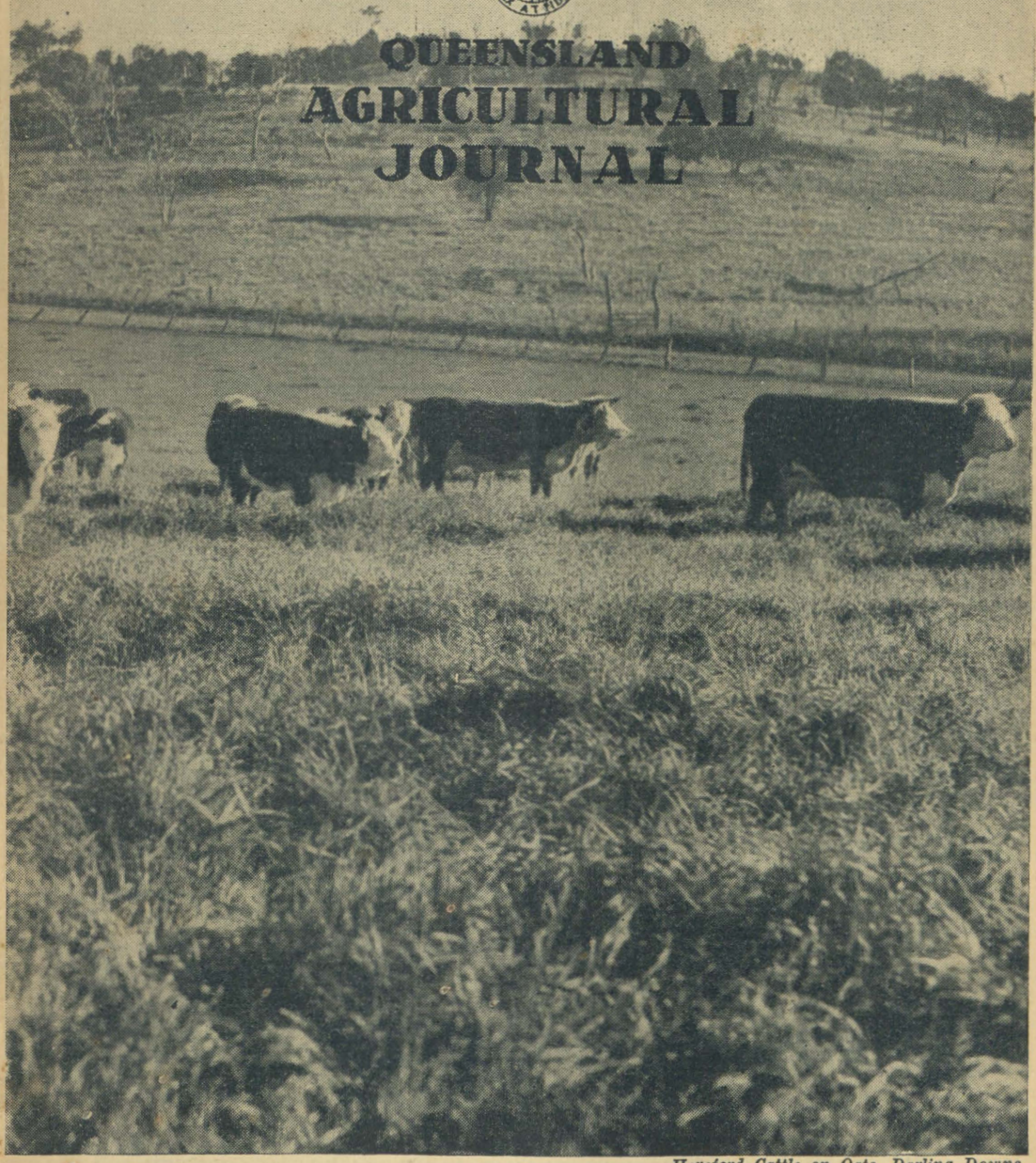
VOL. 77. PART 2 AUGUST, 1953

DEPARTMENT OF AGRICULTURE

QUEENSLAND AGRICULTURAL JOURNAL



Hereford Cattle on Oats, Darling Downs.

LEADING FEATURES

Pineapple Growing

Honey Flora

Bunchy Top Legislation

Herd Recording Survey

Crush Bail

Registered at the General Post Office, Brisbane, for transmission by Post as a Newspaper.

Contents

The Pineapple.

P. MITCHELL (Senior Adviser in Horticulture) and R. C. CANNON (Senior Horticulturist).

THE pineapple, which is indigenous to tropical South America, was introduced to Europe at the end of the 15th century and has since been established in most tropical countries. The pineapple-canning industry is now one of the most important fruit-canning industries of the world, accounting for 20% of the total canned fruit production.

The cultivated pineapple (*Ananas comosus* Merr.) is a monocotyledon of the order Bromeliaceae, and is the only representative of the group which is of economic importance. The plant (Plate 1) is terrestrial in habit, though most other species in this order are epiphytes—that is, plants which cling to others for support without deriving nourishment from them. Its epiphytic relationships are revealed, however, by its ability to remain alive for several months without any contact with the soil. Like most such plants, the pineapple is xerophytic, being able to live and reproduce under relatively arid conditions.

HISTORY.

Pineapples were first introduced to Queensland, probably from India, in 1838 and were then grown at Nundah, Hamilton and Nudgee. For many years, the limitations of transport restricted commercial production to the metropolitan district, which provided the main market. Later, as road and rail communications improved and provided access to more distant markets, the industry expanded along the Near North Coast with its centre at Woombye. At the same time, small areas were established in other coastal districts from the southern border to Cooktown, primarily to cater for local requirements, but with some surplus for export to southern markets.

The initial development of the industry in Queensland followed a market demand for fresh fruit, and as production began to outstrip this demand, attention was given to processing. Small trial shipments of canned pineapples were exported to Great Britain and European countries, as well as India and Canada, as far back as 1892. The Queensland pack, however, was insufficient at that time to meet Australian requirements, and substantial quantities of Malayan canned pineapples were imported to make up the deficiency.

At this stage, many growers were canning surplus fruit not required for the fresh fruit market. In a few years, however, these small processing plants were displaced by larger proprietary canneries operating in the Brisbane area. Following a sharp rise in production about 1920, when extensive plantings in soldier settlements in southern Queensland came into bearing, the State Government erected a well-equipped factory in Brisbane to cope with the increased volume of fruit.

