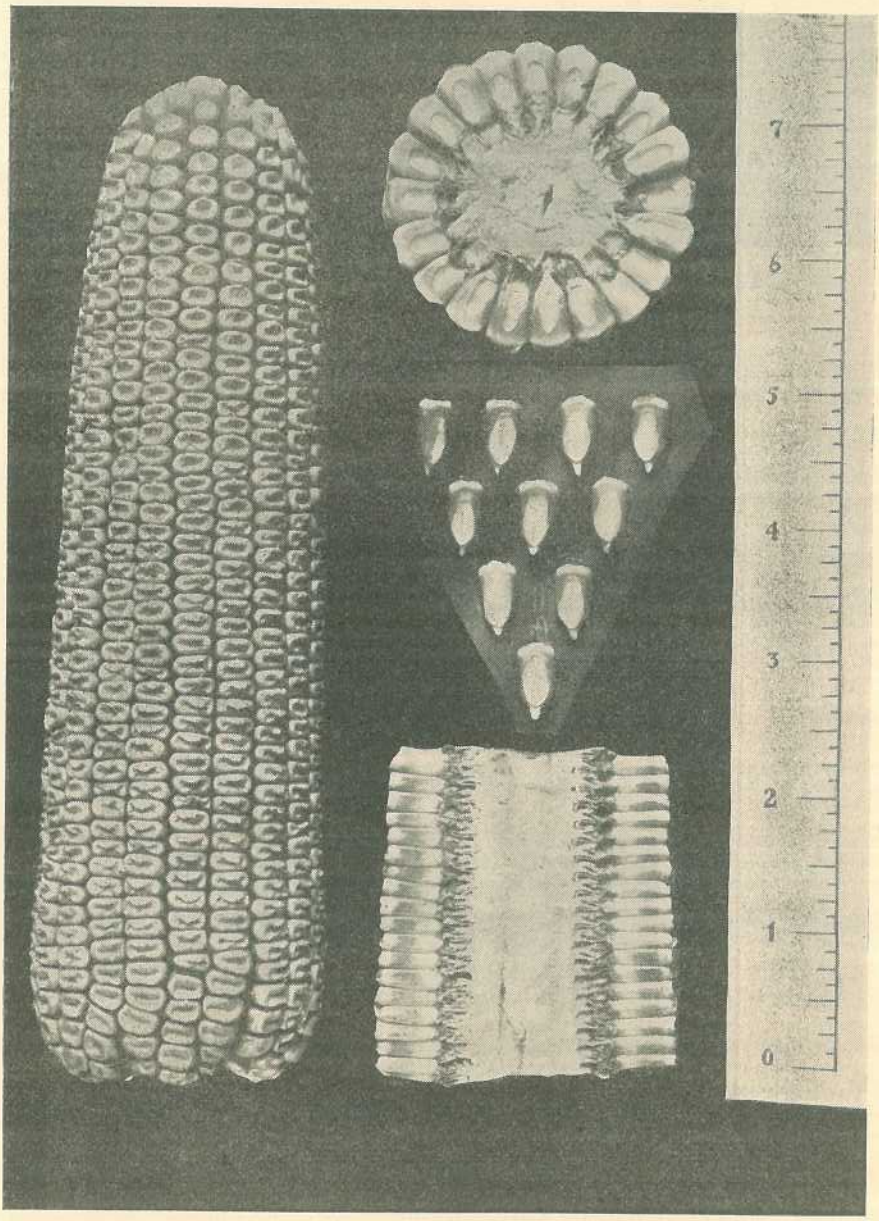



Plate 1.
FUNK'S 90-DAY.

thoroughly established in a well-prepared seed-bed in which the young plants will not have to battle with a host of weeds. The increased return will more than compensate for the extra time and labour spent in the preparation of a really good seed-bed.

### Sowing.

The best time to sow maize for grain will naturally depend on local conditions. In districts which have a long growing season and a comparatively well distributed rainfall, sowings may be made whenever weather conditions are suitable from August to late December. In districts where early frosts are likely to occur it is not advisable to sow later than the middle of December unless a quick-maturing variety is grown, in which case sowing may be carried out as late as the end of December.

Two very important points in connection with the sowing of the crop are, firstly, the choice of a variety which has proved suitable for the district, and secondly, the arrangement of sowings so that the crops will tassel at a time when there is a likelihood of rain occurring. Maize requires moist conditions during tasselling, and if hot dry winds occur then the pollen is destroyed and fertilization cannot take place.

When grain production is the objective, seed should be sown in drills spaced not less than 3 feet 6 inches apart, nothing less than 4 feet spacing being adopted for the tall-growing, late-maturing varieties. The spacings mentioned are for average good soils in districts enjoying a reasonably good rainfall; in drier districts, however, or on poorer classes of soil, the distance may be increased to as much as 4 feet 6 inches. As a general rule, single spacing in the drills gives the most satisfactory results, the grain being dropped singly along the drills with a distance of approximately 12 inches between the individual seed for the early-maturing varieties and from 15 to 18 inches for the late-maturing varieties. From 8 to 10 lb. of seed is sufficient to sow an acre when sown in this manner.

By far the most satisfactory method of sowing is with a seed drill, as by the employment of that implement it is possible to get an even spacing and no loss of moisture occurs, as is often the case when furrows are opened for hand planting. Either single or double-row seed drills may be used, according to the size of the area to be sown. Several different makes are available, each of which can be adjusted to sow the grain at the desired depth, the rate of seeding being regulated by the use of a plate with holes of the required size and number.

In districts where the rainfall is heavy and difficulty is experienced in keeping weed growth in check, many growers run out shallow drills a few inches deep with a light plough or other suitable implement and then sow along the bottom of the drills with a seed drill. When the young maize plants are high enough, the cultivator is worked through the rows and is set in such a way that the soil is drawn in round the plants, filling up the depression made when drilling and thereby smothering the young weeds which have sprung up in the rows. To be effective, this must be done while the weeds are very young. Such a procedure is also of value in areas where the top soil is liable to dry out quickly.

### Varieties.

Practically every variety of maize shows great variability in type due to the fact that, unlike wheat, it is not naturally self-fertilized.

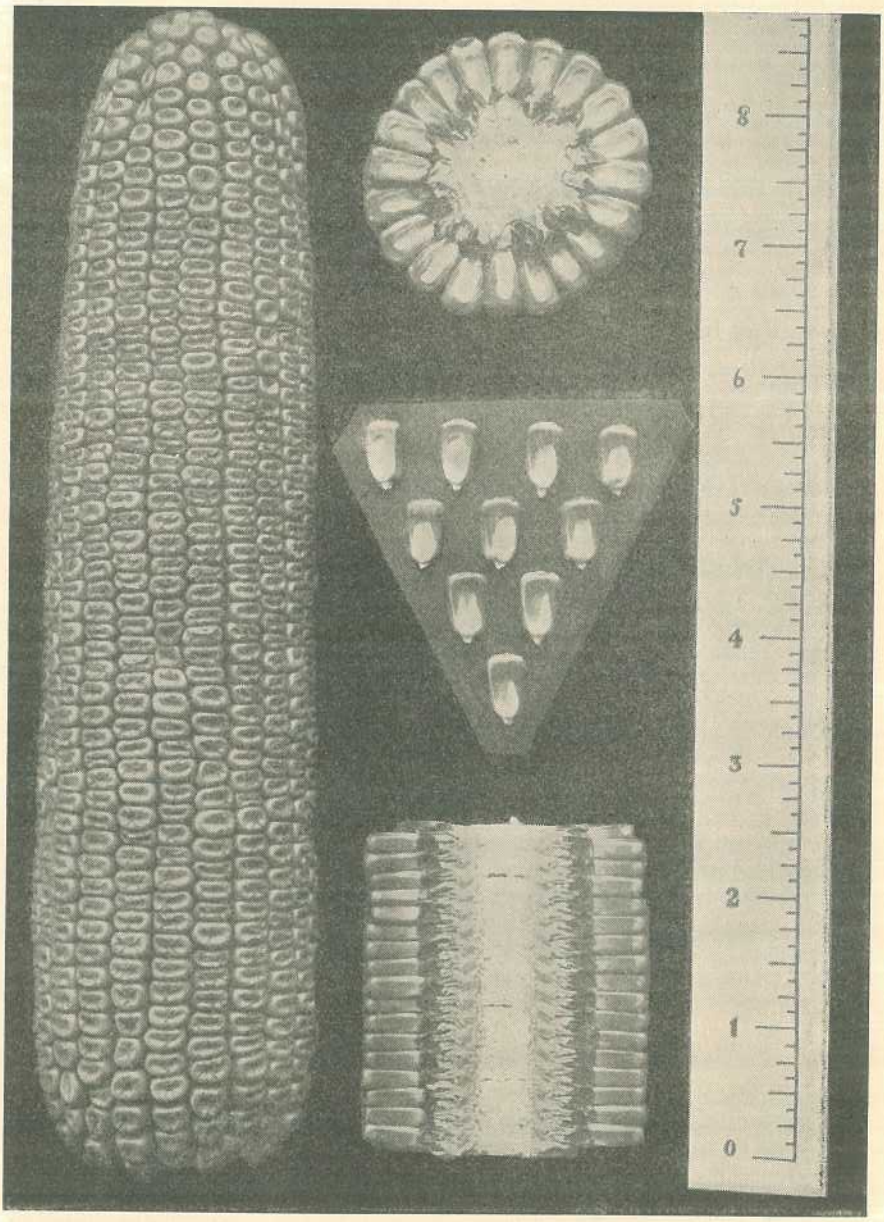



Plate 2.
STAR LEAMING.

Anyone who has been in a field of maize during the tasselling period and has seen the cloud of pollen which is carried throughout the field by wind can readily appreciate the amount of cross-fertilization which takes place. The constant crossing of the different genetic types causes great variability, and consequently there is not the same uniformity of type, even in varieties which have been kept absolutely pure and have been carefully selected for many years, as in those cereals which are self-fertilized. Environment also has an effect on type. Quite frequently the type of a particular variety is also changed through a grower having a fancy for a type other than the predominant one and selecting closely to that type each season.

It is evident that even the best and most carefully selected varieties will show at least some variation in type, and in giving a description of any variety the type which occurs with the greatest frequency is that which is used as a standard.

It will also be readily seen how quickly any variety can lose its varietal characteristics as a result of excessive cross fertilization, particularly in closely-settled districts, through being grown in close proximity to another variety. This unfortunately frequently occurs and large areas are sown annually with maize which bears little or no resemblance to the varietal name by which it is called.

As maize is grown in many districts throughout the State, there is naturally a considerable range of varieties and so-called varieties in use. The poor yielding and otherwise unsuitable varieties are, fortunately, fast disappearing, and one only has to see the excellent quality and trueness to varietal type of the grain exhibited at the different agricultural shows to realise that most growers are now using those better varieties which are most suitable for their particular districts.

The following varieties are those which are recommended for Queensland conditions.

**Funk's 90-Day.**

This variety (Plate 1) was introduced from the United States of America some years ago, and is now extremely popular with growers. It is an early-maturing, fairly short-growing variety, and for a quick-maturing maize it is a very heavy yielder. The ears are of fair size and usually carry from sixteen to twenty rows of very closely-packed grain. The grain is plump, of good depth, and slightly pointed, with an amber-coloured base and a rich yellow cap and a crease dent to a slightly rough dent. This variety is highly recommended for early crops, or for districts which have a short growing season. Yields of up to 100 bushels an acre have been obtained under field conditions from departmental plots; it requires 100 days or more to mature.

**Star Leaming.**

This is a medium early variety (Plate 2) and takes approximately four months to mature. It is without doubt one of the best all-round varieties grown in Queensland. For a fairly quick-maturing variety the ears are large, slightly tapered, and carry from sixteen to twenty rows of very closely-packed grain. They are particularly well covered, are borne low on the stem, and turn down during ripening. The grain is slightly larger than that of Funk's 90-Day, and is also of a brighter amber colour. It is a valuable variety for early or catch crops

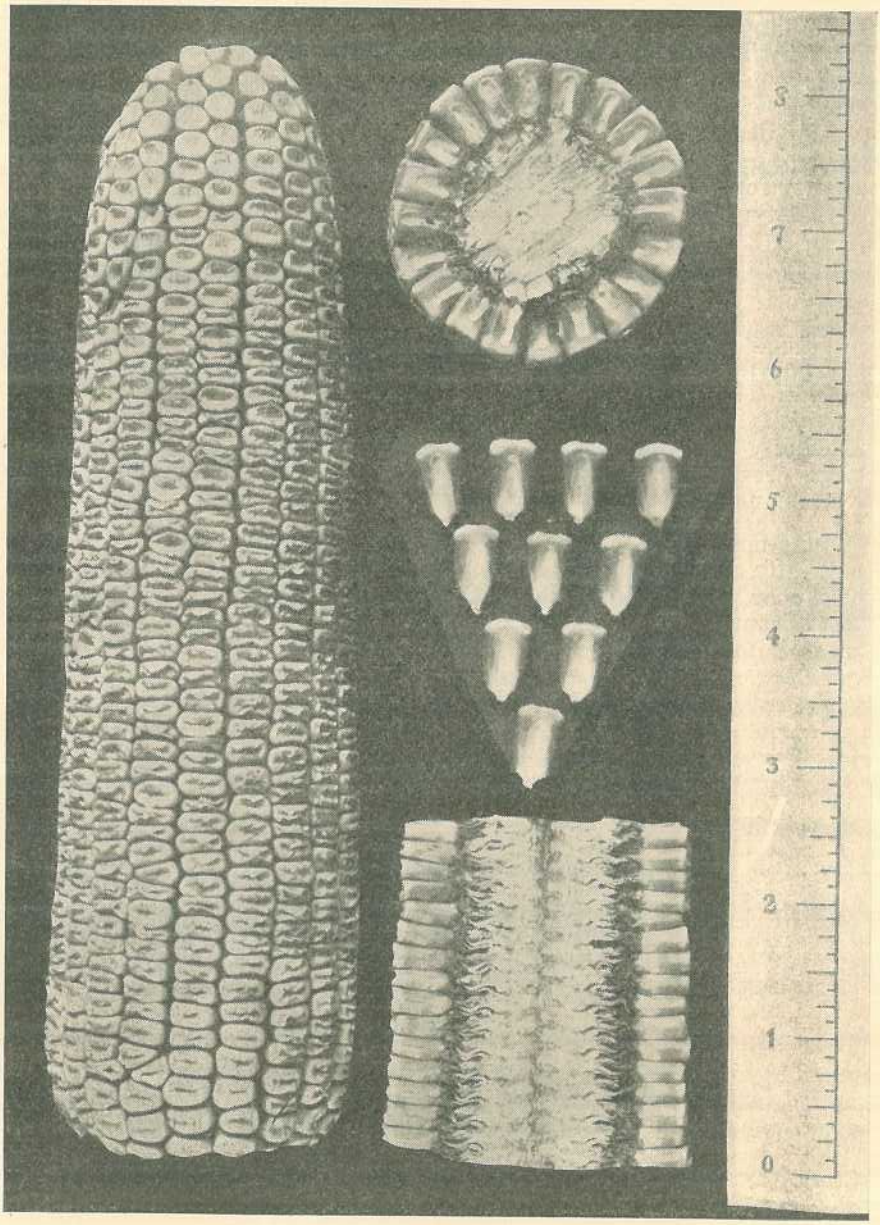


Plate 3.
REID'S YELLOW DENT.

and has proved to be suitable for any district, but particularly for the inland regions which have a low rainfall. Yields of 90 bushels have frequently been obtained. It is also an excellent maize for fodder.

**Reid's Yellow Dent.**

This is a moderately tall-growing variety (Plate 3) which takes much the same time to mature as Star Leaming. The ears are cylindrical in shape, of good size, and usually carry from sixteen to twenty rows of very tightly-packed grain. The grain is a pale amber colour at the base, with a creamy-coloured cap and a rough crease dent. The stalks are light and leafy, and make excellent fodder. Like Star Leaming, this is a very suitable variety for early cropping and for districts which have a short growing season. It is an exceptionally heavy yielder, and yields of over 100 bushels have been obtained.

**Funk's Yellow Dent.**

The growing period of this variety, and many of its habits of growth, are very similar to those of Reid's Yellow Dent. The grain also bears a close resemblance, the only difference being that it is somewhat squarer on the crown and has not so rough a dent. It is also a very good variety for early sowing, but is not quite as heavy a cropper as Reid's Yellow Dent.

**Golden Beauty.**

This is a fairly tall-growing medium late variety (Plate 4), taking approximately four and a-half to five months to mature. The ears are long with a very light core, and usually carry twelve rows of grain. The husk covering is particularly good and the ears turn down very well when ripening. The grain is not so deep, but is much broader than that of the varieties already discussed. It is bright amber in colour with a cream-coloured cap and a long crease dent. This variety is an excellent yielder, is very hardy, and will stand up to dry conditions much better than most varieties. The grain, when shelled, makes a particularly attractive sample and can command top price on the markets.

**Improved Yellow Dent.**

This variety (Plate 5) is now also known as Fitzroy, thus causing considerable confusion, for many growers are purchasing seed thinking they are getting some new variety. It is a late-maturing maize, taking approximately five and a-half months to mature, and is without doubt the heaviest cropper grown in Queensland to-day. The ears are large and cylindrical in shape, usually with sixteen to eighteen rows of grain. The grain is deep and wedge-shaped, of a rich amber colour, with a bright yellow cap and a rough crease dent. The husk covering is very good. For coastal districts and rain-forest lands, where there is a good rainfall, this is definitely the best of the late-maturing varieties. A yield of 117 bushels an acre on one occasion was obtained from an 8-acre departmental propagation plot of this variety in the Imbil district.

**Durum.**

This variety was bred and selected to meet the requirements of the Atherton Tableland where soil and climatic conditions, which include a generous summer rainfall and a moist atmosphere, tend to exercise an

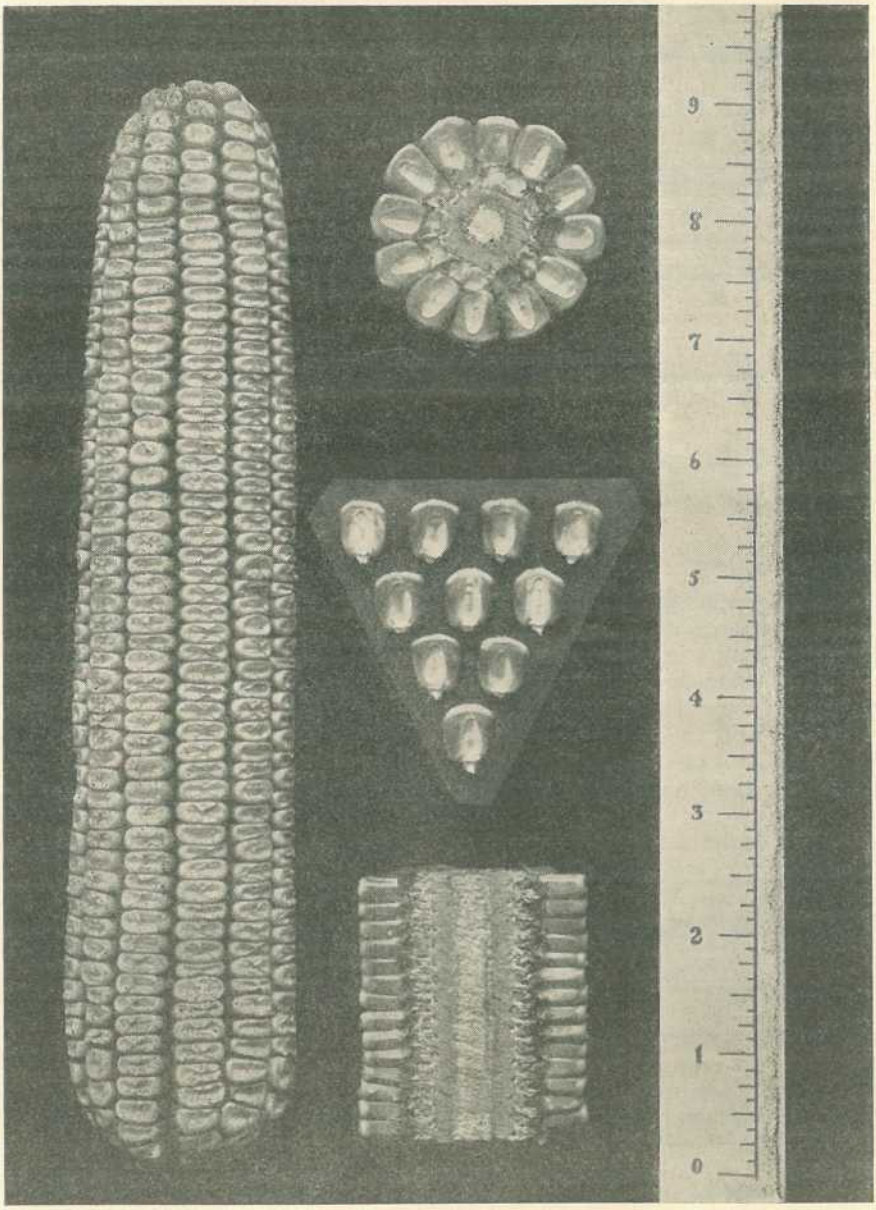



Plate 4.
GOLDEN BEAUTY.