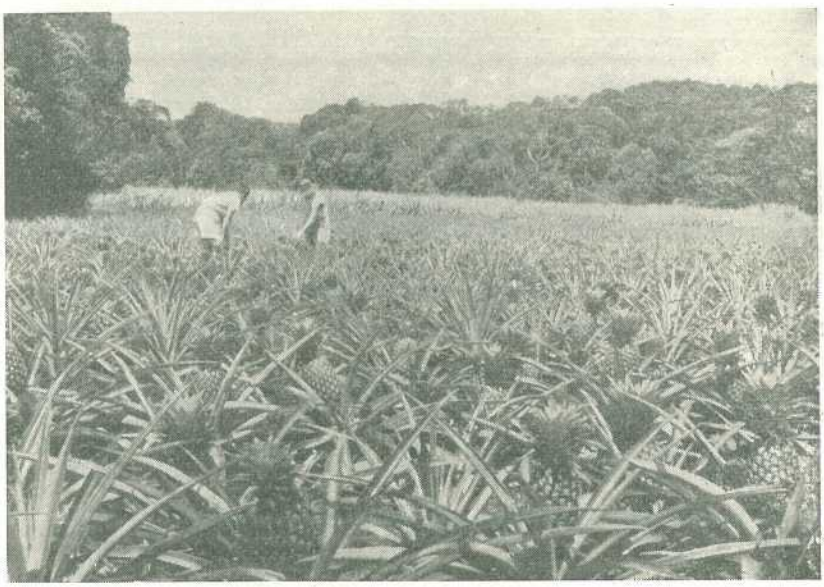


Plate 1.

Smooth Leaf Pineapples. An Innisfail district plant crop ready for harvesting in the summer.

From 1924 to 1931, the pineapple industry remained fairly stable, but early in the 1930's markets for both fresh and canned pineapples virtually collapsed. This collapse was accompanied by the widespread occurrence of wilts, characterised by root failure and plant decline. Intensive investigations were undertaken, and within a few years new methods of soil and crop management had been adopted and production was on the increase. Prices for both fresh and canned fruit also improved steadily until the early 1940's, when the whole output of canned pineapple was requisitioned for the armed services. It was during this period that a growers' co-operative cannery was erected at Northgate, near Brisbane.

STRUCTURE AND FRUITING OF THE PINEAPPLE.

The pineapple is an herbaceous perennial plant, growing to a height of 2-4 feet, depending on the variety and the conditions under which it is grown. It has a dense, shallow root system, arising from the axils of the leaves at the base of the stem and concentrated in the upper six inches of soil.

The long, fleshy, trough-like leaves are arranged spirally around the stem, and collect rain or dew, which is directed to the roots near the base of the plant. They are also provided with large water-storage cells, which enable the plant to withstand dry conditions.

The fruit is a compound structure, consisting of a number of fruitlets or "eyes", each of which is formed from a single flower, and its size is governed by the number of eyes and their subsequent development. The fruit arises from the apex of the stem at the centre of the plant, only one fruit being borne on each stem. The fruit stalk runs through the fruit, as the core, and terminates in a cluster of small leaves constituting the "top" or "crown".

In vigorous plants, offshoots, usually known as "slips", but sometimes called "gill sprouts", "buttons" or "robbers", arise from the fruit stalk as the fruit matures. Each has a small pinelet at its base which is anatomically the same as a fruit although it does not develop any further on the parent plant. If removed and planted, a slip grows into a plant which will fruit in the ordinary way. Slips are produced most prolifically by plants flowering in the spring and bearing a summer crop of fruit.

Another type of offshoot, the "sucker", is purely vegetative, and arises in a leaf axil of the stem. Suckers on a plant crop produce the first ratoon and their suckers in turn produce the second ratoon, and so on. The number of suckers on any plant depends on its vigour and the growing conditions encountered. Usually plants carrying a summer crop are more productive of suckers than those bearing a winter crop.

In southern Queensland, the pineapple plant flowers within 12-18 months from planting, the period depending on the type of planting material and the time of planting. Summer fruit take about five months to mature, whilst winter fruit may take up to seven months. Under optimum conditions the first ratoon crop may be harvested 12 months after the plant crop, but more often than not it will take 18 months, and the same would apply to the second ratoon. These three crops normally constitute the commercially productive life of a pineapple plantation. Allowing for variable weather conditions and irregular fruiting, the complete cycle, therefore, usually occupies about five years.

In the subtropical areas, climatic conditions and irregularity in type, size and vigour of plants usually have the effect of spreading the crop. Consequently, there are in practice four cropping periods in the year, giving a summer, winter and two intermediate crops. This seasonal spread of the crop has some advantages, particularly when both fresh fruit markets and cannery outlets are available.

In the tropics, where summer and winter temperatures are higher and there is a longer growing period, fruit may be harvested within 9-15 months of planting. Under these conditions, the complete crop cycle occupies a shorter period.

PRODUCING DISTRICTS IN QUEENSLAND.

Practically the whole of the Australian pineapple crop is produced in Queensland on frost-free land within the coastal belt. The major producing areas in their order of importance are the Near North Coast, Gympie, Brisbane, Rockhampton, Maryborough, Magnetic Island and Bowen. Large areas in the tropical coastal region are eminently suited

for the production of pineapples, but facilities for transport to markets have limited expansion in the past. The establishment of canneries in the north has been followed by an increase in the area under crop in this part of the State during the last few years.

VARIETIES.

The cultivated varieties of the pineapple may be classified into three main groups—the Cayenne, the Queen and the Spanish. The first is by far the most important group, the Smooth Cayenne being the principal canning variety. Varieties of the Queen group are grown to a lesser extent, exclusively for some fresh fruit markets, but are being superseded by Smooth Cayenne, which is a dual-purpose variety.

The Smooth Cayenne.

The Smooth Cayenne, which presumably originated in French Guiana, is known in England as the Kew pineapple and in Malaya as the Sarawak. The plant is typically stocky and robust, with tapering, fleshy leaves up to 3 ft. in length and 2½ in. in width. The leaf margins are smooth with the exception of a few spines near the tip. The upper surface of healthy leaves is dark olive-green in colour, with an irregular purplish suffusion running along the centre. The flowers are light purple in colour with bright red bracts. The number of flowers on a single spike ranges from 130 to 170, depending on environmental conditions.

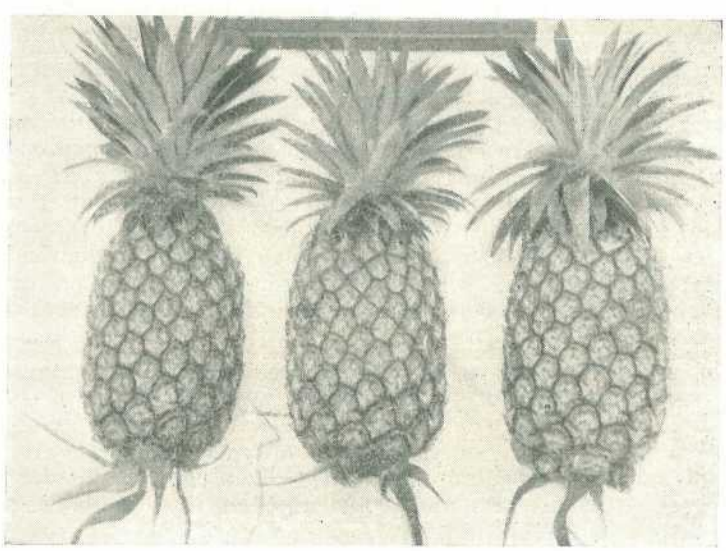


Plate 2.

Smooth Cayenne. The most widely grown pineapple variety in Queensland.

The fruit (Plate 2) is large and cylindrical in shape, and weighs about six pounds. Over-sized fruit may taper towards the apex, but this characteristic varies somewhat with seasonal conditions. The fruitlets or "eyes" are typically broad and flat, with inconspicuous dead bracts. As the fruit ripens, it acquires a deep-yellow to coppery-yellow colour, which first appears at the base and progresses upwards to the shoulders. The flesh is firm, close-textured and juicy, with a light-yellow colour at maturity.

Other varieties of this group are the Hilo of Hawaii and the St. Michel of South Africa.

Varieties of the Queen Group.

Varieties of the Queen group were probably the first pineapples to be cultivated, and apparently the first to be grown in Queensland. At the present time two varieties of this group are still grown here—the rough-leaved or Common Rough, and the Ripley Queen and local selections from it.

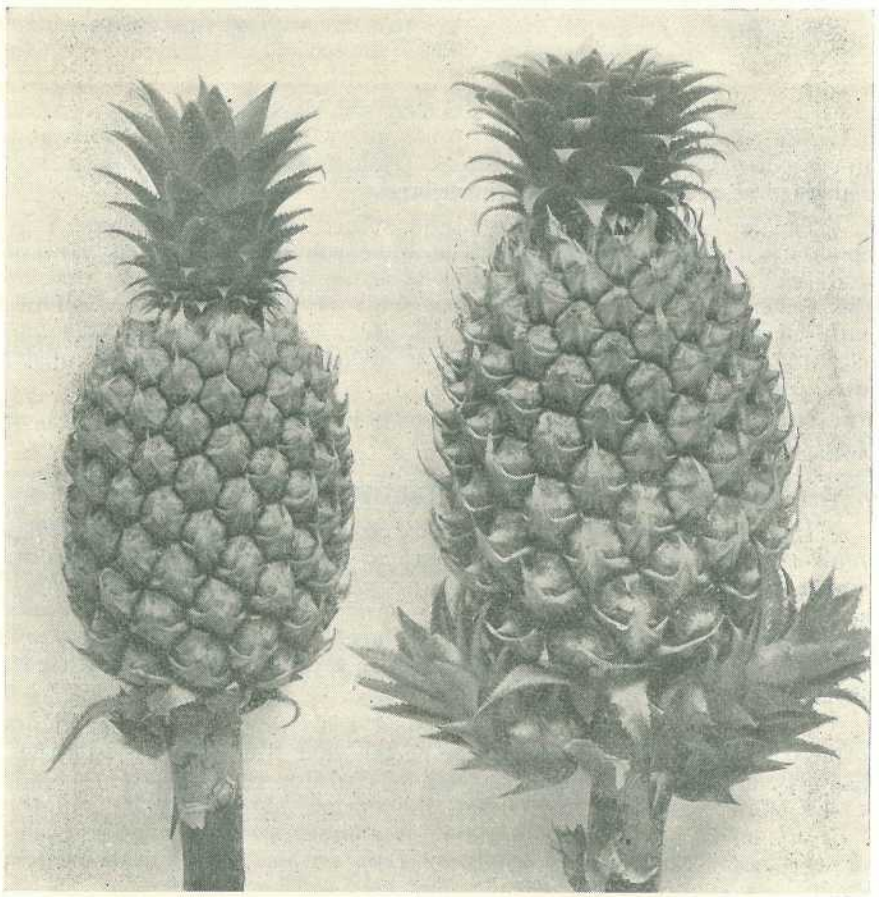


Plate 3.

Pineapple Varieties. Left, Queen. Right, Ripley Queen.

The plants are characterised by a dwarf, compact habit of growth. The leaves are short, stiff, strongly serrated along their entire margins, and thickly covered with a whitish meal on both surfaces. The flowers are lilac in colour, and the eyes are small and prominent. When fully mature the fruit is bright yellow in appearance, with light yellow, crisp and sweet flesh, and is much less juicy than the Smooth Cayenne.

The Queen or Common Rough (Plate 3) has bluish-green foliage and the fruit is more or less barrel-shaped, with an erect top. The *Ripley Queen* has pale-green foliage, heavily tinged with red, and the

fruit is more conical in shape than the Queen, with a distinctly flattened top. The *MacGregor*, which is a local selection from the Queen, is sturdier, broader-leaved, more vigorous and produces larger and better-shaped fruit. A local selection from the Ripley Queen, the *Alexandra*, is similar to the parent variety, but is more vigorous and produces somewhat larger fruit.

A characteristic of these rough-leaved varieties is their prolific suckering. The small size of the fruit and the solid flesh make them more suitable for the fresh fruit market than for canning, and they are not now processed in Queensland.

The *Pernambuco* and *Abachi* are two varieties of this group which are grown in other countries for dessert purposes.

Varieties of the Spanish Group.

Red Spanish is the principal pineapple variety grown in Cuba and Puerto Rico for the United States fresh fruit trade, but it is not represented commercially in Queensland.

The leaves are long, narrow and spined, and are dark green in colour, often tipped with red. The spike contains only 80-90 flowers and the fruit is consequently much squatter and smaller than that of the Smooth Cayenne. The mature fruit is deep yellow in colour, suffused with red, with a white or pale-straw-coloured flesh. Its flavour is not particularly good, but this is to an extent offset by its excellent carrying qualities.

Other varieties in this group grown in other countries are *Sugar Loaf, Mauritius* and *Cabezona.*

PLANT SELECTION.

In any pineapple plantation, there is usually a range of plant and fruit types. This may be due in part to soil and climatic conditions, which have a marked effect on plant growth; abnormalities due to such conditions are not heritable. On the other hand, sports or mutants can arise from time to time which are inherently different from the parent plant and their progeny will reproduce the same characteristics, whether they be good or bad.

High-suckering and multiple-topped fruit are usually the results of environmental factors. The time of the year when fruit is produced has a pronounced influence on its shape; winter fruit (Plate 4) tends to be more conical in shape than the normal summer fruit, and the "prickly eye" or "Christmas pine" is another seasonal manifestation. Many types of crippled and misshapen fruit are also the result of adverse conditions, such as high altitudes and cold southerly slopes.

Inferior sports, such as "collar-of-slips", "long Tom", "dry fruit" and "bottle-neck", occur from time to time. These are heritable types which, if not eliminated, will eventually be responsible for considerable loss as the proportion of undesirable plants increases in the plantation. At the same time, mutants which are superior to the parent may appear in the crop.

Desirable Plant and Fruit Characteristics.

A good fruit should be long, cylindrical and broad shouldered, with large, flat eyes and a small core. It should be low-set on a short fruit stalk bearing no more than four slips, all set well below the base

of the fruit. The stem of the plant should be relatively short, as tall plants have a tendency to fall over when carrying the fruit. It should have at least two suckers originating close to the ground to ensure a stable ratoon plant. The number of suckers is influenced by growing conditions; a well-grown plant will usually produce more than two. They should be about half-grown by the time the fruit is mature, in which case they will afford a measure of protection to the fruit against sunburn and provide an early ratoon crop.