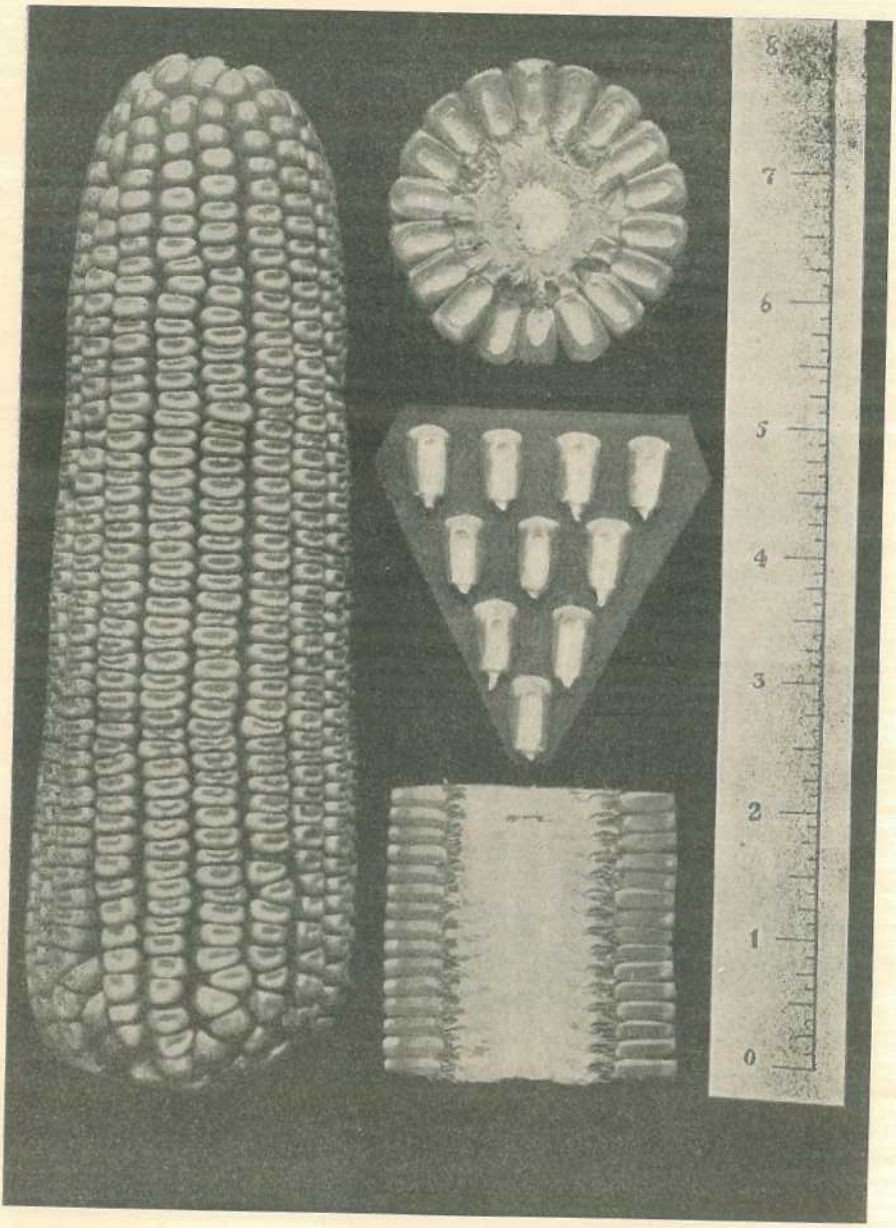



Plate 5.
IMPROVED YELLOW DENT.

adverse effect on the quality and texture of the grain. The Durum variety is harder in texture than the ordinary district-grown grain and is more resistant to Diplodia ear rot.

### Cultivation of the Crop.

After sowing, the land can be harrowed even until the plants are a few inches high. Harrowing will not only destroy young weed growth but will also greatly improve the germination of the maize seed in the event of heavy rain falling shortly after planting and causing the surface soil to become caked.

Many growers are afraid of injuring the young crop, but if the harrowing is carried out on a bright warm day, when the young plants are not brittle, and care is taken to prevent rubbish accumulating under the harrows, the crop will not be injured and indeed it will be definitely benefited by the operation. A light lever harrow is the most suitable implement for this purpose.

The number of inter-row cultivations required will depend on the season and the freedom or otherwise of the land from weed growth. These, however, should be sufficient to keep the surface soil in a friable condition and also to keep weed growth in check. On no account should the surface soil be allowed to remain in a caked condition while it is possible to work a horse cultivator between the rows. As the crop becomes more advanced the inter-row cultivations should be carried out at a shallower depth in order to avoid injury to the roots.

### Hilling.

The chief advantage to be gained by hilling with a mouldboard plough or cultivator fitted with sweeps is that, during wet seasons, a heavy growth of weeds may become established in the rows, and hilling has the effect of smothering or keeping such growth in check. Apart from this, the practice has little to commend it.

### Suckering.

The practice of removing the suckers is not recommended, as experience has shown that their removal not only does not increase the grain yield but, under certain conditions, the yield is actually decreased as a result of the injury suffered by the plants during the removal of the suckers.

WIRE NETTING.

| Size. | Approximate Weight Per Mile. | | | |
|---|---|---|---|---|
| | "A1" Grade. | "A" Grade. | "B1" Grade. | "B" Grade. |
| | T. cwt. qr. lbs. | T. cwt. qr. lbs. | T. cwt. qr. lbs. | T. cwt. qr. lbs. |
| 36 x 1¼ x 17 .. | | 1 8 0 0 | | 1 5 0 0 |
| 42 x 1¼ x 17 .. | | 1 12 0 0 | | 1 8 3 0 |
| 36 x 1½ x 17 .. | 1 4 2 0 | 1 3 2 0 | 1 2 1 0 | 1 1 2 0 |
| 42 x 1½ x 17 .. | 1 8 2 0 | 1 8 0 0 | 1 5 2 0 | 1 5 0 0 |


# The Value of Rhodes Grass on Mixed Dairying and Cotton-growing Farms.

W. G. WELLS, Director of Cotton Culture and Senior Research Officer.

INVESTIGATIONS conducted at the Biloela Research Station in the Callide Valley have indicated that the best yields of cotton are normally obtained during the first three seasons after virgin grassland is ploughed. Virgin grassland is, however, not always available on the farm and various cropping rotations in which cotton is an essential crop have also been extensively tested. One of these rotations, in which three years of Rhodes grass is followed by three years of cotton, before the pasture is re-established, has produced the next best yields of cotton. Information on the yields and quality of Rhodes grass obtained in this rotation indicates that it will enable the dairy farmer in the districts suitable for Rhodes grass to maintain satisfactory pastures for his cows.

Prior to the initiation of the investigations, it was generally thought by farmers that Rhodes grass grew well only on fertile scrub soils. On forest soils, yields of grass often declined very quickly, especially if the seed had been sown on poorly prepared seed-beds. Accordingly the yield and quality of the Rhodes grass produced in grassland-cotton rotations have been studied on a range of types of forest alluvial soils originally covered with either a mixture of ironbark and Moreton Bay ash or box or red gum (blue gum locally) and ironbark.

The results obtained show that Rhodes grass can be successfully grown on cultivated alluvial forest soils. On all but the less fertile sandy clay soils originally covered with stunted types of box trees and saplings, yields varying from six to twelve tons (green weight) of grass at hay stage have been produced by February during the first three seasons of growth. The amount and distribution of the rainfall has materially affected both the yields of grass cut at this stage and also the resultant regrowth after the mid-season mowing. It has been noticed, however, that the deep rooting habit of this grass—on some soils the roots penetrate 13 feet within nine months from sowing—enables it to withstand dry conditions better than annually planted fodder crops. This applies more particularly where the grass is in the first or second year of growth. It has also been noticed that Rhodes grass produces a new growth in the spring following light rains more quickly than do the native grasses; while in the winter, if a good growth of Rhodes

grass has been allowed to develop before frosts, although the top may have been frozen by temperatures as low as 22 degrees F., there has usually been an astonishing amount of green feed on the stool of the plant. In a dry winter, the winter growth in the first season of the grass has been equal in feed value to oats and wheat which have been partially checked by the dry conditions.

There is a tendency for yields of Rhodes grass grown on these forest soils to decline after the third year of establishment, particularly on the less fertile soils. Apparently Rhodes grass grows so vigorously that it utilises the available nitrogen in the soil so quickly that there is insufficient available after the third season to promote a satisfactory production of grass unless the soil is very fertile. This is evidenced by the decline in the crude protein content of the grass cut at hay stage, from 8 to 11 per cent. in the first year of establishment to 4 to 6 per cent. in the third year on fertile soils and 3 to 4 per cent. in the third year on the less fertile soils. Plate 6 illustrates how Rhodes grass in its sixth year on soil of only moderate fertility may be severely checked in growth. Some of the grass in the foreground has been cut to show the height of the grass in the centre of the field behind the person, as compared with the greener and taller growth around the edges of the field where the grass gets additional moisture and nitrogen from the adjacent cultivations.

Plate 6.

RHODES GRASS IN THE SIXTH SEASON OF ESTABLISHMENT ON FOREST SOIL OF MODERATE FERTILITY.

It appears advisable, therefore, to grow Rhodes grass on forest soils in rotation with either row-cultivated crops which do not use much nitrogen or legume crops which build up the supply of nitrogen depleted by the grass. Cotton appears to be the outstanding row-tilled crop to grow in rotation with the grass because it uses less nitrogen than other row crops grown in the Rhodes grass districts. In addition, the cultural practices required to produce a good crop of cotton also cause a marked increase in the activity of the micro-organisms in the soil which decompose the dead grass roots and make nitrogen available for following crops or grasses. After three years of cotton cultivation the nitrate

content of the soils of the Research Station increases sufficiently to allow the production of Rhodes grass which compares favourably in yield and quality with summer fodder crops such as Giant Setaria and Sudan grass grown on similar soils. Plate 7 illustrates the growth of Rhodes grass produced by December on a forest clay loam soil of medium fertility in the second year of establishment after three years of cotton cultivation. This field yielded approximately 3½ tons of air-dried hay of good quality and produced a regrowth which would have provided good grazing for the winter. Undoubtedly dairy farmers in the districts where Rhodes grass grows well should use this grass more extensively as a crop in rotations on their cultivations.

Plate 7.

RHODES GRASS IN THE SECOND SEASON OF ESTABLISHMENT ON FOREST SOIL OF MEDIUM FERTILITY.

By having fields of Rhodes grass in the first, second, and third years of establishment each season, the average dairy farmer would provide markedly superior pasturage for the herd than exists on most farms. The grass would, in its first season, be grazed lightly so as to allow the development of a good growth by winter. This growth would protect the green "shoot" on the stools and thus provide good grazing during the winter months in most of the districts east of the Main Dividing Range. The field in its second year of establishment could be left for hay production and the regrowth grazed for the rest of the season. The field in its third year of growth should be grazed heavily from the start of spring until the end of the wet season when it should be ploughed in preparation for cotton in the following season. It is advisable to plough the Rhodes grass early in March if at all possible as a better supply of subsoil moisture will be conserved for the following crop than if ploughing is deferred until winter or spring. In one experiment it was found that March ploughing conserved moisture in the soil to a depth of 32 inches as compared with only 19 inches in June ploughing.

Growing Rhodes grass on slopes instead of annually planted fodder crops is also advisable to assist in reducing soil erosion. Investigations over a series of years have shown that, after three years of Rhodes grass, the rainfall enters the soil much more easily than in land cropped every

year. There is little if any run-off of storms of under 1 inch in the first year of row cultivation after grassland even on slopes with a drop of 5 feet in every 100 feet. Undoubtedly soil erosion could be effectively reduced if Rhodes grass pastures were used more extensively on the present cultivated slopes.

**Summary.**

It is recommended that farmers on mixed dairying and cotton-growing farms practise the Rhodes grass-cotton rotation. The use of this rotation markedly improves the yield and quality of the pasture and the yield of cotton. The Rhodes grass obtained in this rotation will compare favourably in both yield and quality with summer fodder crops such as Giant Setaria, millets, and Sudan grass produced on similar soil. In addition, the growing of Rhodes grass involves less cultural expense and reduces soil erosion, particularly on the hillside farms.

## MISCELLANEOUS WEIGHTS.

### GRAIN AND MILL OFFALS.

| | |
|---|---|
| 1 bushel of wheat | 60 lb. |
| 1 bushel of maize | 56 lb. |
| 1 bushel of barley | 47 lb. |
| 1 bushel of oats | 40 lb. |
| 1 bushel of bran | 20 lb. |
| 1 bushel of pollard | 20 lb. |

### TIMBER.

| | |
|---|---|
| 300 super. feet ironbark averages | about 1 ton. |
| 400 super. feet stringy bark | about 1 ton. |
| 500 super. feet pine | about 1 ton. |
| 600 super. feet kauri | about 1 ton. |
| 600 super. feet cedar | about 1 ton. |
| 800 super. feet oregon | about 1 ton. |

### WATER.

| | |
|---|---|
| 1 gallon weighs | 10 lb. |
| 11⅕ gallons weigh | 112 lb.: 1 cwt. |
| 224 gallons weigh | 2,240 lb.: 1 ton. |

### BRICKS.

| | |
|---|---|
| 1 brick weighs about | 7 lb. |
| 16 bricks weigh about | 1 cwt. |
| 320 bricks weigh about | 1 ton. |
| 1,000 bricks weigh about | 3 tons 1 qr. 28 lb. |

# Vegetable Production

## Vegetable-growing in North Queensland.

By S. E. STEPHENS, Northern Instructor in Fruit Culture.

(*Continued from p. 281, May, 1944.*)

### PART 4. THE VEGETABLE CROPS.

#### Cabbage.

THE main season for this crop throughout the northern area is late autumn to spring. The earliest crops are produced in the drier portions of the highlands, where the rainfall does not cause serious interference with the raising of seedlings. In such districts crops for harvest as early as March and April can be grown. The highlands will also produce late crops up to December, but for these irrigation is essential.

For commercial planting Copenhagen Market is the most suitable early variety. It is a tender type however, and shows a tendency to split quickly after reaching maturity. For main crop plantings Henderson's Succession and Enkhuisen Glory are the two varieties that give most general satisfaction. For the home gardener, who requires a small, quick-maturing type, Vanguard and Earliball have proved suitable varieties.

To attain success in growing any of the cabbage family, regular and quick growth is essential. The plants must not suffer a check, so must be supplied with ample water and plant food throughout their growth. In addition to receiving the basal dressing of complete fertilizer mixture, the plants should be topdressed with a nitrogenous manure. This may be in the form of sulphate of ammonia or nitrate of soda; or, for the home gardener, liquid manure. The usual rate of dressing is about 1 cwt. sulphate of ammonia or 1½ cwt. nitrate of soda. Two dressings at this rate will produce best results, and should be applied to the side of the rows but not touching the plants. The first dressing should be given when the cabbage commences to form the heart, and the second about a fortnight later. If liquid manure is being used this should be made by filling a container of suitable size to one-third of its capacity with fresh farmyard manure and pouring in water to fill the container. This makes the stock solution and should be set aside for about a week to mature. When used for manuring plants it should be broken down at the rate of about one half-pint of stock solution to one gallon of water. Liquid manure at this strength should be used about once a week throughout the growing period of the crop.

Cabbages are subject to attack by various pests and diseases, control measures for which are given in Departmental advisory pamphlets.

#### Cauliflower.

This crop may be successfully grown in North Queensland only in the coldest portions, viz.:—Charters Towers and west thereof, and the

Evelyn Tableland. The cauliflower is very sensitive to temperature and humidity. High temperatures at transplanting affect the establishment of plants in the field, and heat during the maturing of the crop causes yellowing and fuzziness, and development of leafy growths through the curd. Dry atmospheric conditions prevent satisfactory growth of the plants. The climate required is therefore one with a cool, uniform temperature and abundant moisture. Successful crops are occasionally grown in the warmer parts of the north if the weather is unusually favourable, but satisfactory results cannot be depended upon.

In suitable-growing districts the variety that has given consistently good results is White Queen.

Spacing of plants should be wide enough to allow ample room for development. About 24 inches between plants and 36 inches between rows is recommended. Close crowding of cauliflowers should be avoided as it tends to reduce the size of the head. Culture otherwise is very similar to that required by cabbage, although the period of growth is somewhat longer. The same pests and diseases can be expected.

### Green Sprouting Broccoli.

This vegetable is somewhat similar to an open-headed cauliflower, with the difference that the curd is green instead of white. Furthermore, after the main central head has been harvested, further heads develop in the leaf axils, thus producing two or more harvests from the one plant. This vegetable is well suited to the warmer parts of the North, where it thrives as a winter green. The growth period extends over about five months, the harvest extending over the last six to eight weeks of this period. The heads should be harvested before the curd commences to break, and the primary head should be cut with only one or two of the small youngest leaves. The balance of the plant should be left intact to develop the secondary heads. Planting distance should be as for cauliflower, otherwise culture is the same as for cabbage, and the same pests and diseases may be looked for.

### Brussels Sprouts.

This crop, like the cauliflower, will produce well only in the coldest parts of the north. To attain perfection a long, cold winter is required. Success can be attained on the Evelyn Tableland, Charters Towers, and other western areas. On the Atherton Tableland sprouts of fair quantity can be produced if the winter is a cold one. Sprouts are a long season crop, and will occupy the ground for about six months. Under North Queensland conditions the crop is more suitable for the home gardener than for the commercial grower.

### Choys.

Three types of choys are commonly cultivated in North Queensland.

Pe-tsai is the most widely cultivated type. It looks like a large blanched cos lettuce with broad, white, basal leaf stalks. The leaves are crepe-like, with toothed edges, and are clasped tightly together. Two varieties are commonly grown, viz., Pe-tsai and Wong Bok.

The Pak Choy type is widely grown by Chinese gardeners, and appears to be particularly relished by eastern people. It is non-heading and has cabbage-like leaves with entire edges. The leaves surmount

white, strap-shaped stems, and are almost circular in shape. The apex of the stem divides into a number of raised white ribs that radiate into the leaf blade.

The Gai Choy type has large, dark green, broad leaves, with pale-green stem and ribs. The leaf edges are distinctly toothed, and leafy outgrowths extend to the base of the leaf stems. This plant has a distinct mustard flavour, and in the East Indies is known as Indian mustard.

Choys all require the same cultivation. Rich soil and top dressing with nitrogenous fertilizer or regular liquid manuring are necessary to produce best results. Autumn and winter seasons in the warmer areas and autumn on the highlands are the periods for production of good quality. In the spring and summer months comparatively little leaf growth is produced, and the plants run rapidly to seed. The growth period is normally about five to seven weeks.