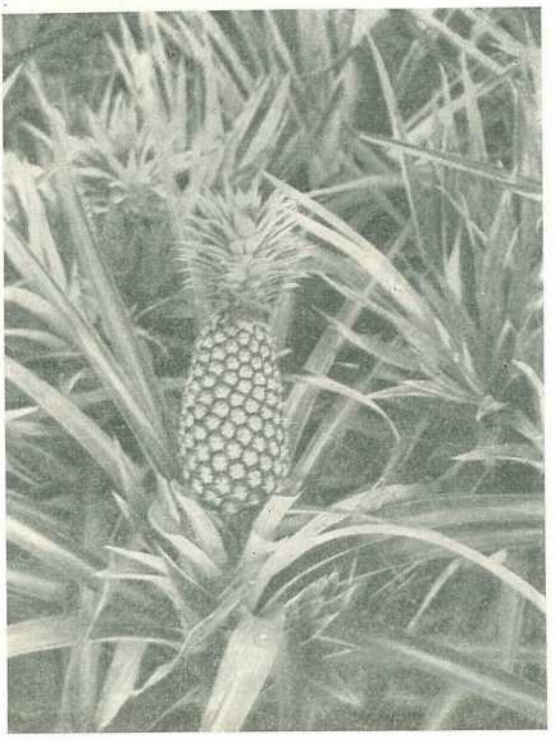


Plate 4.

Winter-type Fruit of the Smooth Cayenne Pineapple in Queensland. The fruit is conical in shape and set high on the plant.

Undesirable Types.

The number of inherently abnormal strains within the Smooth Cayenne variety is large and at least 15 have been recorded in Queensland plantations. Of these, however, there are only four markedly undesirable types. All of them produce slips prolifically and tend to be multiplied very rapidly on account of the abundance of slips which could be used as planting material.

Collar-of-Slips.—The collar-of slips strain is typified by the presence of a large number of slips arising from the stem close to the base of the fruit, or even directly from the fruit itself (Plate 5). In addition, slips may also be borne lower down the fruit stalk. This excessive slip growth develops at the expense of the fruit and results in small, tapered fruit and a considerable reduction in the yield and quality of fruit. The presence of slips or knobs at the base of the fruit, quite apart from its reduced size, renders it unattractive and the removal of these excrescences increases the liability to fruit rot.

Variations of the true collar-of-slips type, such as "near-collar" and "knobby fruit", also occur. In the former (Plate 6), slips are numerous and clustered around the base of the fruit, though not actually originating at its base. In knobby fruit, slip production may be normal but the base of the fruit carries several knobs which vary in number and size. These are probably only environmental modifications of the true collar-of-slips character. Collar-of-slips and near-

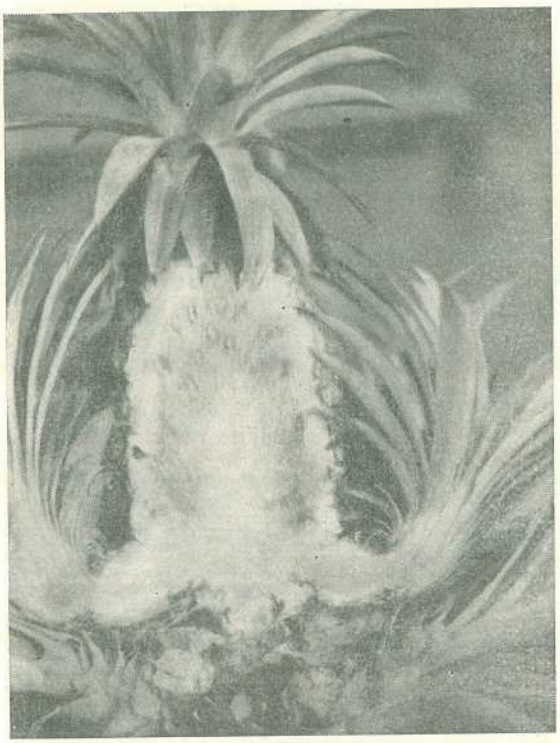


Plate 5.

Collar-of-Slips. A section through a fruit, showing slips arising from the base.

collar plants are often indistinguishable until the fruit has been picked. The near-collar plant could be confused with a vigorously growing, good-type plant with more than the usual number of slips, but there is a difference. In the collar-of-slips type, the slips are so close to the base of the fruit that they break through the bracts at the base of the fruit, whereas in a vigorous plant of the normal type they are attached to the stem below the bracts.

Under adverse conditions, or in a winter crop, the number of slips is normally low and undesirable plant types may escape detection. Hence, it is desirable that selection be done in a summer plant crop. In any case, it would be as well to regard as suspect:—

(1) Plants bearing slips close to the base of the fruit.

(2) Plants bearing slips in the main winter crop.

(3) Plants bearing an excessive number of slips under any circumstances (say, more than three in an average summer crop).

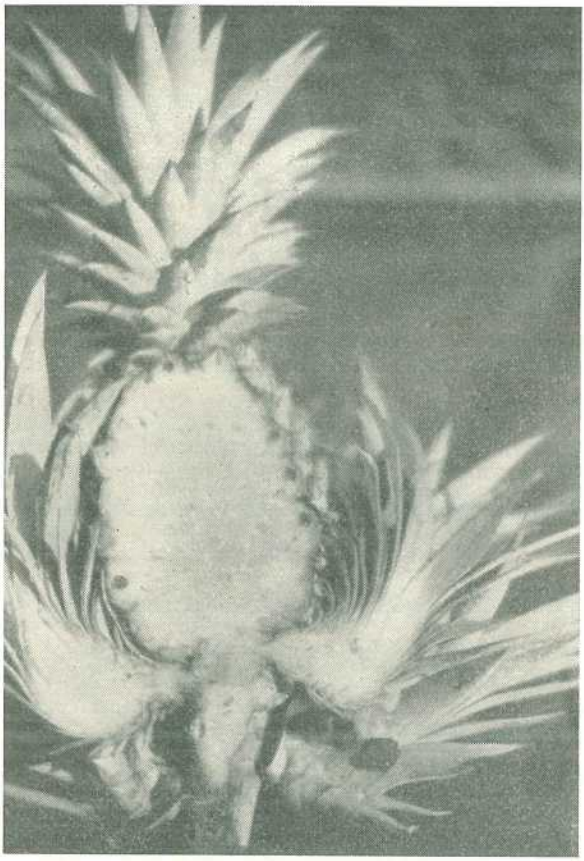


Plate 6.

Near Collar-of-Slips. A section showing slips arising near the base of the fruit.

Long Tom.—The long-Tom is distinguished by its length and the small diameter of the fruit, which is usually knobby at the base (Plate 7). It matures late and sucker growth is so slow that the period between the plant and first ratoon crops may be as long as 2½ years. When growing conditions are very favourable the fruit may be of good size, but usually even the best plants produce inferior fruit. The long-Tom produces slips very freely, hence it can multiply rapidly. However, the type is so easily recognised that it can be eliminated from the stock in a short space of time.

Dry Fruit and Bottle-Neck.—The dry-fruit and bottle-neck plant types are very similar and typical fruits can often be found on plants derived from the same parent (Plate 8). In the dry-fruit type the fruit is small, flowers are absent, and the fruitlets do not develop. In the bottle-neck, the lower fruitlets develop but the upper ones do not; the upper portion of the fruit has, therefore, much the same appearance as a dry-fruit. This irregular development of the fruitlets causes a constriction of the upper portion of the fruit, giving it the appearance of a bottle-neck.

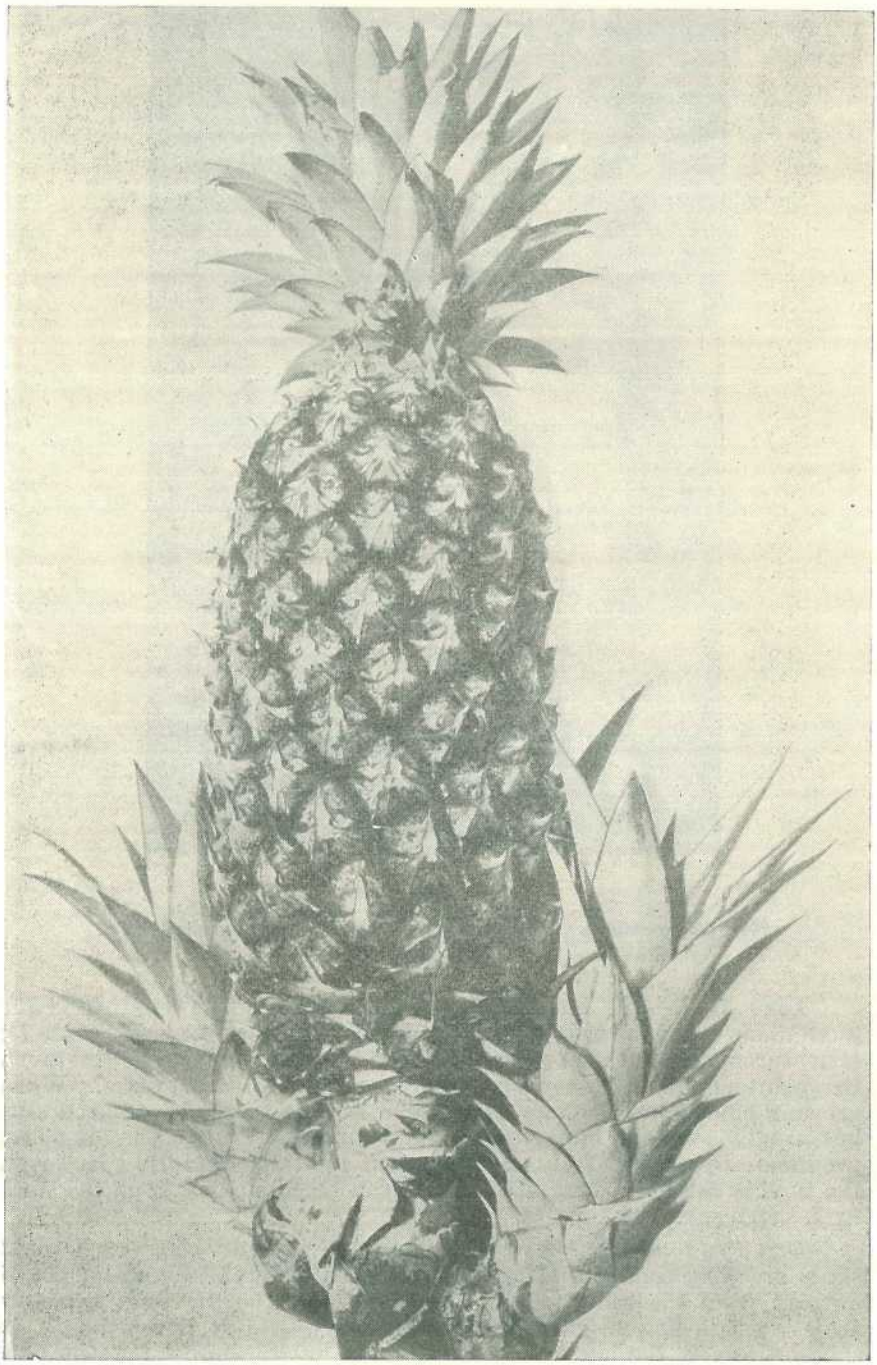


Plate 7.

Long Tom. An undesirable fruit type with an elongated fruit carrying knobs at the base.

In both cases the plants are vigorous and produce slips and suckers quite freely. Since the character is inherited, the progeny are identical with the parent.

Basis of Pineapple Plant Selection.

Improvement in plant type can be achieved in two steps—firstly, the elimination of known undesirable strains; and secondly, the isolation and multiplication of superior strains. Some of the most undesirable