### Kohl Rabi.

The edible portion of kohl rabi is the swollen fleshy stem. It develops into a round turnip-like vegetable above the ground, with the leaves springing from the upper two-thirds of the swelling.

Two varieties, namely Green and Purple, are grown. This vegetable will grow well throughout the whole northern area. In the warmer coastal areas it should be grown during the autumn and winter months, but on the highlands the season may be extended into spring and early summer. The crop should be grown rapidly and harvested whilst still quite young. Slow growth promotes woodiness, which renders the vegetable unpalatable. Over-mature specimens also have a woody texture.

### Turnip.

This is one of the easiest of all vegetables to grow, and will thrive throughout the northern area. In the warmer coastal areas its cultivation should, however, be restricted to the cooler months. At other periods it has a tendency to become woody and strong in flavour. Turnips are sown in rows direct to the field, and thinned out at an early stage to about 4 inches apart. The plants removed in thinning out may be transplanted if desired. The crop should be harvested in six to nine weeks from sowing. White Stone is the standard variety and the one generally most successful throughout the North.

### Swede Turnip.

This turnip is in greater demand on the market than the ordinary turnip, from which it differs in the colour and texture of the leaf and in the structure of the root. Swede turnip has smooth, bluish, slightly fleshy leaves like cabbage, and secondary and fibrous roots arising from the swollen root, whereas the ordinary turnip has thin, light green, hairy leaves, and swollen root free of secondary or fibrous roots.

The crop should be grown quickly to produce tender and succulent roots. The best quality product comes from the cooler parts of the area, such as Charters Towers, Atherton, and Evelyn Tableland, and the western areas. Swedes of very fair marketable quality can, however, be produced in coastal areas during late autumn and winter months. Sowing should be directed to rows in the field, with subsequent thinning

to about 9 inches apart. Broadcast sowing is sometimes practised, but this is not to be recommended, owing to weeding difficulties. Purple Top variety is recommended.

Swede turnips are particularly susceptible to attack by cabbage aphis, and for this reason it is most undesirable to plant them in proximity to cabbage or other greens of this family. They are a crop which normally does not command high prices, but owing to the ease with which they are produced are frequently planted fairly extensively. Owing to their small monetary value they are usually given the minimum of attention, with the result that they tend to become a breeding ground for cabbage pests. For this reason they should be strictly isolated, and, as soon as the profitable harvest has been collected from them, the balance should be destroyed.

### Radish.

The growth period of this crop is very short, hence good results can only be obtained when the soil contains plenty of readily available plant food. Radish will thrive on a wide range of soils, but a loose, friable soil gives best results. Seed germinates in about three days, and, as germination is usually high, it should be sown thinly to allow room for development of the roots without heavy thinning of the young plants. Seedlings are hardy and seldom affected by frost, so planting may be continued throughout the winter on the highlands, as well as during the warmer months. In coastal areas planting should be restricted to autumn, winter, and early spring months. In hot weather the roots quickly become pithy and useless so their development must be watched closely, and harvesting carried out as soon as they are ready. Suitable varieties are French Breakfast (globe type), Long Scarlet, and Long White Icicle. To maintain regular supplies planting should be undertaken about every ten days.

### Okra.

This is an African vegetable not yet widely grown in this country, but popular in parts of America. It is a small shrub growing to about 3 feet in height. It requires a long warm season for successful growth, so should be restricted mainly to coastal regions. If grown on the highlands it should be planted in the spring so that it has the warm season ahead for full development. The optimum temperature for good germination of seed is above 80 deg. F. Soil should be nearly neutral in reaction. Plants should be set 12-24 inches apart in rows 3 to 4 feet apart. Seeds are usually sown direct to the rows in the field as the young plants are not easily transplanted. Flowers are produced singly in the leaf axils of the main stem and branches. They develop progressively from the base to the top of each branch, and when plants are growing strongly, open at the rate of one per day on each stem. The pods grow from 4 to 12 inches long. They should be harvested when about half grown, at which stage they can be cut across easily with a knife. Beyond this stage of growth they quickly become tough and woody. Maturing of pods on the plants will also seriously affect growth and productivity. Harvesting should be carried out every two days to avoid over-maturity of the pods. Where conditions of soil and climate are favourable yields of over 100 pods per plant can be expected.

### French Beans.

This crop is divided into two classes, namely, dwarf and climber, the former being generally the more satisfactory commercial type,

because it is not necessary to erect trellis or pole supports for the crop. Beans require a well drained, friable soil. Soils with a tendency to crust formation are not desirable as the young plants may be unable to break through the crust and poor stands then result. Fertilizer trials on beans in this State indicate that a dressing low in nitrogen and high in phosphate gives best results. A mixture containing about 3 per cent. to 4 per cent. nitrogen and 12 per cent. to 15 per cent. phosphate applied at rates up to 6 cwt. per acre will supply the needs of this crop. Care should be used in applying fertilizer to a bean crop, as contact between seed and fertilizer may result in poor germination. Fertilizer should be placed below the seed and well mixed and covered with a layer of soil before the seed is planted.

Bean plants are injured by heavy frosts; very hot weather on the other hand may affect the setting of pods, causing the blossoms to fall. Seasons for beans in the North are therefore spring and summer for the highlands, and autumn, winter, and early spring for the coastal areas that are free from frost. In North Queensland the crop takes six to seven weeks to reach the flowering stage, and pods should be ready for harvest in about a fortnight from first flowering.

Brown Beauty and Canadian Wonder are generally the most reliable varieties for the North.

Bean fly is the most serious pest attacking this crop, and is prevalent throughout the year in coastal areas, and during the greater part of the year on the highlands. Spray will control its ravages, provided the proper spraying schedule is strictly adhered to.

French beans require harvesting about twice each week to ensure that the pods are in the correct stage of succulence. The correct stage for harvest is when the pods have attained their full growth, but before the outline of the seeds can be seen on the surface of the pods. At this stage the pods will snap cleanly across when bent. Such beans will retain their fresh condition for a reasonable time after picking. Immature pods, on the other hand, quickly wilt and become limp and shrivelled.

### Long Beans.

These are strictly tropical beans that thrive during the hottest part of the year. In coastal areas they take the place of the French bean during the hot summer and wet season months. The planting season is September to February. These beans are climbing twiners, and give best results when provided with stake supports. One variety, however, is frequently grown on the ground as a sprawling bush. The customary method of culture is to plant in double rows about 24 to 30 inches apart. Light sticks, about 6 feet long, are then leaned from the rows to each side of a central wire or sapling ridge pole as illustrated in Plate 8.

First harvest from long beans may be expected in about seven weeks and the cropping period should extend over six to eight weeks. Long bean pods are produced successively on extending fruit stalks; therefore, care must be taken when harvesting mature pods not to injure the fruiting stems. The picking should be done by twisting the pods away from the growing point of the stems. The pods must be harvested whilst they are round and fleshy and before the seeds swell. They develop very rapidly, so harvesting must be carried out almost every second day.

Varieties that give best results are brown, black, and variegated seeded. The former produces a very long bean up to 22 inches, well rounded and fleshy, and has an extended cropping season. The black-seeded variety also produces long pods, but they are less fleshy than the brown-seeded ones. The variegated variety gives pods up to 12 inches long and usually has a shorter season than the brown-seeded type. It is the type that is sometimes grown as a bush.

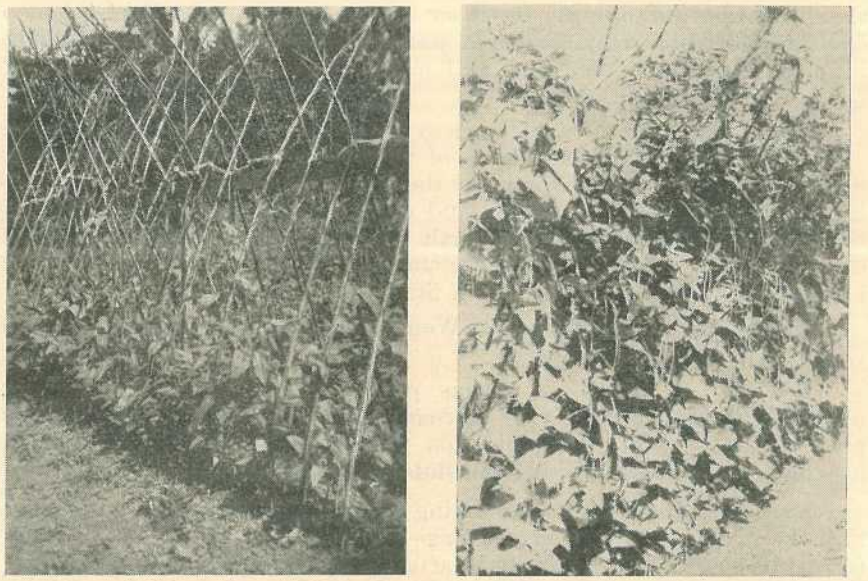


Plate 8.
LONG BEANS, SHOWING THE METHOD OF STAKING AND THE MATURE CROP.

## Sword Bean.

This is another summer bean of very vigorous growing habit. It is an extensive climber and one plant will cover a considerable area. A trellis or wire netting fence is desirable for its support. The plant is resistant to the attack of bean fly. The pods are produced on extending fruit stems similar to the long beans, and when mature each pod may measure up to 15 inches long by 2 inches broad. The fully-developed seeds are about 1 inch long by ½-inch wide by ¼-inch thick, red in colour with a black hilum on one edge extending almost the full length of the seed. For use as a vegetable the pods are harvested when not more than 6 to 8 inches long by 1 inch wide and before the seeds develop. The seeds when well developed are considered to be poisonous. In the immature stage the beans are crisp and fleshy and can be sliced and prepared in the same manner as French beans, requiring only slightly longer cooking. Seed is planted in tropical coastal areas in early spring. Cropping commences in about three months and will continue until the following winter.

## Peas.

Strictly speaking, this is a cool-climate vegetable, and as such its satisfactory culture in North Queensland is restricted. The highland and inland areas are most suitable, but during the winter months a

certain amount of success may be attained in coastal areas. Soils for this crop should be no more than slightly acid in reaction, over pH 6 giving best results.

Fertilizer of high phosphate content is desirable—in fact, superphosphate alone will usually give satisfactory results. Planting should be undertaken in early autumn so that maturity is reached during the coolest period of the year, as high temperatures at this stage of growth are conducive to poor cropping. Good surface cultivation and hilling of the rows assist in promoting vigorous growth.

Yorkshire Hero has long been the standard variety, but Greenfeast and Stratagem also give good results under Northern conditions.

## WEIGHT OF STEEL WIRE.

| Gauge. | Yards per cwt. | Weight Per Mile. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 wire. | | | 2 wires. | | | 3 wires. | | | 4 wires. | | | 5 wires. | | | 6 wires. | | | 7 wires. | | |
| | | C. | Q. | L. | C. | Q. | L. | C. | Q. | L. | C. | Q. | L. | C. | Q. | L. | C. | Q. | L. | C. | Q. | L. |
| No. 6 | 393 | 4 | 1 | 26 | 8 | 3 | 24 | 13 | 1 | 22 | 17 | 3 | 20 | 22 | 1 | 8 | 26 | 3 | 16 | 31 | 1 | 14 |
| No. 7 | 467 | 3 | 3 | 2 | 7 | 2 | 24 | 11 | 1 | 26 | 15 | 0 | 8 | 18 | 3 | 10 | 22 | 2 | 12 | 26 | 1 | 14 |
| No. 8 | 566 | 3 | 0 | 12 | 6 | 0 | 24 | 9 | 1 | 8 | 12 | 1 | 20 | 15 | 2 | 4 | 18 | 2 | 16 | 21 | 3 | 0 |
| No. 9 | 700 | 2 | 2 | 2 | 5 | 0 | 4 | 7 | 2 | 6 | 10 | 0 | 8 | 12 | 2 | 10 | 15 | 0 | 12 | 17 | 2 | 14 |
| No. 10 | 882 | 1 | 3 | 27 | 3 | 3 | 26 | 5 | 3 | 25 | 7 | 3 | 24 | 9 | 3 | 23 | 11 | 3 | 22 | 13 | 3 | 21 |
| No. 11 | 1077 | 1 | 2 | 15 | 3 | 1 | 2 | 4 | 3 | 17 | 6 | 2 | 4 | 8 | 0 | 19 | 9 | 3 | 6 | 11 | 1 | 21 |
| No. 12 | 1333 | 1 | 1 | 8 | 2 | 2 | 16 | 3 | 3 | 24 | 5 | 1 | 4 | 6 | 2 | 12 | 7 | 3 | 20 | 9 | 1 | 0 |

## CORRUGATED IRON.

Number of Sheets in One Ton (approximate).

Ordinary 3 inch corrugations :—

| | GAUGES. | | | | | |
|---|---|---|---|---|---|---|
| | 18 | 20 | 22 | 24 | 26 | 28 |
| Length 5 feet | 94 | 112 | 130 | 166 | 230 | 248 |
| ,, 6 ,, | 78 | 92 | 110 | 140 | 192 | 206 |
| ,, 7 ,, | 66 | 80 | 94 | 120 | 164 | 176 |
| ,, 8 ,, | 58 | 70 | 82 | 104 | 144 | 154 |
| ,, 9 ,, | 52 | 60 | 60 | 94 | 128 | 136 |
| ,, 10 ,, | 46 | 56 | 56 | 84 | 114 | 122 |

| | | Sq. ft. |
|---|---|---|
| 1 ton galvanized corrugated iron, 26 gauge, single lap .. | will cover about | 2,200 |
| 1 ton galvanized corrugated iron, 26 gauge, lap and half | will cover about | 2,000 |
| 1 ton galvanized corrugated iron, 26 gauge, double lap .. | will cover about | 1,900 |
| 1 ton galvanized corrugated iron, 24 gauge, single lap .. | will cover about | 1,600 |
| 1 ton galvanized corrugated iron, 24 gauge, lap and half | will cover about | 1,500 |
| 1 ton galvanized corrugated iron, 24 gauge, double lap .. | will cover about | 1,400 |

# PLANT PROTECTION

## Pineapple Scale.

HUBERT JARVIS, Research Officer.

THE pineapple scale* (Plate 9) occurs in most parts of the world where its host plant is grown commercially in the field and also in cooler countries where pineapples are, or have been, grown in glass houses. Thus it was first described from Germany in 1788, long before pineapples became an important commodity in world trade, and it was later recorded from England in 1841. In Australia, the scale was collected in New South Wales in 1891 and subsequently listed in the "Descriptive Catalogue of the Scale Insects of Australia." In Queensland, an outbreak recently occurred at Rochedale; though localised, the infestation was very severe.

### Description and Life History.

The pineapple scale is one of the hard-shelled scale insects, and, as is usual with this kind of pest, dense colonies are found on infested plants. The scale which covers the female is circular in outline and almost flat except for a slightly raised portion in the centre. It is approximately one-sixteenth of an inch in diameter and its colour is greyish-white. Underneath the scale is the translucent, slightly yellowish insect with hair-like mouthparts through which the sap is extracted from the tissues of the host plant. The scale covering the male is somewhat smaller and rather different in appearance from that of the female. It is roughly rectangular in shape and almost white in colour and carries three longitudinal ridges on the upper surface. On all infested plants there is a partial segregation of the two sexes, the circular female scales predominating on the leaves and the rectangular male scales at the base of the fruits and on the suckers.

The life history of this insect is similar to that of other hard-scaled species. Small yellowish eggs are laid by the adult female and hatch within a week. The minute, yellowish crawlers which emerge from the eggs leave the shelter of the parent scale and seek suitable feeding sites on the leaves, stems, and fruits of the host plants. Once feeding begins, the young insect secretes a covering scale which is typical of both the sex and the species. At the same time, the limbs become atrophied and are shed during one of the moults associated with growth. Growth then continues until development is completed, the whole process requiring approximately two months during the warmer part of the year. The adult female never leaves the point where it settled early in life and is always wingless. The adult male is, however, a very fragile, two-winged insect which emerges from the scale on completing its development, mates, and then dies. Several generations occur during the year.

* *Diaspis bromelliae* Kerner.

## Nature and Extent of Infestation.

Heavily infested plants are conspicuous on account of the grey, scurf-like appearance of leaves, stems, and fruits which results from the presence of thousands of insects matted together into a crust over the surface. They show obvious signs of ill-health, which finds expression in the small size of the fruit, lack of vigour in the off-shoots, and a certain amount of stunting in growth. Such plants, however, are seldom killed outright.

Though described from pineapples and best known as an occasional pest of this plant, the scale is said to have several other hosts. These include the canna, English ivy, olive, and the sago and fan palms. In Queensland the insect has been recorded only from the pineapple. Both the Smooth Cayenne, the canning variety grown in Queensland, and the Ripley or Queen variety which is grown exclusively for the fresh fruit market, may be attacked.

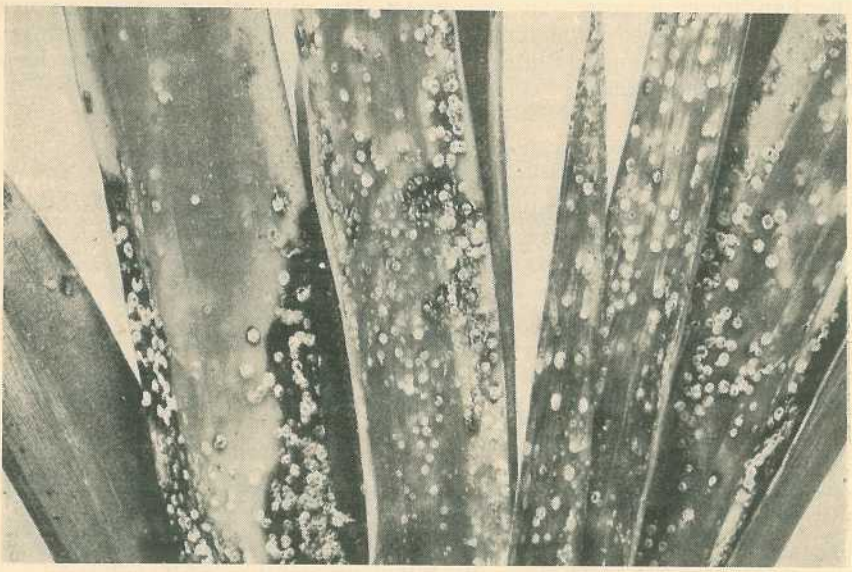


Plate 9.
SCALE-INFESTED LEAVES OF PINEAPPLE PLANT.

All the infested crops involved in the recent outbreak were four or more years old and showed obvious signs of declining vigour, even in areas where the scale population was negligible. Conditions were, therefore, favourable for the pineapple scale, and the severity of the attack indicated that the pest had been in the district for some years. In spite of this, surveys in the Rochedale and adjacent districts failed to widen the known infested area beyond the few adjoining properties on which it was first discovered. It must be inferred, therefore, that natural dispersal is very slow. Infested planting material would, of course, rapidly distribute the insect, but Rochedale is more or less isolated from the more important pineapple-producing areas and is not a source of planting material for outside districts.

## Control.

Though the scale is well known in most countries where its host plant is grown at all extensively, control measures apparently receive little attention, and it must be presumed, therefore, that the pest is seldom an important factor limiting production. This is perhaps not surprising, for the cultural standards required from growers of canning quality pines are exacting in respect to both the careful selection of planting material and the management of the crop on a three-crop cycle basis. Planting material is usually drawn from the off-shoots of parent plants under two years old, and these are unlikely to harbour the scale unless they themselves were infested when planted out in the field. Even if circumstances compelled a grower to use inferior planting material, it is improbable that young plants carrying so conspicuous an insect would escape detection and subsequent elimination. Similarly, the short-term rotation used by Smooth Cayenne growers is unfavourable to the pest, for the cropping period normally allows insufficient time for an insect of this kind to increase to troublesome proportions. Quite apart from the handicaps imposed on the insect by cultural practices, natural controls can also be important. Perhaps the most striking of these is a small wasp parasite (Plate 10), which occasionally destroys large numbers of the scales.