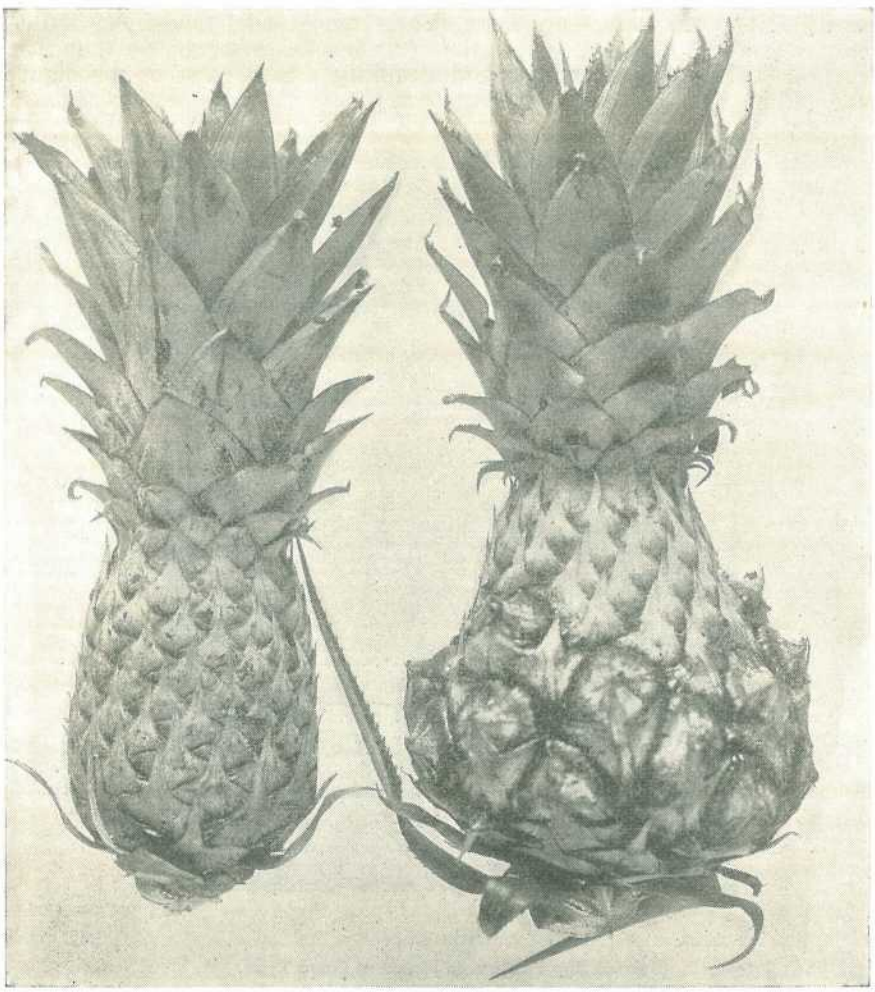


Plate 8.

Dry and Bottle-neck Fruits. These two off-types should be rogued from the plantation.

types tend to multiply more rapidly than the better types, and rapid deterioration will take place in successive plantings if they are not eliminated. Hence, the simplest and quickest method of improving the stock is that of mass selection.

Mass selection is well within the capabilities and facilities of the farmer and entails only a limited amount of time and patience, which

will be well rewarded. The isolation and multiplication of superior true-breeding types, on the other hand, cannot be conveniently handled on a commercial plantation. It involves the selection of single plants and their multiplication by special techniques; the method is normally used only by plant breeders.

Mass Selection Methods.

Defects in plant type may be masked by lack of vigour; hence selection should be practised on a vigorous plant summer crop, when good and bad characters are most clearly expressed. Selection should commence about a month before the fruit reaches maturity so that the fruit can be used in assessing the desirability or otherwise of the plant type (Plate 9).

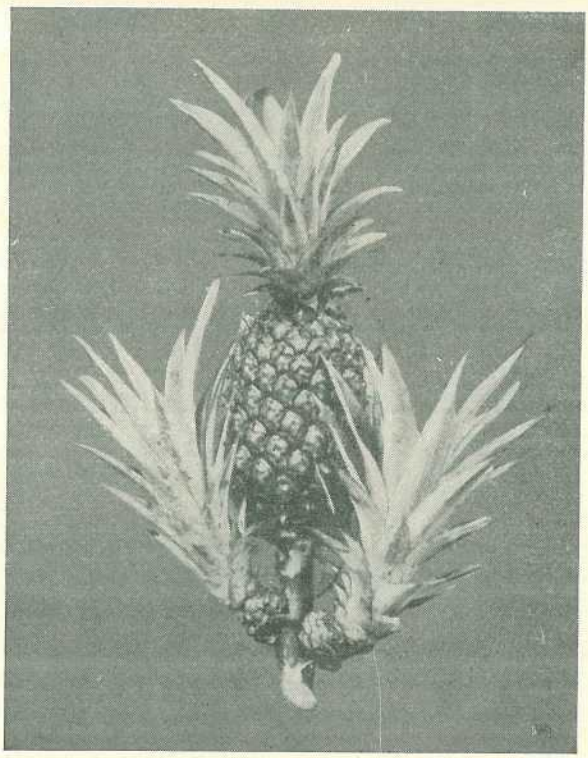


Plate 9.
Normal Slip Position in Plants of Good Type.

In mass selection, any part of a selected parent plant which will be used for planting material must be marked so that it can be identified later on. This can most easily be done by daubing the tops, slips and suckers with paint. To save time and paint, a preliminary assessment of the area to be selected is made to determine the relative proportions of good and bad types. If the former predominate, the reject plants may be marked, and *vice versa*.

A cheap grade of ordinary house paint of any colour may be used for marking the plant. Orange has been found very suitable, as it is distinctive against a green background. It is applied with a brush

or a wad of cloth tied to a stick. If reject plants are being marked, no special precautions are necessary in the application of the paint, since the planting material is to be destroyed in any case. If, on the other hand, desirable plants are being marked, paint should be used sparingly to avoid its running into the growing point of the plants or planting material.

As the crop is usually allowed to ratoon, there is no need to destroy undesirable parent plants immediately. However, the slips should be removed as soon as practicable, as they are only an unnecessary drain on the plant reserves through the winter.

As the fruit is harvested, the selected tops should be reserved for the current autumn planting. The slips on selected plants may be left on the parent fruit stalk until required for planting in spring.

SELECTION OF LAND FOR PINEAPPLES.

The selection of land for the pineapple crop is based on at least four important factors—elevation, aspect, soils and drainage. The first two are particularly important in southern Queensland, where the climate is subtropical.

Elevation and Aspect.

The pineapple is susceptible to cold conditions, and in southern Queensland growth virtually ceases from early June to late July. Increase in altitude, with its accompanying reduction in temperature, is reflected in the seasonal behaviour of the crop. A noticeable difference in growth and fruiting is apparent at altitudes above about 850 ft. At greater elevations, cropping is delayed and the plants receive a major setback in abnormally cold seasons.

Although the average temperature at lower elevations is more suited to the pineapple, there is a frost hazard in some areas. Here local knowledge of the frost history in any given area is the best indication of its suitability for the crop, since there are many indeterminable factors which influence the incidence of frost. If, by any chance, the crop must be planted on land bordering the frost zone, careful attention should be paid to air drainage, as obstacles which impede the downward flow of cold air from the cultivated area tend to increase the frost risk.

In southern Queensland, pineapples are mostly grown on hillsides to escape frost and it is here that aspect becomes important. The most suitable aspects are from east to north, since they receive the maximum amount of sunlight and are therefore the warmest. Westerly and southerly aspects, particularly the latter, are much colder. The topography of southern Queensland is usually broken and only rarely has all of the cultivable land on a farm an east to north aspect. If at all practicable, however, at least 60 per cent. of the pineapple land should face east to north.

Crops grown on less favourable aspects will mature their crops 2-6 weeks later. In some cases, aspect may be exploited to spread the harvesting period, as, for example, where there is limited labour available.

Soils.

The first requirement of a pineapple soil is that it should be well-drained. A deep, well-drained loam, amply supplied with organic matter and having a friable subsoil, is most suitable, but in practice pineapples are grown on a wide range of soil types. In southern Queensland, the alluvial soils are seldom used because the land is subject to severe frosts.

Drainage.—Soil drainage is determined more by the structure of the subsoil than that of the surface soil. For instance, some of the sandy soils have an almost impervious subsoil which is responsible for waterlogging in wet seasons. The topography of the land, as well as the presence of shelving rock or clay at shallow depths, may cause localised waterlogging on otherwise well-drained soils of good texture. Unless a soil is friable to a depth of about two feet, it will usually be necessary to make some provision for subsurface drainage.