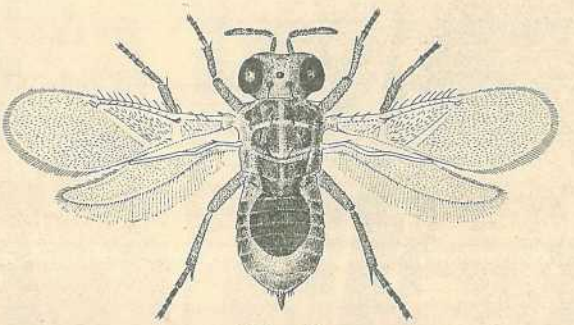


Plate 10.
WASP PARASITE OF THE PINEAPPLE SCALE × 30.
[*Drawing by William Manley.*

The pineapple scale is easily killed by summer white oil emulsions when the infested parts of the plant can be thoroughly sprayed. Field treatment is, however, not particularly effective owing principally to the fact that many of the scales are located in sheltered parts of the plant which cannot be reached with ordinary spray equipment. Hence, a considerable number survive treatment and provide a nucleus from which the pest may again increase to pest proportions in a comparatively short time. Precautions must, therefore, be taken to prevent the introduction of the pest to uninfested plantations, and the most obvious method is to use only clean planting material. The amount of planting material required for the establishment of a commercial area is considerable, and pre-planting treatments, such as fumigation, which might destroy any scales present, could only be applied in an emergency. However, there is little risk of introducing the pest if the farmer draws his supplies from areas where the scale has not been seen, particularly if the planting material is taken from two-year-old stands which have just completed bearing their first crop of fruit.

If, in spite of this precaution, the scale does appear on a plantation, it will usually be confined to a relatively small area for some time. Eradication may then be attempted by digging up and burning any plants which show the slightest sign of infestation and then spraying plants in a marginal strip round the area with a while oil emulsion at a concentration of one in forty.

## Lichens in Citrus Orchards.

F. W. BLACKFORD, Assistant Research Officer.

LICHENS belong to a very lowly form of plant life consisting of a fungus and an alga living together in close association. They are of very frequent occurrence in the wet, coastal districts of Queensland, and, in a citrus orchard, are usually found on the trunks and larger branches of old or neglecteed trees as grey, paper-thin growths (Plate 11) pressed close to the bark or as greyish-green, branched, thread-like tufts standing out from the bark (Plate 12).

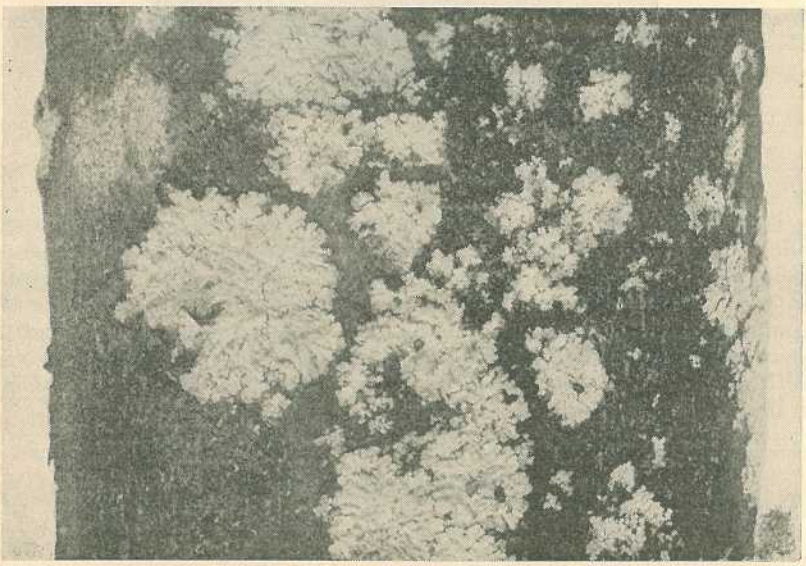


Plate 11.
LICHENS GROWING ON BARK OF CITRUS TREE.

Although many orchardists believe that lichens are harmful to the citrus trees on which they occur, such is not the case. Rather does their presence indicate that the infested trees are in an unhealthy or neglected condition, and actually their food is obtained from the air and any decaying material which may collect in crevices and cracks in the bark. The trees merely serve as a base on which this peculiar plant association may grow; quite commonly old wooden fence posts may be found performing the same function for the lichens.

### Control.

Usually no special measures need be applied to control the growth of lichens. The 1 in 15 lime sulphur spray applied in late winter for

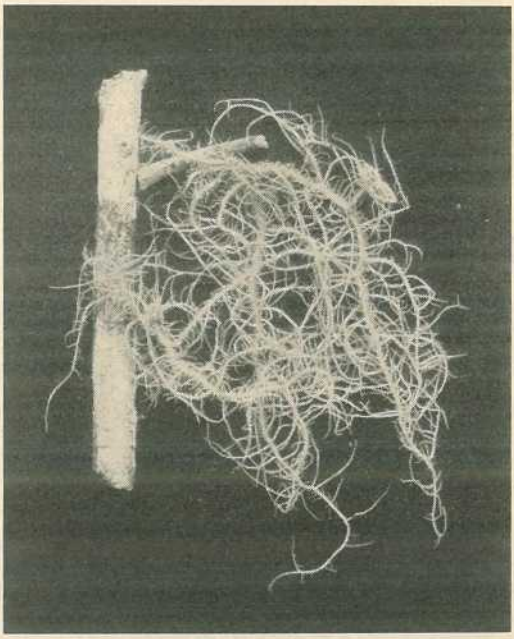


Plate 12.
MUCH-BRANCHED LICHEN GROWING ON CITRUS TWIG.

the control of white louse, Maori mite and bud mite, and the cuprous oxide mixture applied at other times for disease control both check the development of lichens. Therefore, if lichens appear to any extent in a citrus orchard, either of these sprays, regularly applied at the time recommended for its usual purpose, will restrict and finally eradicate lichenous growth. Appropriate measures for the improvement of the health of the trees should also be taken to hasten the disappearance of the lichens.

## Mealy Bugs.

W. A. SMITH, Assistant to Research Officer.

THE group of scale insects known as mealy bugs* comprises a number of species which attack cultivated plants. They are small, oval in outline, covered with a white mealy powder, and possess waxy filaments protruding from the sides of the body. The adult females are rarely more than a-quarter of an inch in length and have no wings. The male is quite different in appearance, being an inconspicuous, winged insect with two long filaments of wax projecting from the abdomen.

### Habits and Life History.

Mealy bugs feed by inserting their piercing mouth parts into the tissues of the fruits, leaves, stems, or roots of their host plants and extracting the sap. The damage done to an infested plant is not great, but the associated sooty moulds which mar the appearance of the host plant and frequently blemish its fruit, are very objectionable. Garden plants subject to infestation include poinsettias, crotons, ferns, and

* *Pseudococcus adonidum* L., *Ferrisiana virgata* Ckll. and related insects.

orchids; gladioli bulbs may also be attacked. Custard apples (Plate 13), grapes (Plate 14), citrus, pineapples, passion fruit, grasses, such as paspalum, and even weeds, such as nut grass and mint weed, may often be the host plants of mealy bugs.

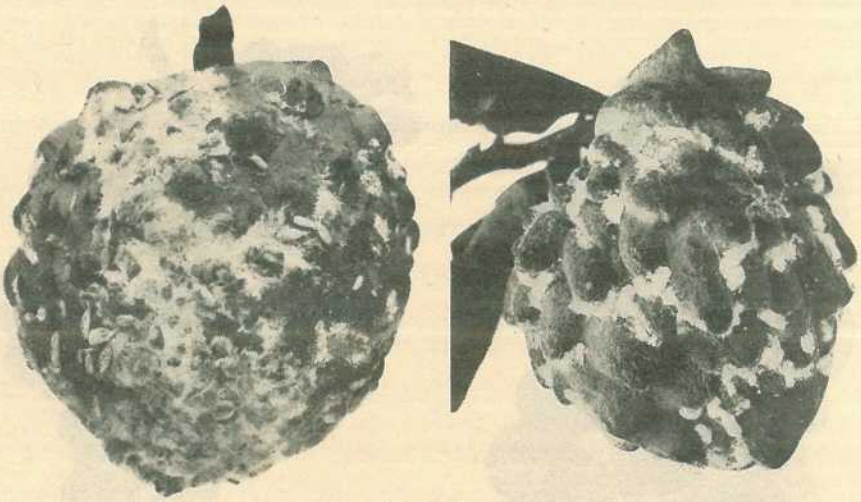


Plate 13.
CUSTARD APPLE FRUITS INFESTED BY MEALY BUGS.

These insects secrete a sugary solution known as honey dew, and this is attractive to ants, which frequently carry the mealy bugs about on the plant or from plant to plant in much the same way as they do aphids. New colonies may be established by the ants in crevices on the plant or in any available sheltered place of a similar nature, though the insects also establish new colonies independently of the ants. Eggs develop within the body of the female and hatch only after the death of the parent insect. The young larvae, though somewhat similar in structure to the adult females, are much smaller and have the mealy covering and wax filaments less well developed. Mealy bugs grow rather slowly, and there are seldom more than three complete generations each year.

**Control.**

Normally, a ladybird beetle*, which is steely-blue in colour with brown-tipped wing cases, is active during outbreaks of mealy bugs. The larvae of this beneficial insect also feed on the mealy bugs and, being similar in appearance, are frequently mistaken for them. Although they are also covered with meal and wax, they are flatter and much more active than the insects on which they feed and can thereby be distinguished from them. Another and larger insect enemy of mealy bugs is the larva of a lacewing. This predator can be identified by the fact that its larva usually carries scraps of scales and other fragments on its back and by the presence of distinct sickle-shaped jaws.

In spite of the beneficial activities of these two predatory insects, control measures are sometimes required for mealy bugs. On garden plants, many of which are susceptible to spray injury, a spray containing 1 oz. of nicotine sulphate, 3 oz. of soft soap, and 4 gallons of water

* *Cryptolaemus montrouzieri* Muls.

can be safely used. Two or more treatments at short intervals will usually be necessary to establish control. Stored bulbs are liable to become infested, and these should be immersed in a bath containing 2 oz. of white oil, 1 oz. of nicotine sulphate, and 4 gallons of water for at least thirty-six hours and then dried in the sun.

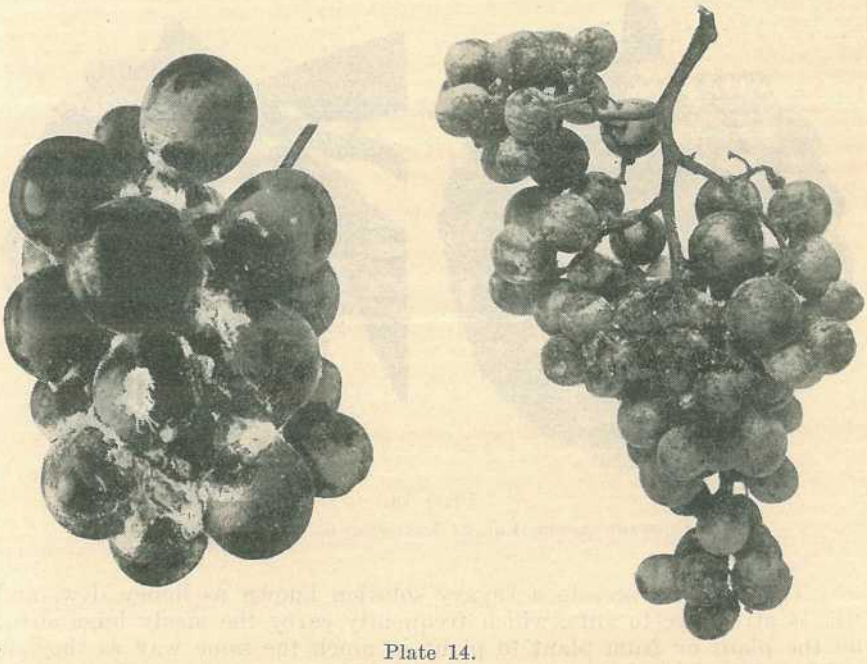


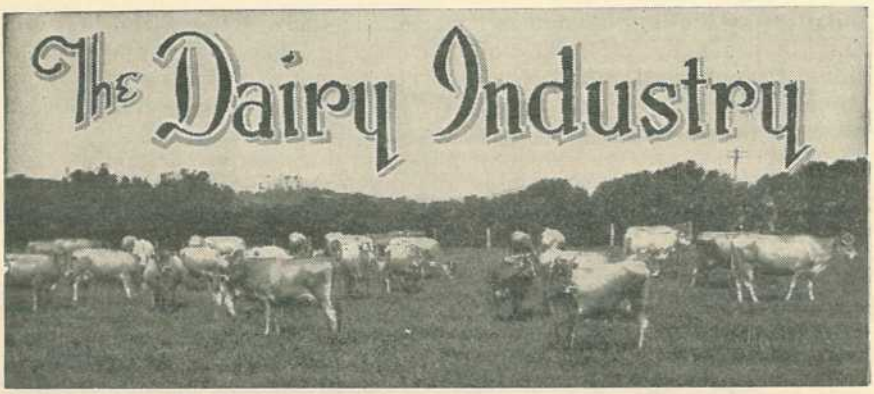
Plate 14.
GRAPES INFESTED BY MEALY BUGS AND BLEMISHED WITH SOOTY MOULDS.

Custard apples and grapes, the two fruits on which mealy bugs can become a major problem owing to contamination of the fruit at harvesting, may require to be sprayed. If mealy bugs are apparent when the fruit is beginning to set, a spray containing 1 quart of white oil, 1 pint of nicotine sulphate, and 80 gallons of water can be applied. Later in the season, when the fruit is maturing, any contaminated fruit should be treated with a derris spray at the strength recommended by the manufacturers. Spot spraying is usually all that is necessary at this stage. These sprays should, where possible, be applied when the young are hatching.

**NOTICE TO READERS.**

Because of the present necessity for strict economy in the use of paper, readers are requested to renew their subscriptions promptly. If renewals are unduly delayed, it may be impossible to supply back numbers of the Journal.

Address all renewals and other correspondence to the Under Secretary, Department of Agriculture and Stock, Brisbane.




# Dairy Premises.

E. B. RICE, Director of Dairying.

(*Continued from p. 376, June,* 1944.)

## Shed and Dairy Layouts for Machine-milking.

(*a*) *Detached Shed and Dairy.*—Any type of shed referred to may be built in accordance with the preference of the individual. However, irrespective of shed design, the Regulations insist upon the following requirements in the dairy section of any shed intended for use with a

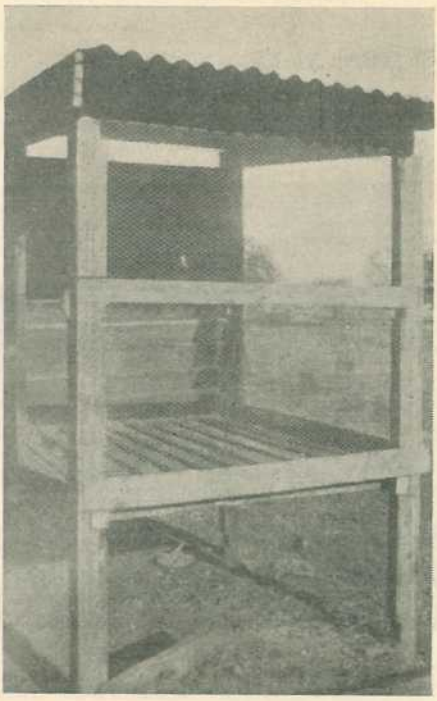


Plate 15.
COVERED MILK STAND.

milking machine:—(*a*) A 6-feet walled air space between the first bail and the separating or milk-cooling room; (*b*) The engine and vacuum pump to be housed outside the separating-room; (*c*) the milk or cream to be stored and washing-up and storage of utensils to be done 30 feet away from the cowyard. The air passage may be, and usually is, used to house the engine and vacuum pump. Protection of the engine from inclement weather is secured by placing louvres on the outside (shed exit end) end of the air passage. A typical layout is shown in Plate 16.

Plate 16.

MILKING BAILS AND DETACHED DAIRY HOUSE "A."—Electricity is used to drive the milking machine on this farm.

(*b*) *Combined Dairy Building.*—With the increasing use on dairy farms of milking machines, steam sterilisers, and mechanical cooling, certain disadvantages were associated with a division of dairying operations, and so to replace detached buildings, a building was planned

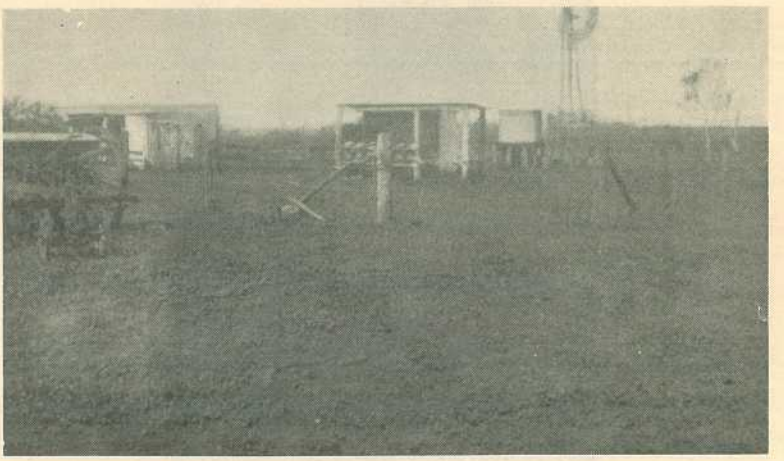


Plate 17.

LAYOUT OF DAIRY BUILDINGS ON A SMALL FARM WHERE ALL OPERATIONS, EXCEPT MILKING, ARE CARRIED OUT IN THE DETACHED DAIRY.—Note the Dairy House "B," covered milk stand, and galley for boiling water all combined in one building.

Plate 18.
LOUVRED ROADSIDE CREAM SHELTER.

in which all work could be done under a single roof. The main features of the combined dairy building (see Q.A.J., Jan., 1941), are:—

1. The dairy section of the building—consisting of (*a*) engine-room (and air-passage), (*b*) separator and milk cooling room, (*c*) milk or cream storage stand, and (*d*) wash-up room—is attached to and under the same roof as the bails.

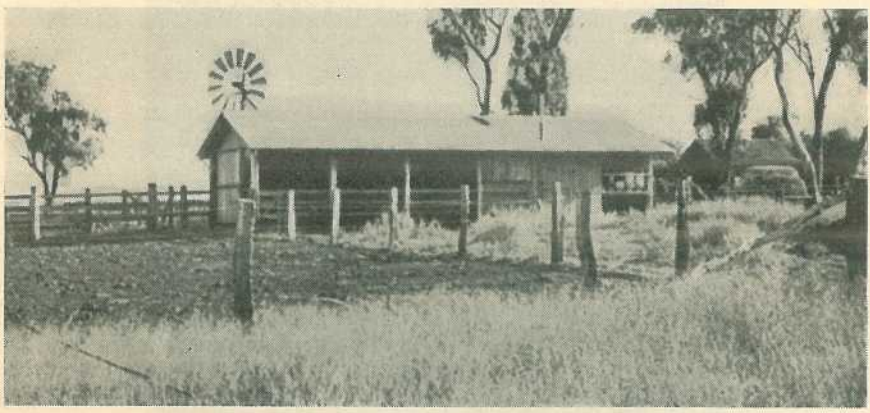


Plate 19.
A GENERAL VIEW OF A COMBINED DAIRY BUILDING AND IMMEDIATE ENVIRONMENT.—Note side assembly yard.

2. Concreted areas at the entrance to and exit from the bails up to a distance of 30 feet from the dairy section of the shed provide a clean approach for stock, and reduce dust and shed odours in the vicinity of the dairy section.

3. A stock-proof enclosure extending 30 feet in each direction.

Plate 20.
A CLOSE VIEW OF THE SHED, SHOWING EXIT RACE AND LOUVRES IN ENGINE-ROOM.

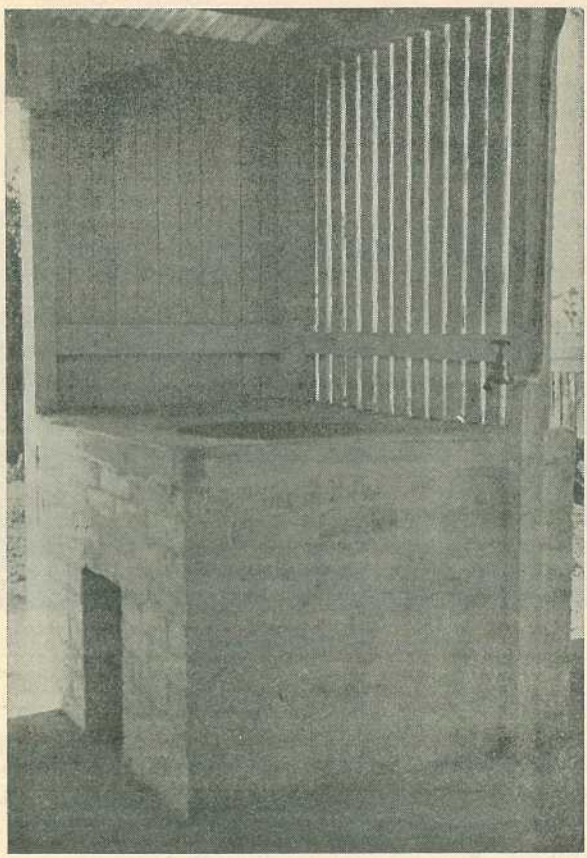


Plate 21.
A CONVENIENT BUILT-IN BOILER ON A DAIRY FARM; RACKS FOR UTENSILS ARE NEARBY.

Full information in regard to this building is obtainable in the bulletin "A Dairy Building Plan."

### Shed and Dairy Equipment.

The necessary equipment for dairy sheds is itemised below:—

(1) Abundant water supply.

(2) Adequate hot water or steam supply. The minimum is a 12 gallon set-in boiler, within 15 feet of the shed, while steam sterilisation is compulsory in a shed operating a milking machine.

(3) A wash-up trough, 34 inches long by 20 inches wide by 11 inches deep, fitted with a draining plug.

(4) Draining rack of galvanised iron piping, or approved material, 16 inches wide and long enough to hold all utensils.

**Sundry Items.**

*General.*—Milk vat, buckets or dishes for udder wash water, udder cloths, milk buckets, wash-up brushes, flyproof covers for milk or cream

Plate 22.

A CONVENIENT SINK WITH RUNNING WATER PROVIDED IN THE COWSHED FOR THE USE OF MILKERS.

cans, broom, shovel, hosepipe, limewashing equipment, cleansers, first-aid chest, containing needle and syringe, milk fever outfit, two thermometers, drenches, poison antidotes, and pamphlets dealing with common ailments of dairy cattle.

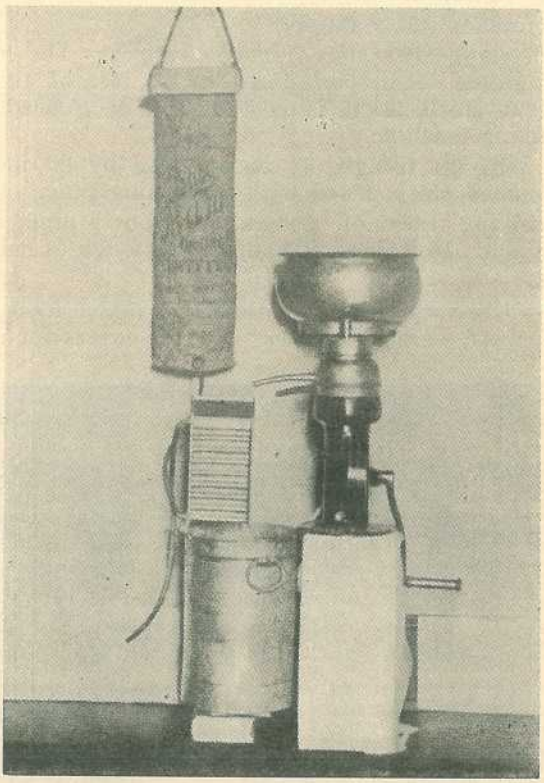


Plate 23.
AN INEXPENSIVE CREAM COOLER.

## TABLE OF DISTANCES.

| Place, &c. | Distance from Dairy. | Distance from Milking Shed. |
|---|---|---|
| | Feet. | Feet. |
| Dairy house .. .. .. .. .. | .. | 30 |
| Milking shed .. .. .. .. .. | 30 | .. |
| Residence .. .. .. .. .. .. | 50 | 80 |
| Stock.. .. .. .. .. .. .. | 30 | .. |
| Stables .. .. .. .. .. .. | 100 | 50 |
| Sanitary convenience (except septic system) .. | 150 | 150 |
| Calves, calf pen .. .. .. .. .. | 50 | 50 |
| Fowlhouse .. .. .. .. .. .. | 50 | .. |
| Manure .. .. .. .. .. .. | 130 | 100 |
| Pigs or piggery .. .. .. .. .. | 150 | 150 |
| Trap drain .. .. .. .. .. .. | 30 | 30 |

*For Cream Farms.*—Separator, cream cans, strainer (fine mesh), cream stirrer, cream cooler, cool cabinet or concrete trough for holding cooled cream.

*For Milk Farms.*—Milk cooler or aerator, strainer (use 20-mesh gauze), cotton-wool filter discs, milk cans.

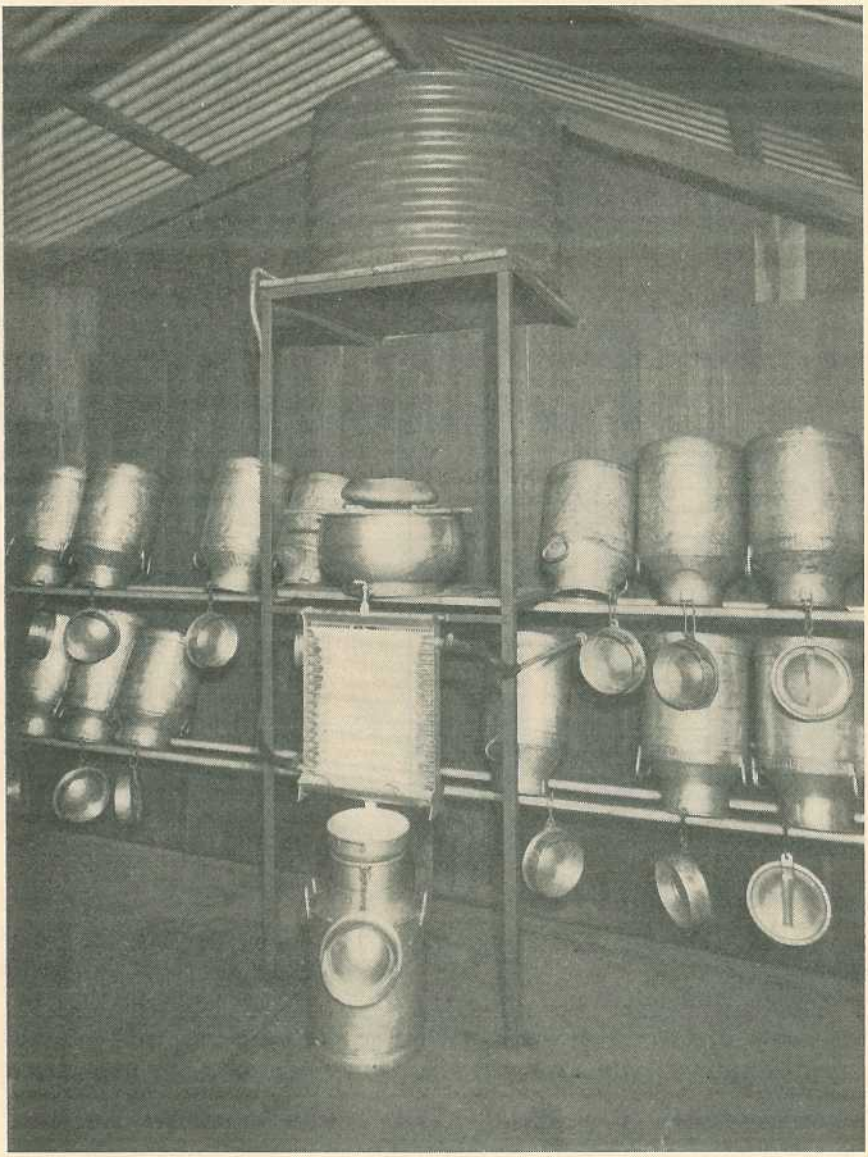
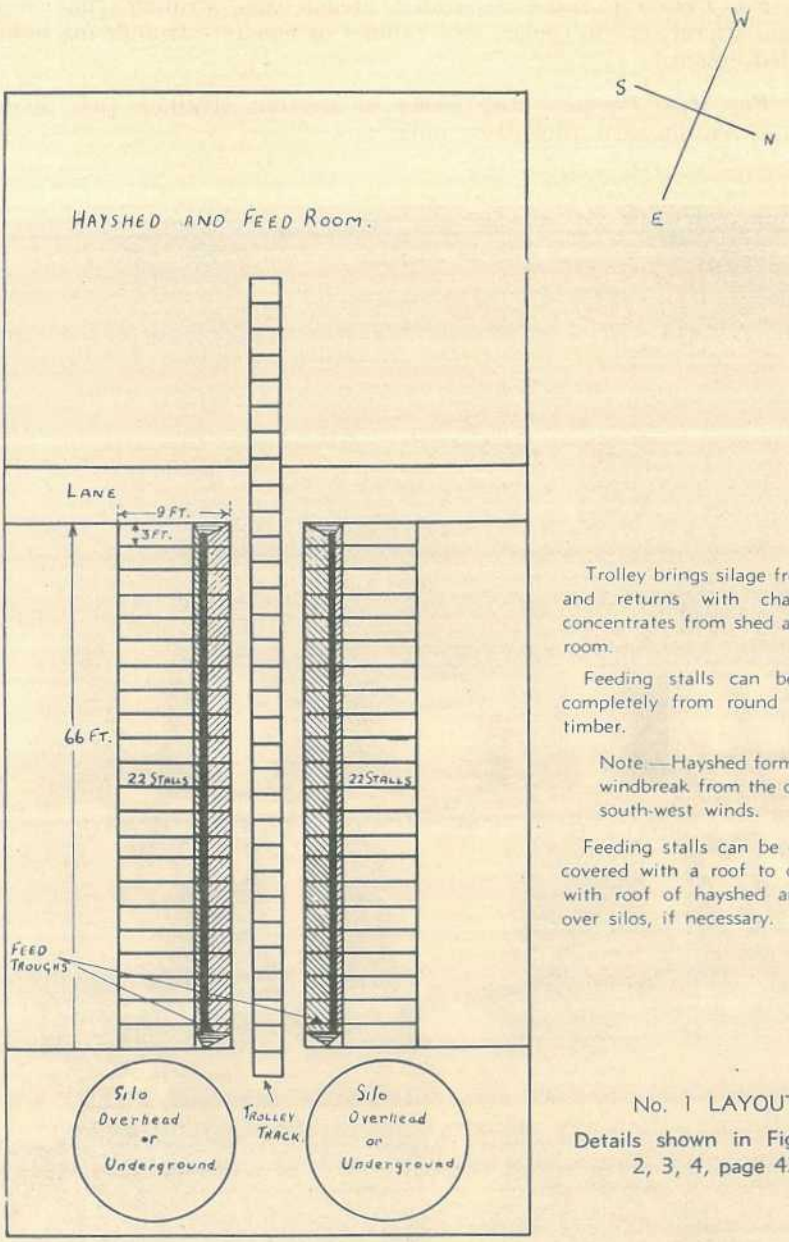


Plate 24.

MILK COOLER, USING WATER STORED IN AN UNDERGROUND TANK ADJOINING THE MILKING SHED.—The water is pumped from the underground tank to the small tank in the shed just before milk-cooling commences.




Trolley brings silage from silos and returns with chaff and concentrates from shed and feed room.

Feeding stalls can be made completely from round or split timber.

Note.—Hayshed forms a windbreak from the cold south-west winds.

Feeding stalls can be open or covered with a roof to coincide with roof of hayshed and roof over silos, if necessary.

No. 1 LAYOUT.

Details shown in Fig. Nos. 2, 3, 4, page 42.

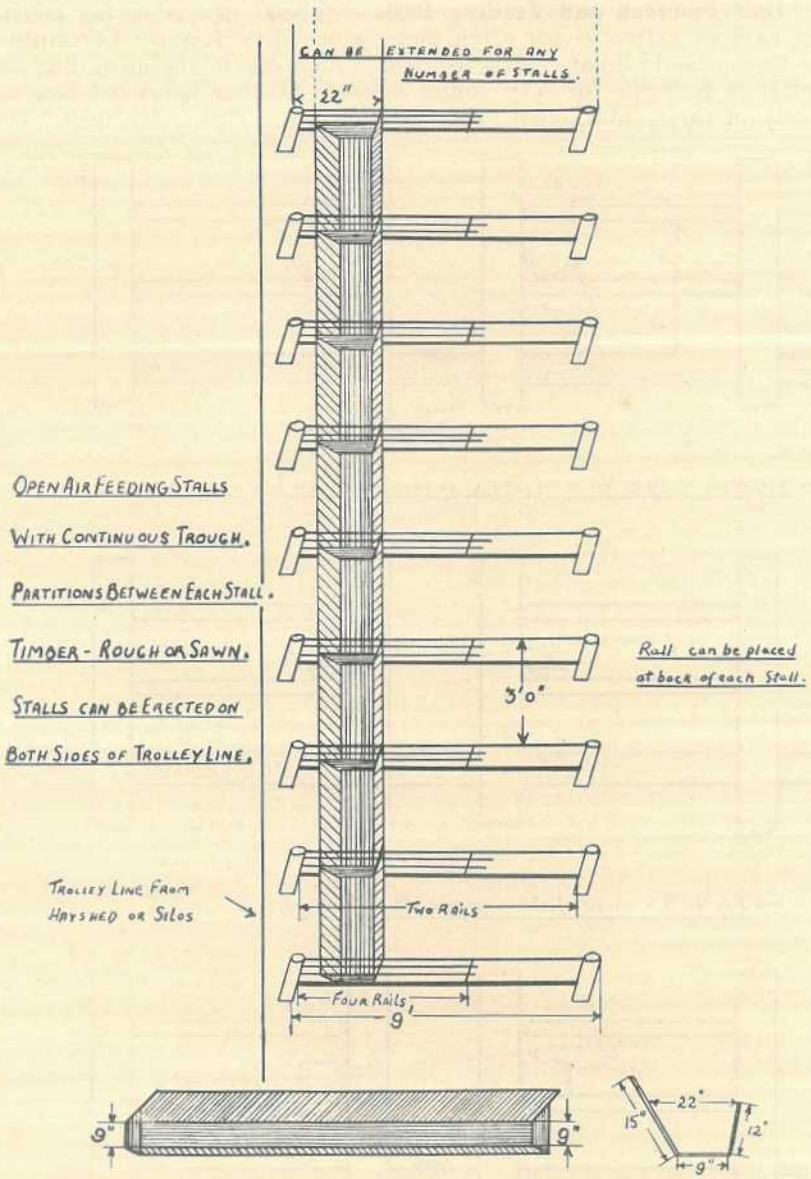
Fig. No. 1.

Plate 25.

FODDER RESERVES AND FEEDING STALLS COMBINED.

## Subsidiary Dairy Farm Buildings and Adjuncts.

**Feeding Stalls.**—Although hand-feeding is at present almost confined to stud farms and farms supplying the liquid milk market



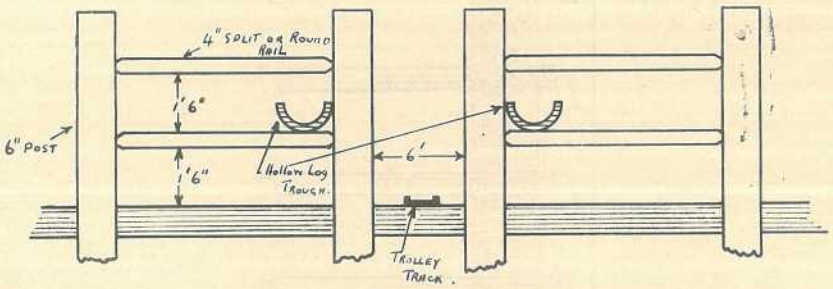

NO 2 LAYOUT WITH DETAILS.

Plate 26.

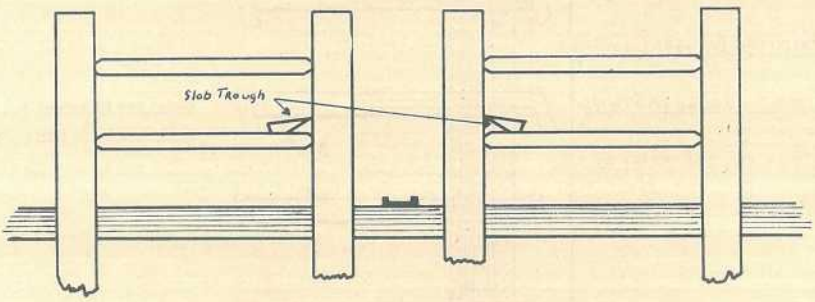
OPEN-AIR FEEDING STALLS ON A DOWNS FARM.

the practice may be expected to extend as dairying becomes more intensive. For the guidance of anyone contemplating the installation of feeding bails, three typical Queensland designs are shown in Plates 25, 26, 27, and 28.

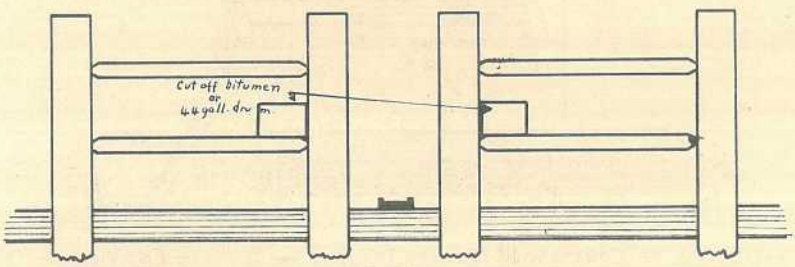
**Calf Paddock and Feeding Bails.**—Special provision for housing and care of calves is too often lacking on dairy farms. Certainly in the Queensland climate calves are better kept out in the open, but some shelter is desirable for very young calves. All that is needed is a shed closed on three sides, open to the north, with a clean, dry floor. Only




— FIG No2 - SIDE VIEW OF STALL SHOWING HOLLOW LOG TROUGH. —




— FIG No 3 - SIDE VIEW SHOWING SLAB TROUGH. —




— FIG No 4 - SIDE VIEW SHOWING TROUGH OF CUT OFF BITUMEN OR 44 GALL. DRUM. —

Plate 27.

DETAILS OF STALLS AND TROUGHS FOR NO. 1 LAYOUT.

a small run is required for recently dropped calves. They can soon be removed to a larger calf paddock, which should have good pasture, be well drained, and provide shelter from excessive heat and cold winter winds by means of a belt of trees or hedges along the western and southern fences. Calf-feeding bails—the open-air kind are sanitary and suitable—ensure ease in feeding, avoid spillage of the skim milk, give the weaker and slower-eating calves the opportunity for their fair share, prevent calves sucking each other, and make them easier to handle. By leaving the calf in the bail for about 20-30 minutes after feeding the inclination to suck others is curbed.