Acidity.—Pineapples are adapted to acid soils and it is usually considered that the optimum pH range for plants is between 4.5 and 5.0. On some soil types the application of sulphur is beneficial. As, however, excessive acidity is frequently associated with poor soil structure, the use of sulphur is generally undesirable. Since the continued application of such artificial fertilizers as sulphate of ammonia increases soil acidity, land cropped with pineapples automatically becomes more acid from year to year.

Organic Matter.—The amounts of organic matter and its decomposition products in a soil play an important part in determining its texture, structure, moisture-holding capacity and fertility. Most of the soils in the coastal belt are notably poor in organic matter. Their condition can be improved by the addition of decaying vegetable material from old pineapple crops or from intercycle green manures.

Soils of Pineapple-growing Areas in Queensland.

In Queensland, pineapples are grown on a wide range of soils, which include sands, sandy loams, basaltic red loams, red loams, clay loams, gravelly loams, and gravelly clay loams. Each has its own problems and requires some degree of special treatment if the best results are to be obtained.

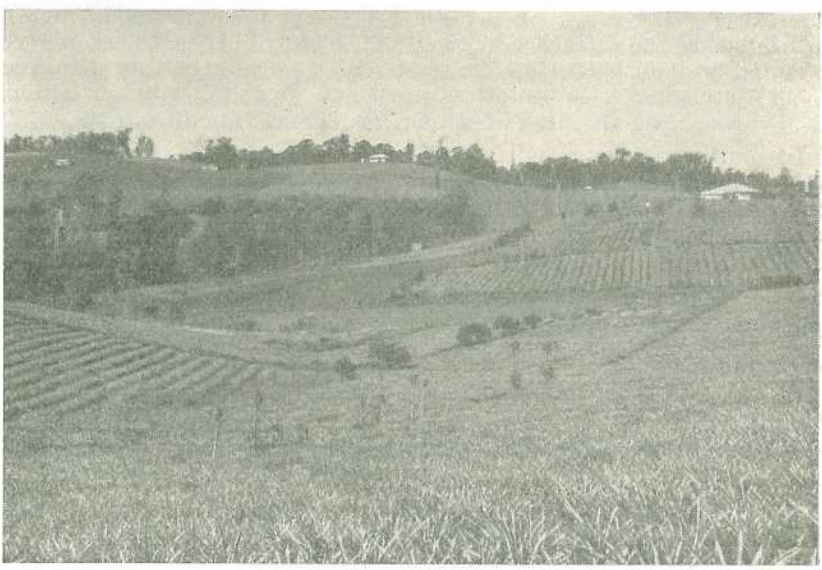


Plate 10.

A Pineapple Plantation in the Woombye District. The soil is a brown sandy loam with a porous subsoil and therefore relatively well drained.

In the area from *Caboolture to Beerwah,* the soils are mostly sands and sandy loams with a reddish-brown subsoil. They are all low in plant foods and organic matter and deficiencies of zinc and copper are common. Some of the sandy soils in this area have an impervious subsoil, which leads to waterlogging in wet seasons unless the natural drainage is improved.

The soils of the *Nambour-Woombye-Palmwoods* area fall into two main groups. The better type, which is characteristic of the Woombye district, is a dark-brown to red-brown sandy loam with a reddish subsoil which allows free drainage (Plate 10). The other group comprises the shallower grey-brown soils, overlying yellow subsoils, which are generally not so well drained. Both are low in plant foods and organic matter, but generally speaking, the reds are superior in this respect to the grey-brown soils.

The soils of the *Blackall Range* and *Buderim* are red loams of basaltic origin which usually have been badly eroded and severely leached; they are difficult soils to manage.

In the *Gympie* district the soils are mainly red loams and clay loams which are generally fairly fertile. The red loams derived from quartzite are rich in manganese, which interferes with iron availability, and consequently iron deficiency symptoms are quite common.

The *Nikenbah-Dundowran* soils are greyish-white, gravelly clay loams overlying a greyish-yellow clay (Plate 11). They are lacking in structure and are extremely poorly drained. In the virgin state they usually produce good crops, but replant crops are less satisfactory.

In the *Yeppoon* area, near Rockhampton, the soils are mostly red-brown loams, similar to those of the Mary Valley, near Gympie, and are

Plate 11.

Plantation at Nikenbah. The soil is a somewhat shallow and stony clay loam.

derived from the same series of quartzite parent rock. Like them, they are manganiferous, generally well drained and tolerably well supplied with plant nutrients.

At *Bowen* and *Ayr*, the soils are alluvial, dark-grey sandy loams and lighter-coloured sands, well supplied with potash but low in nitrogen. Since they overlie gravels, they are mostly well drained and can be irrigated fairly easily from the ample supplies of underground water which are present at shallow depths.

The *Magnetic Island* soils are coarse to gravelly sands of granitic origin. They are extremely well drained but are poorly supplied with nutrients, particularly nitrogen.

In the *Innisfail* and *Cairns* districts, pineapples are grown mainly on deep, red-brown basaltic loams and lighter sandy soils. The former, especially, are reasonably well drained and moderately fertile.

PREPARATION OF LAND.

On account of the shallow nature of the pineapple root system, excessive cultivation of the crop is normally undesirable because of the risk of root injury. Consequently the land should be well prepared before planting, as the cropping cycle occupies up to five years. An exception to this rule is possible in the case of virgin scrub lands, where the initial planting may be made in untilled land, following a scrub burn.

Preparation for Planting.

The land should be brought into a good state of tilth, but a fine seedbed tilth is not necessary for pineapples; a slightly rough surface is, if anything, an advantage. It should, however, be well cultivated to destroy as many weeds as possible, in view of the desirability of avoiding excessive tillage after planting.

For spring planting, land which has been under grass should be ploughed and cultivated between June and September. In the case of replant land which has been under a winter green manure, the latter should be ploughed under before the end of the winter so that cultivation can be completed before the end of September, when planting would commence.

For autumn planting, land preparation should be completed by the end of February to allow planting in early March. If the land has been under a summer green crop, this should be ploughed under in sufficient time to allow for the final preparation of the land by the end of February.

LAYOUT OF THE PLANTATION.

In laying out a plantation, provision has to be made for access roads to facilitate cultural operations and harvesting, and for drainage channels to dispose of surface runoff and minimise soil erosion.

When the crop is harvested by hand, it is neither convenient nor economical to carry fruit more than 1½-2 chains along the rows, hence roadways intersecting the rows should be spaced not more than four chains apart. This determines the length of rows and may also influence the location of surface drains provided to carry the runoff from the rows.

Surface Drainage.

The first consideration is to divert from the cultivated areas all runoff water from adjacent land. This necessitates the construction of a main diversion drain immediately above the field and leading to the

nearest natural water channel. A drain at least 18-24 in. wide and 12 in. deep, with a fall of 1-2%, is necessary. This allows a free flow of water without any undue loss of soil.