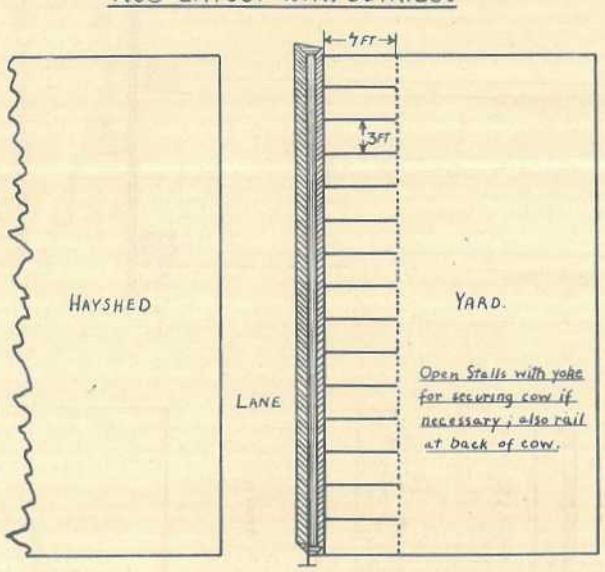



FIG NO1 - LAYOUT OF FEEDING STALLS SIMILAR TO THOSE ON A PROPERTY ON THE DARLING DOWNS.

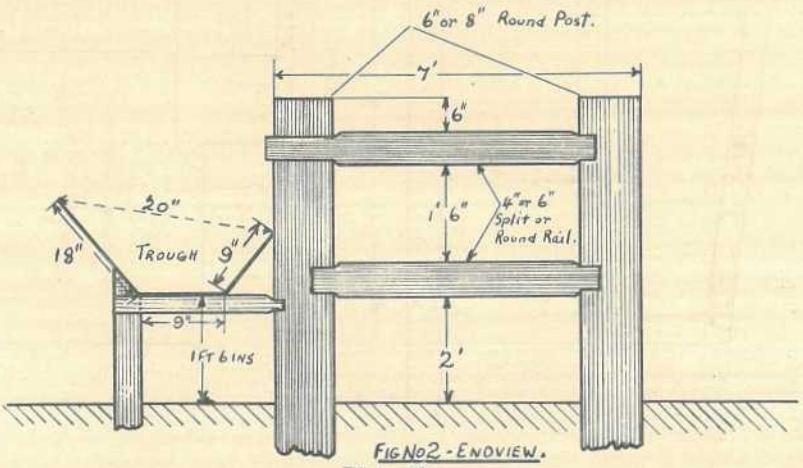
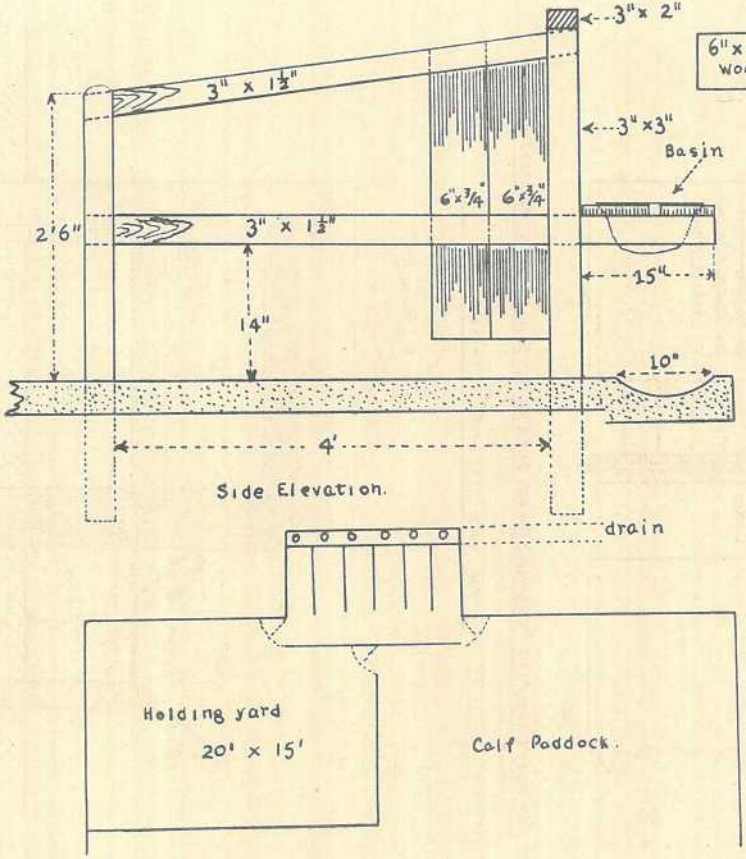
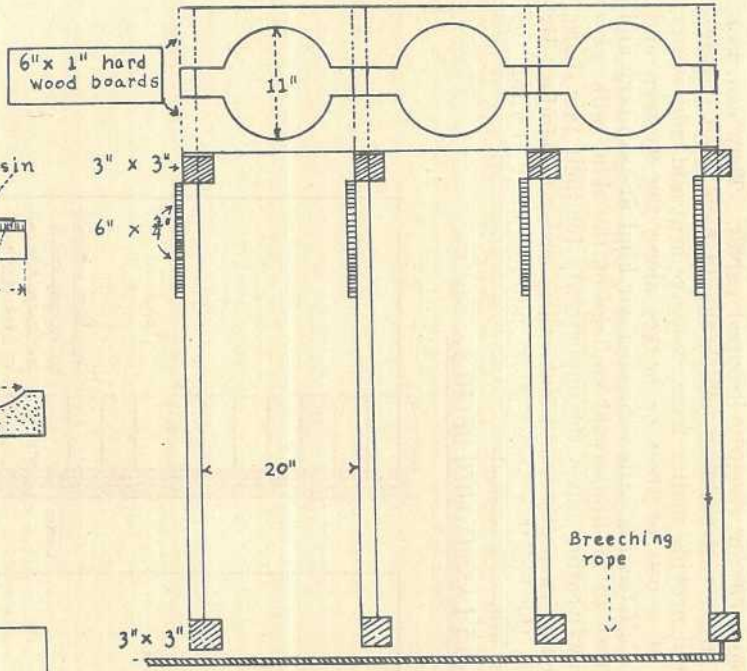



Plate 28.
A THIRD TYPE OF FEEDING STALLS.




Plan showing details

## CALF PENS

Showing side elevation and ground plan, also sketch of calf paddock and holding yard.

Plate 29.

**Isolation Paddock.**—An isolation paddock, although usually conspicuous by its absence, should be provided on every dairy farm. How many diseases could be checked if a farmer had a good isolation paddock in which he could place and watch a suspected animal, without any danger of the animal coming into contact with the rest of the herd?

**Crush.**—Apart from milking, any operation performed on dairy cows in the bails invariably upsets them, making them nervous while in the bails for some days afterwards. Consequently, they often acquire the habit of soiling the floors. A crush should be used for all operations on dairy stock, except milking; for example, the handling of bulls and young stock, testing for tuberculosis, inoculating, and so on.

**Implement Shed.**—Protection of valuable farm machinery and implements from the weather should be ensured. All that is required is a roof. It is advisable to have strong supporting posts, which should be as few as possible in order to give the least interference in the moving of implements.

**Silo.**—The necessity for the conservation of fodder, especially silage, in order to carry the dairy herd over periods of pasture scarcity or drought, is being increasingly appreciated. The silo should be handy to the cow shed. The special departmental bulletin, entitled "Fodder Conservation," should be consulted on this subject.

Plate 30.
TREES LEFT TO PROVIDE SHELTER AND SHADE FOR COWS ADJACENT TO THE COWYARD.

**Shade and Shelter.**—Protection of dairy stock from the discomfort of excessive heat or cold should receive consideration on every dairy farm. Belts of trees or scrub are eminently suitable. The planting of trees or shrubs adapted to rapid growth in the particular district in which the farm is situated will provide breakwinds along portions of the westerly and southerly fences.

**Bull Paddock.**—On Queensland farms, the bull is usually allowed to roam freely with the herd. The disadvantages of this system are:—(*a*) records of dates of service cannot be kept; (*b*) "freshening" cannot be controlled; (*c*) the bull's services are needlessly wasted; (*d*) disease may be spread by the bull; (*e*) there is always a risk of the

bull attacking some person. The special care which a good bull warrants can only be properly given if he is kept apart from the herd. Plate 31 illustrates a safety bull paddock widely used in Western

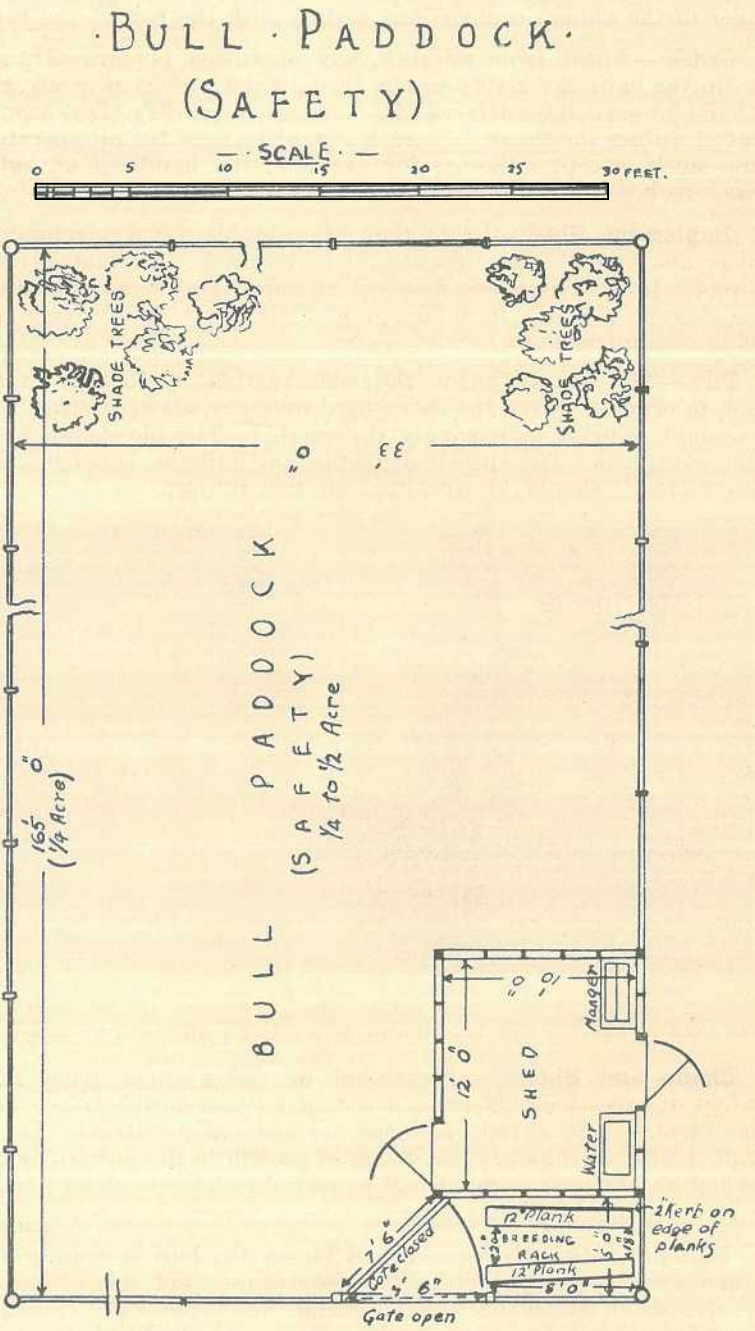



Plate 31.

A PLAN OF A SAFETY BULL PADDOCK.

Australia. Acknowledgment is made to the West Australian Department of Agriculture for permission to reproduce it in this Journal.

### Conclusion.

A prudent course for any farmer to follow before commencing any buildings, making alterations, or installing equipment is to contact the nearest dairy officer, who will willingly give any advice or information. This would avoid any possibility of buildings having to be altered because of failure to comply with the Act. Moreover, the dairy officer can often suggest ways and means of economising in expenditure by building the premises in a certain manner.

Plans and specifications of the buildings referred to in this paper are obtainable, free of cost, upon enquiry from the Department.

## WATERPROOF WHITEWASH.

A waterproof whitewash which has been used extensively on Bukura Agricultural Station, Kenya, for external work and has withstood our high rainfall and even severe hail, where the plaster is hard enough to resist pitting, is made up as follows:—

(*a*) Unslaked lime or lime oxide, 7½ lb.
(*b*) Rock salt or cattle salt, 1¼ lb.
(*c*) Cement, ¾ lb.

The method of preparation is:—Dissolve the salt in 1 gallon of cold water. When completely dissolved pour on to the lime. Now add to the lime 1½ gallons of water, *slowly* allowing it to slake. Add the cement by sprinkling on a little at a time when the lime is almost slaked. Stir thoroughly. It is advisable to use a trough-like receptacle for the preparation of this limewash, because terrific heat is generated during the slaking of the lime. The use of a narrow-mouthed mixing vessel can very easily result in a mild explosion caused by the steam, with probable serious burns to the operators.

It is highly important that, as soon as the lime has slaked, the wash should be applied *immediately and while still hot.* That is why the above proportions have been given as it has been found that one man can supply this volume before the last of it gets cold.

It will be found that the quantity of water given is by no means a constant. It depends on the quality of the lime used, some slacking quickly, some slowly, so that each type generates heat at a different rate. Thus, more or less water is lost as steam according to the quality or type of lime used. Rock forms slake slowly, but the powders are almost instantaneous. The ideal mixture should have the consistency of rather thick distemper. A little water may have to be added to the last gallon or so of mixture. Keep stirring constantly. It pays to have two people on the job, one to stir and prepare the batches of wash and one to apply it.

It is important to see that the surface to receive the whitewash is free of old, flaking lime or other washes. Part of the advantage of this wash is its power to penetrate the plaster, whether the latter is cement or lime. Thus a clean surface will ensure success.

For internal use this whitewash has also been most useful, because it can be washed, even scrubbed without coming off.

Of the many receipes for whitewash, this appears to be the only one, so far tried, that bears out its name and is certainly proof against rain once it has set. It takes about two days to harden sufficiently to withstand heavy rain. For preference, just as with plasterwork, this whitewash should be applied, externally, during dull or misty weather, but it will be found that it will set and not flake even if applied during dry hot weather.

—*From an article by M. D. Graham, Agricultural Officer, Department of Agriculture, Kenya, in the* EAST AFRICAN AGRICULTURAL JOURNAL *for January,* 1944.

# PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock, which have qualified for entry into the Advanced Register of the Herd Book of the Australian Illawarra Shorthorn, Jersey, and Ayrshire Societies production records for which have been compiled during the month of May, 1944, (273 days unless otherwise stated).

| Name. | Owner. | Milk Production. | Butter Fat. | Sire. |
|---|---|---|---|---|
| | | Lb. | Lb. | |
| **AUSTRALIAN ILLAWARRA SHORTHORN.** | | | | |
| **MATURE (STANDARD 350 LB.)** | | | | |
| Model 2nd of Alfa Vale (365 days) | W. H. Thompson, Nanango | 16,060·5 | 783·855 | Reward of Fairfield |
| Queenie 19th of Greyleigh (365 days) | W. H. Thompson, Nanango | 16,829·15 | 632·469 | Thornleigh Champagne |
| Alfa Vale Model 14th | W. H. Thompson, Nanango | 11,692·3 | 526·83 | Reward of Fairfield |
| Alfa Vale Model 9th | W. H. Thompson, Nanango | 11,085·05 | 514·218 | Reward of Fairfield |
| Jamberoo Glory 4th | M. J. Brosnan, Clifton | 10,291·65 | 414·725 | Brookland Ter. Banker |
| **JUNIOR, 4 YEARS (STANDARD 310 LB.)** | | | | |
| Sunnyview Locket 2nd | W. Henschell, Yarranlea | 9,025·25 | 366·829 | Burradale Byron |
| College Stately 13th | A. H. S. & College, Lawes | 7,564·4 | 320·667 | Dulcamah Disraeli |
| **SENIOR, 3 YEARS (STANDARD 290 LB.)** | | | | |
| Alfa Vale Model 16th | W. H. Thompson, Nanango | 12,686·7 | 605·522 | Penrhos Pansy's Pride |
| Glen Idol Daphne 5th | Estate P. Doherty, Gympie | 9,980·9 | 372·647 | Blacklands Count |
| Ventnor Mab 7th | C. W. Black, Kumbia | 8,435·3 | 342·251 | Kyabram Twinny Boy |
| **JUNIOR, 3 YEARS (STANDARD 270 LB.)** | | | | |
| Alfa Vale Florrie 4th | W. H. Thompson, Nanango | 13,899·25 | 621·829 | Penrhos Pansy's Pride |
| Alfa Vale Model 17th | W. H. Thompson, Nanango | 11,303·6 | 459·268 | Penrhos Pansy's Pride |
| Jamberoo Birdie 6th | M. J. Brosnan, Clifton | 10,953·2 | 423·544 | Greyleigh Valiant |
| Jamberoo Crummy 5th (258 days) | M. J. Brosnan, Clifton | 9,094· | 349·88 | Greyleigh Valiant |
| College Molly 8th | A. H. S. & College, Lawes | 7,111·05 | 309·584 | Hillview Premier |
| Tara Flower (206 days) | K. Roche, Sladevale | 6,765·16 | 276·287 | Murrays Bridge Pansy's Gift |
| **SENIOR, 2 YEARS (STANDARD 250 LB.)** | | | | |
| Jamberoo Modesty 14th (258 days) | M. J. Brosnan, Clifton | 9,160· | 345·957 | Greyleigh Valiant |
| Bileena Butterfly 3rd | K. Roche, Sladevale | 7,073· | 256·715 | Tara Governor |

JUNIOR, 2 YEARS (STANDARD 230 LB.)

| | | | | |
|---|---|---|---|---|
| Greyleigh Gem 160th | W. H. Thompson, Nanango | 13,377·4 | 512·374 | Greyleigh Wootan |
| Jamberoo May Flower 10th (254 days) | M. J. Brosnan, Clifton | 8,572·05 | 313·786 | Greyleigh Valiant |
| Trevor Hill Hope | G. Gwynne, Umbiram | 6,754·08 | 262·603 | Valera Optimist |
| Happy Valley Warden Belle | R. R. Radel, Coalstoun Lakes | 6,054·77 | 256·214 | Sunnyview Warden |
| Happy Valley Nursie | R. R. Radel, Coalstoun Lakes | 5,373·25 | 254·85 | Sunnyview Warden |
| Bileena Flo 2nd | K. Roche, Sladevale | 7,054·25 | 249·928 | Tara Governor |
| Burnley Jaunty | A. B. Wilson, Harlaxton | 6,025·65 | 240·645 | Calrossie Earl |

## JERSEY.

MATURE (STANDARD 350 LB.)

| | | | | |
|---|---|---|---|---|
| Romsey Sunflower | D. R. Hutton, Cunningham | 6.966·81 | 356·751 | Retford May's Victor |

SENIOR, 4 YEARS (STANDARD 330 LB.)

| | | | | |
|---|---|---|---|---|
| Trecarne Jersey Queen 5th | T. A. Pethrick, Lockyer | 6,524·85 | 348·999 | Jerseylea Golden Duke |

JUNIOR, 4 YEARS (STANDARD 310 LB.)

| | | | | |
|---|---|---|---|---|
| Trecarne Chimes 5th | T. A. Petherick, Lockyer | 6,907·55 | 341·022 | Jerseylea Golden Duke |
| Westbrook Tulip 101st | A. H. S. & College, Lawes | 6,013·15 | 318·505 | Oxford Asters Lad |

JUNIOR, 3 YEARS (STANDARD 270 LB.)

| | | | | |
|---|---|---|---|---|
| Oxford Carolyn | E. Burton and Sons, Wanora | 6,850·6 | 389·272 | Oxford Daffodil's Count |
| Oxford Frances 2nd | E. Burton and Sons, Wanora | 6,883·85 | 359·316 | Oxford Daffodil's Count |
| Gem Dolly | W. Bishop, Kenmore | 7.249·3 | 333·057 | Calton Lothean |

SENIOR, 2 YEARS (STANDARD 250 LB.)

| | | | | |
|---|---|---|---|---|
| Boree Butterfly | W. & C. E. Tudor, Branch Creek | 8,200·59 | 450·371 | Maurfield Larkspur's Gift |
| Oxford Maid Marion | E. Burton and Sons, Wanora | 6,914·7 | 366·007 | Oxford Ajax |
| Ashview Eva | C. Huey, Sabine | 5,938·6 | 315·644 | Trecarne Butter Queen's Officer |
| Gem Claudette 2nd | W. Bishop, Kenmore | 6,179· | 309·649 | Calton Lothean |
| Ashview Treasure | C. Huey, Sabine | 5,279·55 | 255·353 | Trecarne Butter Queen's Officer |

JUNIOR, 2 YEARS (STANDARD 230 LB.)

| | | | | |
|---|---|---|---|---|
| Oxford Mercia | E. Burton and Sons, Wanora | 6,731·05 | 310·728 | Oxford Ajax |
| Oxford Ginger May | E. Burton and Sons, Wanora | 5,993·8 | 303·764 | Oxford Maid's Victor |
| Oxford Dixie 2nd | E. Burton and Sons, Wanora | 5,525·65 | 302·479 | Oxford Ajax |
| Oxford Sandra | E. Burton and Sons, Wanora | 4,680·9 | 247·877 | Oxford Daffodil's Count |
| Oxford Lila 2nd | E. Burton and Sons, Wanora | 5,067·85 | 247·861 | Oxford Franco |

## AYRSHIRE.

MATURE (STANDARD 350 LB.)

| | | | | |
|---|---|---|---|---|
| Longlands Nilly | St. Christopher's Stud, Brookfield | 9,211·8 | 370·717 | Longlands Piermont |


## Automatic Self-Feeders for Pigs.

E. J. SHELTON, Instructor in Pig Raising.

THE progressive pig breeder is continually on the lookout for equipment which makes herd management more efficient; money expended on such equipment brings a good return by saving time and labour and by permitting more effective handling of stock. Self-feeders which operate automatically, regularly renewing the supply of food for the pigs and protecting it from undue waste—such as from rain, wind, rats, and birds—are worth consideration, especially during war time, when food must be conserved as much as possible.

The feeder consists essentially of a bulk hopper to hold a supply of food and three or more feeding places immediately below into which the food flows; sliding and hinged flaps regulate the amount of food flowing into the feeding place as the food therein is eaten. The hopper should be large enough to hold several days' supply of feed, and the inside walls should be as smooth as possible in order to permit the free and easy flow of food into the trough—some foods, particularly cereal meals, tend to clog, hence this precaution. When it is desired to feed two or more foods separately in the same self-feeder, partitions may be placed in the hopper at any desired positions.

The self-feeder may be adapted to the feeding of any kind of grain, although shelled grain and ground foods are most commonly used. It may be used to feed maize on the cob, but in this case the feeder would be required to be of a larger size than shown in Plates 33 and 34 in order to hold sufficient grain to feed a number of pigs for several days without refilling.

Maizemeal or barley would require a smaller opening to prevent too rapid a flow of grain than would, say, whole maize. It will be noted in the plans that the sliding and hinged flaps have been fitted with thumb screws so as it may be adjusted to suit the type of grain being fed.

One of the most noticeable features about pigs that are accustomed to self-feeders is that there is no over-crowding at the feeders and no evidence of gluttony—only a small quantity of food is consumed at any one time; it is eaten slowly, thoroughly masticated, and there is little or no waste, neither is there any risk of over-eating and serious digestive trouble. It is always advisable to have good pasturage for the pigs during the time they are on self-feeders and irrespective altogether of the system of feeding adopted. It is important that a permanent clean supply of drinking water be available adjacent to the feeders.

### Creep Feeder for Young Pigs.

The primary self-feeder is the creep self-feeder. It is used from the time the pigs are about three weeks old until they are able to compete more evenly with their companions at the common food trough. Little pigs that are thus self-fed on an efficient and appetising ration make rapid gains. In some of the litter-record work carried out by departmental officers, self-fed suckers reached the weight of 50-54 lb. at eight weeks of age; this exceeds the average weight of a weaner by 12-14 lb., and, of course, gives the pig that much better start in life.

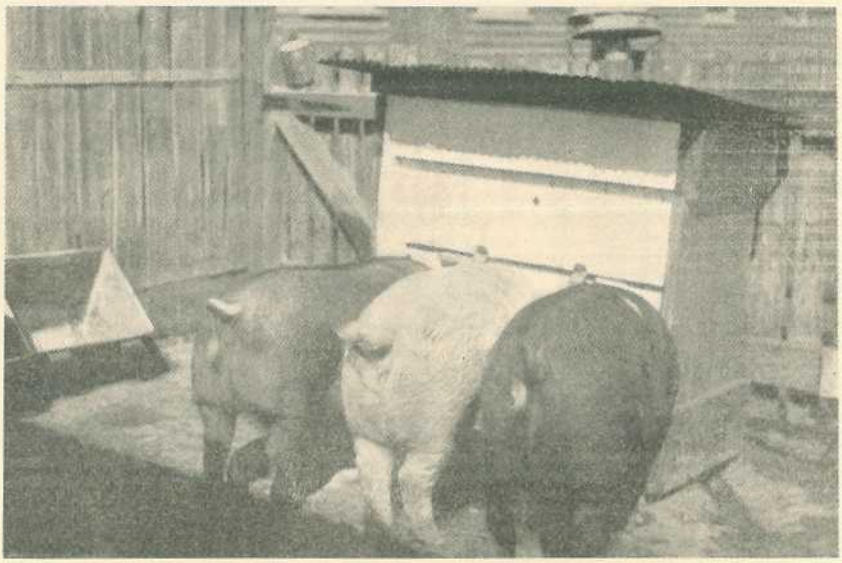


Plate 32.
PIGS AT A ONE-WAY SELF-FEEDER.

One of the most interesting phases of creep self-feeding is the condition of the sow at weaning time, for, being partly relieved of the strain upon her system, she is in much better heart for future mating than when the litter is entirely dependent upon her milk supply. Young pigs self-fed along these lines do not miss their mother's milk to the same extent when weaning time arrives, and thus they overcome the inevitable check in growth which occurs when there is a complete change from one class of food to another.

### Self-feeding of Older Pigs.

The self-feeding method gives excellent results with growing and fattening pigs, and with old sows—backfatters and choppers—that are being fed to very heavy weights. The self-feeding of old sows for market has a very special advantage, particularly if grain is cheap and the milk supply too limited to allow them to have as much as they can drink. The saving of labour alone in this system is well worth while.

In America the self-feeding of pigs has been developed along "cafeteria" lines, in which different foods are placed in separate compartments of the self-feeder, or in different feeders, and the pigs learn to adjust their requirements and to eat sufficient of the various units to make their feeding profitable.

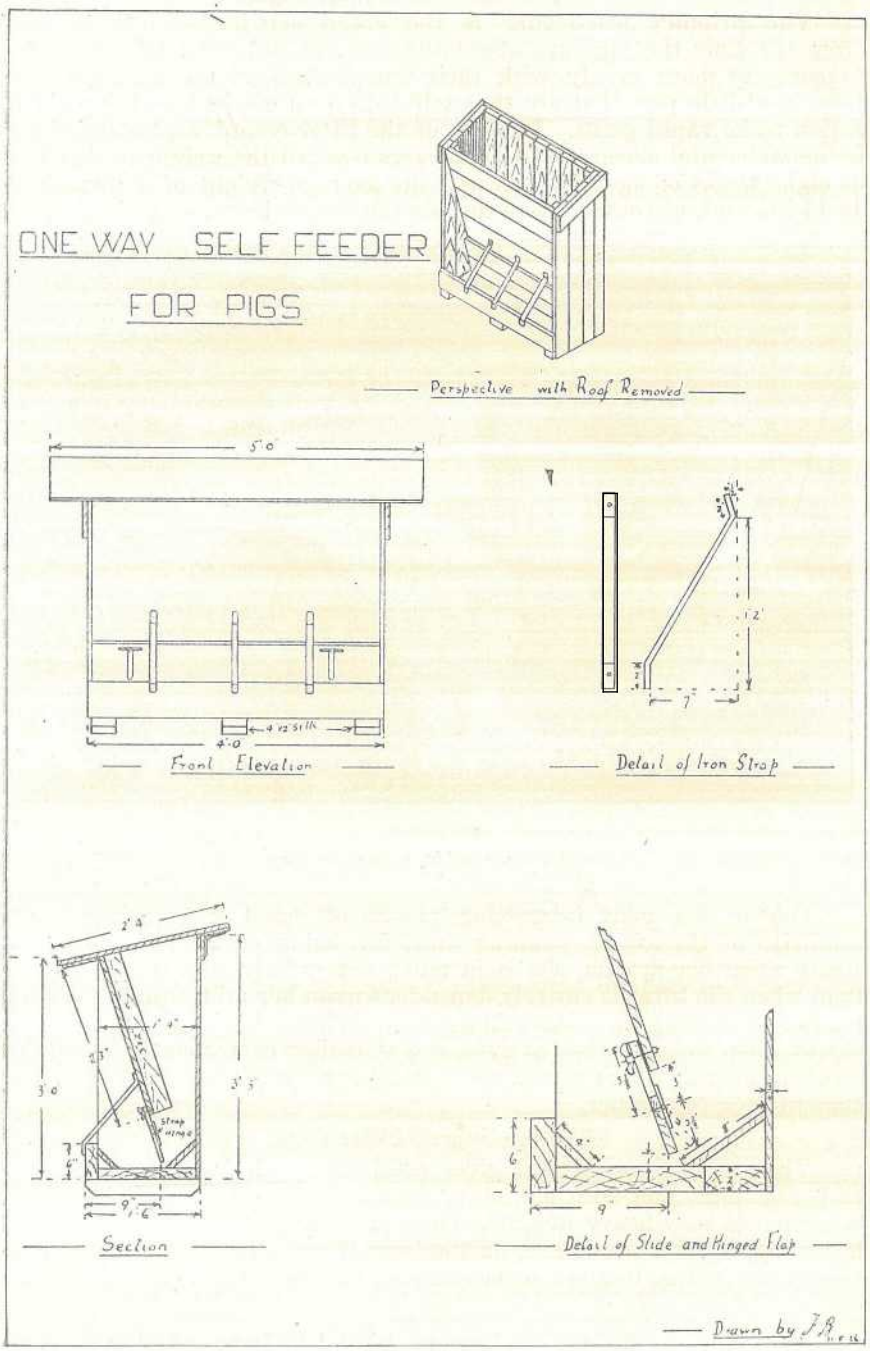



Plate 33.

DETAILS OF ONE-WAY SELF-FEEDER.

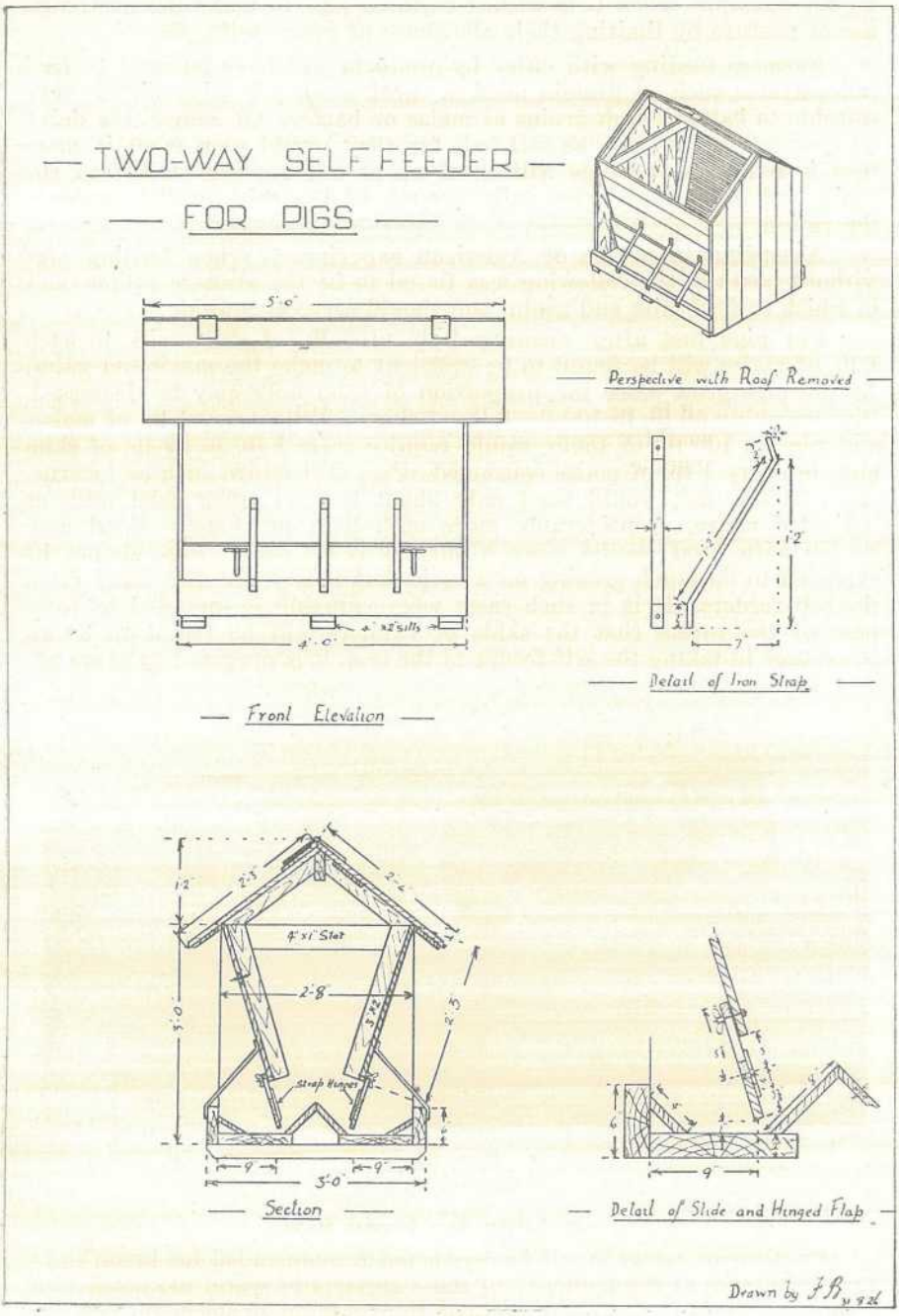



Plate 34.
DETAILS OF TWO-WAY SELF-FEEDER.

The self-feeder should not be used when rapid gains are not required, as, for example, when it is wished to force pigs to make the maximum use of pasture by limiting their allowance of grain, milk, &c.

Farmers feeding with dairy by-products will have no need to feed concentrates such as protein meal or meat meal, for skim milk is very suitable to balance such grains as maize or barley. Of course, the dairy by-products should not be self-fed, for they would soon spoil if more feed is fed than the pigs will clean up at one feeding. Self-feed the grain and hand feed twice daily enough of the skim milk to balance the ration.

According to results of American experiments when feeding pigs without pasture, the following was found to be the average proportions in which to feed milk and grain, and should serve as a guide:—

For pigs just after weaning 4 lb. to 6 lb. of skim milk to each 1 lb. of maize will be found to be sufficient to make the maximum gains. As the pigs grow older the proportion of skim milk may be decreased. Pigs weighing 50 lb. to 100 lb., 3 lb. of skim milk to every 1 lb. of maize, and pigs at 100 lb. to 150lb. would require from 2 lb. to 2½ lb. of skim milk to every 1 lb. of maize consumed. Pigs on pasture such as lucerne, rape, barley, &c., would need only about half as much skim milk as indicated above. Considerably more milk than previously stated may be fed with good results when a surplus is on hand. Pigs cannot be expected to do much grazing on a crop that is any distance away from the self-feeders. It is in such cases where grazing is intended to form part of the ration that the skids or runners will be found to be an advantage in taking the self-feeder to the crop it is proposed to graze off.

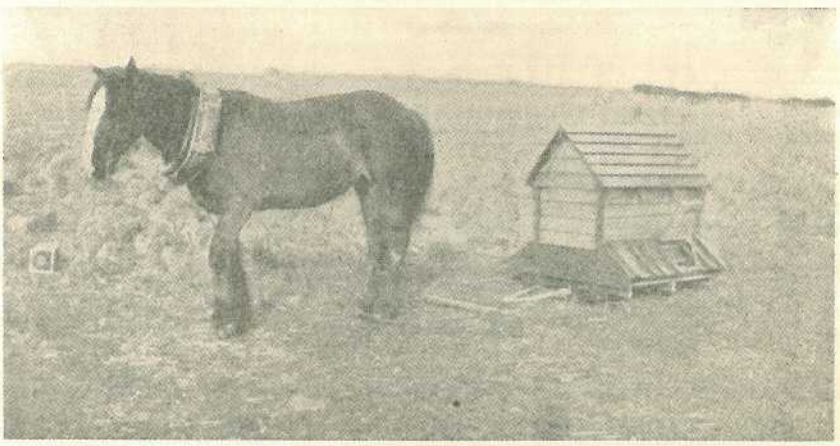


Plate 35.
SHOWING METHOD OF TRANSPORTATION.

### Unsuitability for Brood Sows.

Continuous access to self-feeders is not recommended for brood sows. This is because of the tendency of these animals to spend too much time consuming grain or meal and too little time grazing on succulent pasture. The brood sow must be treated in much the same way as the dairy cow, whose milk supply is improved under a system of hand-feeding concentrates, but in both cases the greater portion of the food must be grass or fodder crops as distinct from grain.

## Care of Self-feeders.

The two types of self-feeders illustrated should be built on skids or runners to facilitate moving them. If they are strongly constructed, this method of transport will be found simpler and less expensive than carriage on a wagon or slide. It is a distinct advantage to place the self-feeder on a wooden or concrete platform. A well-built feeder should give service for a number of years if painted annually. Self-feeders are, however, not fool-proof. They need regular and constant attention; they need to be kept well filled with grain, in coarse meal form for preference; they need daily inspection, for food may clog in the hopper and the animals may go hungry. After heavy rains or wind, inspection is necessary to see that everything is in order.

## Construction.

MATERIAL REQUIRED FOR ONE-WAY SELF-FEEDER.

*Skids*—Three 18 in. lengths of 4 x 2 hardwood.

*Trough*—One 3 ft. 10½ in. length of 12 x 2 pine;
One 3 ft. 10½ in. length of 4 x 2 pine;
One 3 ft. 10½ in. length of 8 x ¾ pine;
One 3 ft. 10½ in. length of 4 x ¾ pine.

*Front Panels*—Five 3 ft. 10½ in. lengths of 6 x ¾ T. & G. pine;
Two 2 ft. 3 in. length of 3 x 2 pine.

*Sliding and Hinged Flaps*—Two 3 ft. 10½ in. lengths of 4 x ¾ pine.

*Ends and Back*—Twenty-four 3 ft. 3 in. lengths of 6 x ¾ T. & G. pine;
One 7 ft. length of 6 x ¾ pine.

*Top*—Ten 2 ft. 4 in. lengths of 6 x ¾ T. & G. pine;
Two 5 ft. lengths of 6 x ¾ pine.

*Hardware*—Three 1 in. x ¼ in. iron straps;
Six 3 in. strap hinges;
Two 3 in. x ½ in. bolts with thumb nuts;
Nails, &c.

MATERIAL REQUIRED FOR TWO-WAY SELF-FEEDER.

*Skids*—Three 3 ft. lengths of 4 x 2 hardwood;

*Trough*—Two 4 ft. lengths of 6 x 2 pine;
Two 3 ft. 10½ in. lengths of 12 x 2 pine;
Two 3 ft. 10½ in. lengths of 8 x ¾ pine;
Two 3 ft. 10½ in. lengths of 4 x ¾ pine.

*Panels*—Ten 3 ft. 10½ in. lengths of 6 x ¾ T. & G. pine;
Four 2 ft. 3 in. lengths of 3 x 2 pine.

*Sliding and Hinged Flaps*—Four 3 ft. 10½ in. lengths of 4 x ¾ pine.

*Ends*—Twelve 4 ft. 2 in. lengths of 6 x ¾ T. & G. pine.

*Frame of Roof*—One 4 ft. length of 6 x 2 pine;
Four 21 in. lengths of 3 x 2 pine;
Two 2 ft. lengths of 4 x 1 pine.

*Roof*—Twenty 2 ft. 4 in. lengths of 6 x ¾ T. & G. pine;
Four 5 ft. lengths of 6 x ¾ pine.

*Hardware*—Six 1 inch x ¼ inch iron straps;
Eight 3 in. strap hinges;
Two 5 in. strap hinges;
Four 3 in. x ½ in. bolts with thumb nuts;
Nails, &c.

Copies of the plans illustrated in this article may be obtained on application to the Under Secretary, Department of Agriculture and Stock, Brisbane, Queensland.

# ANIMAL HEALTH

## Treatment Against Worm Parasites of Cattle.

A. K. SUTHERLAND and R. REIK, Animal Health Station, Yeerongpilly.

THE worms affecting cattle in Queensland are described in the Department's pamphlet "Parasitic Worm Diseases of Cattle." The introduction of phenothiazine and wartime shortages of other drugs (e.g. tetrachlorethylene) necessitates some amendments to the treatments described in the pamphlet.

### Drenches.

1. *Bluestone Solution*:—

Dissolve 1 lb. of bluestone crystals in 2½ gallons water.

Dose rates:—

Calves 2-4 months old, 1½-2 fl. oz.
Calves 4-8 months old, 2-3 fl. oz.
Calves 8-12 months old, 3-4 fl. oz.
Calves 12-18 months old, 4-5 fl. oz.

This drench is cheap and simple to prepare and bluestone is readily available from country storekeepers. It is effective only against the large stomach worm (*Haemonchus*), but, as this is the parasite which usually does most damage, good results are generally obtained. A second treatment should be given two to three weeks after the first.

2. *Bluestone-Nicotine Sulphate.*—

Supplies of nicotine sulphate (Black leaf 40) are not plentiful but if it is available it can be added to bluestone solution to make a drench which is effective against large stomach worms, small brown stomach worms, small intestinal worms, and tape worms.

Dissolve 1 lb. bluestone in 5 gallons of water and add 16 fluid oz. of nicotine sulphate.

Dose rate—2 fl. oz. per 100 lb. body weight. The maximum dose for any animal, irrespective of weight, is 4 fl. oz.

Nicotine must be used with care. If the calves are weak or anaemic reduce the dose or, better still, use bluestone alone and then treat with bluestone-nicotine when they have improved in condition.

3. *Phenothiazine.*—

Phenothiazine is the best general treatment and will remove most of the worm parasites. It is the only effective treatment for the large bowel (nodule) worm.

The doses of powder recommended are—

For grown cattle, not more than 2 oz.

For cattle above 12 months old, not more than 1½ oz.

For calves about 6 months old, not more than 1 oz.

If the brands of phenothiazine now on the market are mixed at the rate of 1 lb. of powder to 12 fl. oz. of water a suitable suspension is produced and the above amounts of phenothiazine will be contained in the following doses of the mixture:—

Grown cattle—3 fl. oz.

Cattle about 12 months—2¼ fl. oz.

Calves 6 months old—1½ fl. oz.

The powder should be sieved to remove lumps and then the water is stirred in to form a suspension resembling thin cement. This suspension is best given with a drenching gun, but drenching funnels or bottles may be used.

Calves are not as tolerant to phenothiazine as sheep and ill effects are sometimes seen, particularly if an overdose is given. If young cattle in very poor condition are being treated, it is advisable to reduce the dose rate and repeat treatment later when the animals have improved in condition.

The urine of animals treated with phenothiazine will be red for a few days but soon returns to normal.

Phenothiazine is available (usually in 1 lb., 5 lb., and 7 lb. packets) from farm and station suppliers and many country chemists, or from—

Imperial Chemical Industries, 100 Creek street, Brisbane;

Taylor Elliotts, Charlotte street, Brisbane;

Wm. Cooper & Nephews, Box 3946V, G.P.O., Sydney, N.S.W.

### Treatment of Lung Worms.

Lungworm is usually accompanied by moderate to heavy infestation with stomach and intestinal worms but the cough due to lungworms usually attracts most attention so that the effects of the other parasites are overlooked. There is no efficient specific treatment for lungworm. Injections into the windpipe have been often used, but this treatment is of doubtful efficiency and it is not recommended. Furthermore, some of the ingredients of the mixtures used are not now available.

If infected calves are drenched with phenothiazine to remove stomach and intestinal parasites and put on to good feed, their natural resistance will be increased, so that they can overcome lungworm infestation. A natural age resistance to lungworm is developed as calves grow older. Failing phenothiazine, use bluestone or bluestone-nicotine sulphate. Note that calves infected with lungworms are often in poor condition so it may be necessary to use a reduced dose of phenothiazine and repeat treatment later with a full dose.

### Preventive Measures.

General control measures to minimise worm infestations are described in the pamphlet mentioned previously.

When calves are drenched they should be turned into a paddock which has not carried sheep or cattle for a month. A pasture contaminated with worm eggs and larvae may reinfest the calves so quickly that little benefit is obtained from the drenching.

Good feeding helps the animal to resist worm infestation and its effects. If after drenching calves are turned on to good feed in a spelled paddock, they will derive the maximum benefit from the treatment.

Good management and feeding will minimise the amount of drenching required during the year.

## Treatment of Pigs for Large Roundworm Infestation.

A. K. SUTHERLAND and R. REIK, Animal Health Station, Yeerongpilly.

LARGE roundworms (*Ascaris lumbricoides*) can be removed from the intestine of pigs by giving the proper dose of phenothiazine powder in a small feed. Drenching with oil of chenopodium in castor oil is also very efficient, but chenopodium has been unprocurable since early in the war.

The following procedure is recommended for giving phenothiazine:

Divide the pigs into groups according to their weights and confine each group in a pen or yard.

Starve for 18 to 20 hours so that the feed containing the drug will be readily eaten.

The doses of the powder are as follows:—

| | |
|---|---|
| Pigs of 25 lb. live weight | 5 grams ($\frac{1}{6}$ oz.) |
| 25 to 50 lb. live weight | 8 grams ($\frac{1}{4}$ oz.) |
| 50 to 100 lb. live weight | 12 grams ($\frac{1}{2}$ oz.) |
| 100 to 200 lb. live weight | 20 grams ($\frac{2}{3}$ oz.) |
| Over 200 lb. live weight | 30 grams (1 oz.) |

The appropriate weight of phenothiazine (accurately weighed) for each group is mixed with about four times its weight of dry ground feed (such as crushed wheat, pollard, etc.). The pigs should have plenty of troughing space so that each one in the group will eat his share of the drug.

If the pigs are accustomed to slop feeding the phenothiazine may be fed in a thick mass—but not in watery slops.

The urine of treated pigs will be red for 4 to 5 days but soon returns to normal.

Giving phenothiazine to a group of pigs in their feed as described here is less efficient than drenching each pig individually with the appropriate dose of a phenothiazine-water mixture. However, pigs are difficult to drench and the above method is advised because it is simple and effective.

Note that with mass treatment the greedy or aggressive pigs may take excessive doses of phenothiazine and show ill effects.

The life cycle of the large round worm and its effect on pigs and recommended preventive measures are described in the pamphlet "Parasitic Worm Diseases of the Pig" so it is necessary to mention here only certain points which have a bearing on treatment.

Pigs become infested by eating worm eggs which contaminate their food. These eggs have come from worms living in the bowel of other pigs. When pigs feed off the ground or can place their feet covered with mud containing worm eggs in the troughs, they cannot escape infestation. These eggs hatch into immature worms (larvae) which migrate through the liver and lungs before finally settling as adults in the intestine of the pig. The larvae do much damage in the liver and lungs, which results in stunted growth and unthriftiness and coughing (which may persist for months). Pneumonia due to bacterial invasion of damaged lung tissue is a common sequel. These are the most serious effects of the parasite, and are seen in pigs up to 4 or 5 months of age. The adult worms living in the intestine are also harmful but are usually found only in pigs over 2 months of age. A few adult worms may produce no recognisable symptoms but they lay an enormous number of eggs which are very dangerous to the young pigs.

Phenothiazine or oil of chenopodium will remove the adult worms from the intestine but no drug will have any effect on larvae in the liver and lungs. The above facts lead to the following points which must be remembered when applying treatment—

(i.) Treatment is successful in removing only those worms which are in the intestine.

(ii.) Young pigs suffering from the effects of infestation with larvae only will not be benefited by treatment, and

(iii.) Worms which are in the larval stage when treatment is given will continue their development unharmed to the adult stage and thus may give the false impression that the drug did not remove those adult roundworms which were in the intestine at the time of treatment.

Control measures must aim therefore at preventing infestation of young pigs. This is achieved by the sanitation described in the above mentioned pamphlet and by treating all the older pigs on the property so as to remove the egg laying worms. Efficient treatment twice yearly should be sufficient if yards and runs are managed hygienically.

Phenothiazine is available in 1 lb., 5 lb., and 7 lb. packages from farm and station suppliers and from many country chemists, or from :—

Imperial Chemical Industries, 100 Creek street, Brisbane;

Taylor Elliotts Pty. Ltd., Charlotte street, Brisbane;

William Cooper & Nephews, Box 3946V, G.P.O., Sydney.

**CHANGES OF ADDRESS.**

Subscribers are asked to kindly notify changes of address to the Department of Agriculture and Stock, Brisbane, without delay.

# Phenothiazine for Worm Parasites in Horses.

A. K. SUTHERLAND and R. REIK, Animal Health Station, Yeerongpilly.

PHENOTHIAZINE is the most efficient drug for the treatment of horses infested with redworm (*Strongyles*). Of the worm parasites infesting horses, the redworm is the most damaging. Young horses may be heavily infested with large roundworms (*Ascaris equorum*) and phenothiazine will also remove these worms satisfactorily.

The phenothiazine powder is best given in the feed in the following doses:

Draught horses, 30 gram. (1 oz.).

Light draughts and saddle horses, 25 gram. ($\frac{3}{4}$ oz.).

Yearlings and ponies, 20 gram. ($\frac{2}{3}$ oz.).

Phenothiazine is not always safe for horses and some animals show serious ill effects after treatment. In order to reduce the chances of such ill effects taking place, it is suggested that the dose be divided into 3 or 4 parts and one of these given each day until the full dose has been received.

Most horses readily consume the treated food, especially if a little molasses is added. Starvation before treatment is not necessary. Bran mashes should be fed before, during and after treatment, but if the horses are on green feed and the bowels are free, this is not essential.

The urine of treated animals becomes red when exposed to the air but the colour returns to normal in 4 to 5 days.

Horses should be spelled after treatment for about five days or until the colour of the urine returns to normal.

All the horses in a mob should be treated even though only a few are showing symptoms.

After treatment the horses should be run in a paddock which has carried no horses for a few months.

Phenothiazine is available in 1 lb., 5 lb. and 7 lb. packages from farm and station suppliers and from many country chemists, or from

Imperial Chemical Industries, 100 Creek street, Brisbane.

Taylor Elliotts Pty. Ltd., Charlotte street, Brisbane.

William Cooper & Nephews, Box 3946V, G.P.O., Sydney.

## PULSE, TEMPERATURE, RESPIRATION.

Appended figures should prove helpful in diagnosing and treatment of diseases in livestock:—

| | Pulse a Minute. | Respiration a Minute. | Normal Temp. |
|---|---|---|---|
| Horse .. .. .. | 38-43 | 8-12 | 100 |
| Cow .. .. .. | 50-60 | 12-16 | 101 |
| Sheep .. .. .. | 75-80 | 20-30 | 103 |
| Pig .. .. .. | 70-80 | 20-30 | 102 |
| Dog .. .. .. | 80-90 | 15-25 | 101 |


# Tank Measurements

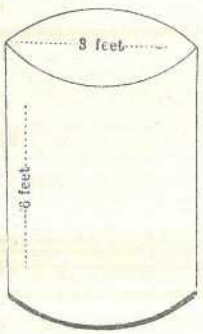
## CIRCULAR TANKS.

To find the area of Circular Tanks and Cisterns,—
Square the diameter, multiply by ·7854, multiply by depth.

EXAMPLE 1.

Tank measures 3 feet in diameter by 6 feet deep.
Square the diameter 3 × 3 = 9 feet.

9 feet × ·7854 × 6
9
7·0686
6
42·4116




= 42·4116 cubic feet in the tank, or almost 42½ cubic feet.

As there are 6¼ Imperial gallons in 1 cubic foot of water, multiplying the above 42·4116 by 6¼ gives the number of gallons in the tank.

Thus,—42·4116 × 6¼
6¼
2544696
106029
265·0725 gallons, (very little over 265 gallons.)

## CIRCULAR TANKS.

EXAMPLE 2.

A shorter formula by which the capacity in gallons could be ascertained is:—
Square the diameter, × by depth, × by 4·908:

3 × 3 = 9 × 6 × 4·908
6
29·448
9
265·032 gallons.

Or,—Square diameter, × by depth, × by $4\frac{9}{10}$, would give it roughly

$$3 \times 3 = 9 \times 6 \times 4\tfrac{9}{10}$$

9

54

$4\frac{9}{10}$

216

$48\frac{1}{2}$

$264\frac{1}{2}$

EXAMPLE 3.

Another way of finding the capacity in gallons, which might be used by those not familiar with fractions:—

Square the diameter in inches, multiply by the depth in inches, divide by 353. Circular tank measures 3 feet in diameter by 6 feet deep.

$36 \times 36 \times 72 \div 353.$

36

36

216

108

1296

72

2592

9072

353)93312(264½ gallons (about)

706

2271

2118

1532

1412

120

Having found the number of gallons, to find the number of cubic feet, divide by $6\frac{1}{4}$. To divide by $6\frac{1}{4}$, multiply by 4, and divide by 25.

Thus.—$264\frac{1}{2}$ gallons divide by $6\frac{1}{4}$.

4

25 { 5)1058

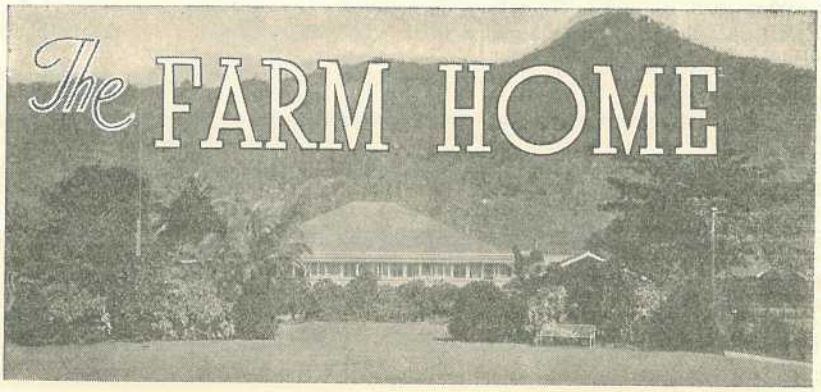
5)211-3

42-1 } $\frac{8}{25}$ = almost $42\frac{1}{2}$ cubic feet.

These formulæ do not work out with mathematical precision, but are sufficiently accurate for practical purposes.

## PRESERVING WIRE NETTING.

A good plan is to mix a portion of cement in the tar used for the purpose. When dried it forms a coat which lasts, whereas tar alone soon leaves the netting when underground.




# 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.*

## BABY'S HEALTH: NATION'S WEALTH.

### Winter Ills and the Children.

DO you know that last year approximately 1,110 babies and children died before they reached the age of 5 years? Of these, 158 died from respiratory infections (those which affect the nose, throat, bronchial tubes and lungs). The sickness rate from these infections was, of course, much higher. Since parents have learnt to understand the dangers of summer diarrhœa there has been a great lessening in the death and sickness rate from that disease, and so now it is the duty of every mother and father to learn about the respiratory infections, so that they can help to lessen the number of children who contract them and thus prevent much unnecessary illness and suffering among the little ones. As you know, these diseases are usually much more prevalent in the winter because buildings and public vehicles are closed up to keep out draughts. It is in badly ventilated rooms and vehicles that the germs which are contained in the droplets sprayed into the atmosphere by careless people coughing and sneezing without covering nose and mouth with a handkerchief are spread to anyone within 4 feet and at the same height as or lower than the person sneezing.

The trouble is that we accept the common cold as inevitable, and not much to worry about, and do not realise that it is the forerunner of bronchitis and pneumonia and leads to a lowered resistance to other infections as well. The common cold is highly infectious and unfortunately one attack does not give immunity, but there should not be as many children as there are whose mothers complain that they are "always catching colds."

Let us see what can be done to improve the position.

### Prevention of Colds.

The great thing is to increase the children's resistance. Keep the house well ventilated and have the children out of doors as much as possible in the daytime, even when the weather is cold, provided they are playing actively. Make use of every half hour of sunshine. Do not allow young children into over-crowded buildings. Do not let baby sleep in the kitchen—a sunny veranda is much better, provided he is warmly covered.

Dress the children according to the temperature of the day, not of the season. The heat-regulating mechanism of the body deals with ordinary changes of temperature. Constant overclothing weakens this mechanism and increases the danger of chilling when the clothes are removed.

See that the children have a long, unbroken sleep at night and a daytime sleep or rest as well.

Give a quick, cool sponge and a brisk, vigorous rub down after the bath every morning.

When lifting children from a warm bed after a sleep protect them carefully from sudden chilling.

See that the children have a nourishing and vitamin rich diet, their full supply of milk—fresh or dried—their full ration of butter, cheese, if they are old enough, and plenty of yellow and green vegetables and fruits, wholemeal bread, and porridges. If they have been subject to frequent colds, one of the fish liver oil preparations, such as Cod and Halibut, may be given daily during the cold weather. All artificially-fed babies should have one of these in addition to their food.

Because colds are so infectious, keep children away from anyone who has a cold or other respiratory trouble. Do not allow children to be kissed and fondled indiscriminately. Even members of his own family should not kiss a child on the mouth.

Questions on this or any other subject concerning Maternal and Child Welfare will be answered 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.

*Pork Chops Grande.*

Allow one pork chop for each person, fry in the usual way and, while frying, prepare two onions peeled and sliced, two sticks of celery finely sliced. Fry in one dessertspoonful of butter. When cooked add two well-beaten eggs and half a cupful of milk. Stir for a few seconds. Place the chops, well drained, on a hot dish and pour savoury around. Serve with mashed potatoes.

*Pork Pie.*

Take 1 lb. minced pork, 1 pig's foot (for jelly), and prepare as follows:—Take 1 lb. self-raising flour, melt ½ lb. lard, pour over flour and work into a dough. Line a cake tin, fill with minced pork, and cover with remaining dough. Bake in moderate oven for one hour. Cover pig's foot with water, bring to boil, and allow to simmer for one and a-half hours. Strain and season to taste. Allow stock and pie to cool a little, then pour pig's foot stock into the pie and allow to cool and set.

This is a very nice dish and is readily prepared. If available, two pig's feet may be used instead of one to provide for a richer stock and jelly.

*Bran Biscuits.*

*Ingredients*:—1 cup bran, 1 cup S.R. flour, ¼ lb. dripping, ¼ lb. sugar, 1 egg. *Method*:—Cream butter and sugar, add egg and beat well. Mix S.R. flour and bran together and stir into mixture. Roll out thin, cut into rounds or fingers, and bake on greased slide in moderate oven.



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