There are two surface drainage systems in use—cross-sectional and contour drainage. The former has been practised for many years in southern Queensland and meets the requirement of providing free surface drainage, but inevitably results in some loss of soil. The application of contouring methods reduces soil losses, but in certain soils may permit greater intake of water into the soil. In extreme cases subsurface drainage may be necessary.

Plate 12.

Contour Planting in an Established Plantation. The grassed waterway in the mid-foreground collects surface water from the rows and delivers it safely at the bottom of the slope.

Cross-Sectional Drains.—Cross-sectional drains consist of interception drains at intervals of not more than 45 ft., running across the slope, with a fall of 5 ft. per chain (about 7%) capable of carrying away runoff from the intervening cropped areas. Between drains, the rows may run directly down the slope or at an angle to it, in a herringbone pattern. In setting out the rows, provision is also made for small, inter-row drains to eliminate wash across the rows, which is conducive to erosion and detrimental to the plants.

Contouring.—Contour drains are placed at much the same intervals as cross-sectional drains, but their fall is limited to 2% so that the flow is reduced to non-erosive velocities (Plate 12). Since they follow the contour of the land they will not necessarily be parallel, their distance apart varying along their length according to the slope of the land at any point.

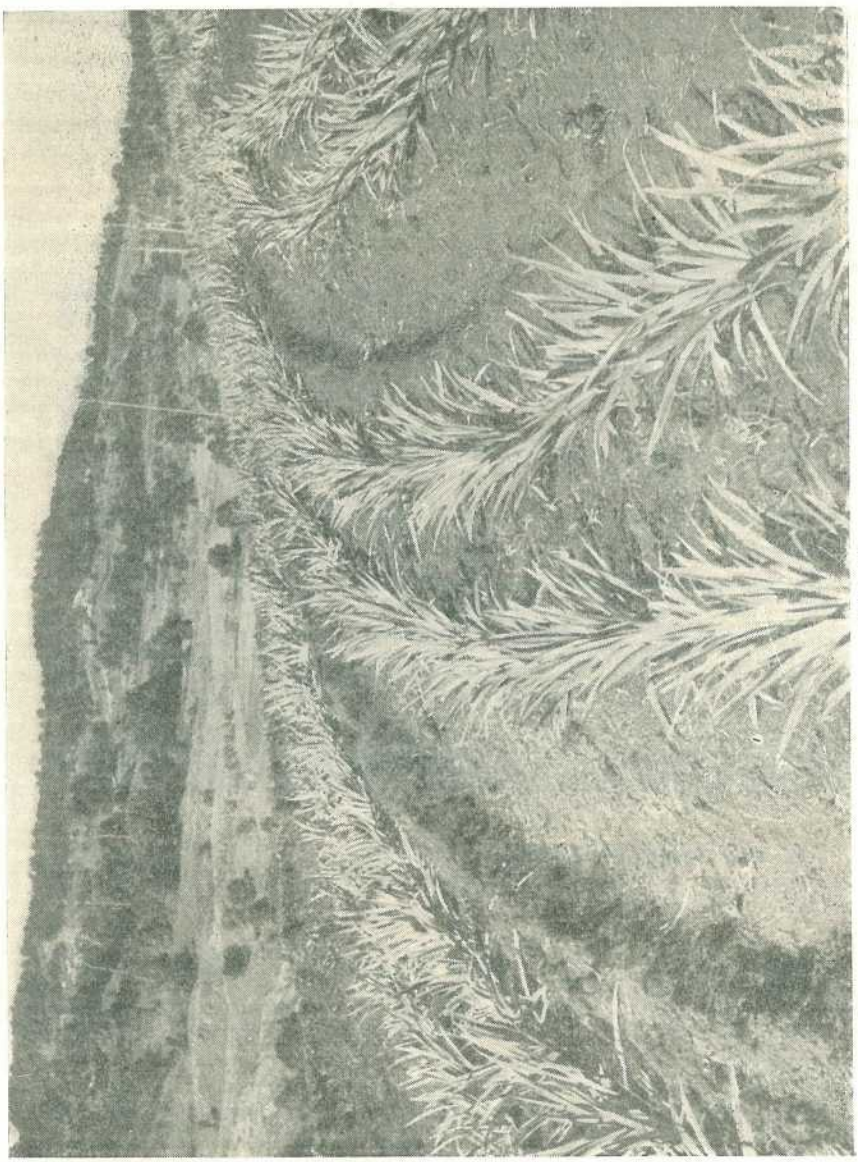


Plate 13.

Contour Planting. A recently planted area on a steep slope in the North Coast district. Note the drain between each pair of rows.

In contour-drained areas, planting follows the contour and it is also essential here to provide inter-row drains between adjacent rows (Plate 13). These would be given a fall of 2-4%, depending on soil type and the length of the rows. Inter-row drains may be set out parallel to the main drain above, leaving a number of short-point rows immediately above the lower drain. As there is a tendency for soil to accumulate on the upper side of the rows and to move away from the lower side, the planting rows should be closer to the upper inter-row drain.

PLANTING MATERIAL.

Pineapples may be propagated by any one of four types of planting material—tops, slips, suckers and butts. Provided they are of good type and are properly handled, all give good results. The time taken to produce a crop varies with the planting material. Under optimum conditions, slips and suckers will crop in about 18 months in southern Queensland, whereas tops and butts take about two years. In North Queensland growth is faster and there is not the same difference between tops and slips or suckers; all will fruit in 12-18 months as a general rule.

With any given type of planting material, the period from planting to harvesting depends on the size of the material planted. For instance, it may take small slips as much as six months longer to produce a crop, particularly in southern Queensland. For this reason, planting material should be graded before planting, otherwise the stand will be uneven.

Tops.

Tops are excellent planting material, and being usually of much the same age and size, produce a very uniform stand.

After the tops are removed from the fruit at harvesting they should be stripped and stacked to dry the cut ends. Stripping entails the removal of the small basal leaves so that about ¼ in. of the butt is exposed. This should be done promptly, for the fresher the material, the easier it is to strip the leaves. The stripped tops should then be spread out, base uppermost, in a single layer in the open. On no account should they be heaped in the shade, where they are liable to rot very quickly. Prepared tops should be allowed to dry for at least 24 hours before being planted, but they can be left for longer periods if desired.

Alternatively, tops may be removed in the field as the fruit is being harvested, and placed, base uppermost, on top of the plants. They dry quickly, but stripping before planting is more difficult than in the previous case.

Summer tops are large and fit in well with the normal cropping schedule in southern Queensland. Winter tops are less satisfactory but may be used in an emergency when better planting material is not available. In North Queensland, winter tops are only slightly smaller than summer tops and are consequently quite good planting material.

Slips.

Slips are available in quantity only from a summer crop. When the fruit is harvested they are relatively small and it is usual to leave them on the parent plant until a few days before they are required for planting. During this period they grow at the expense of the parent plant and its ratoon crop, but this is normally justified by the need for good material in a new planting.

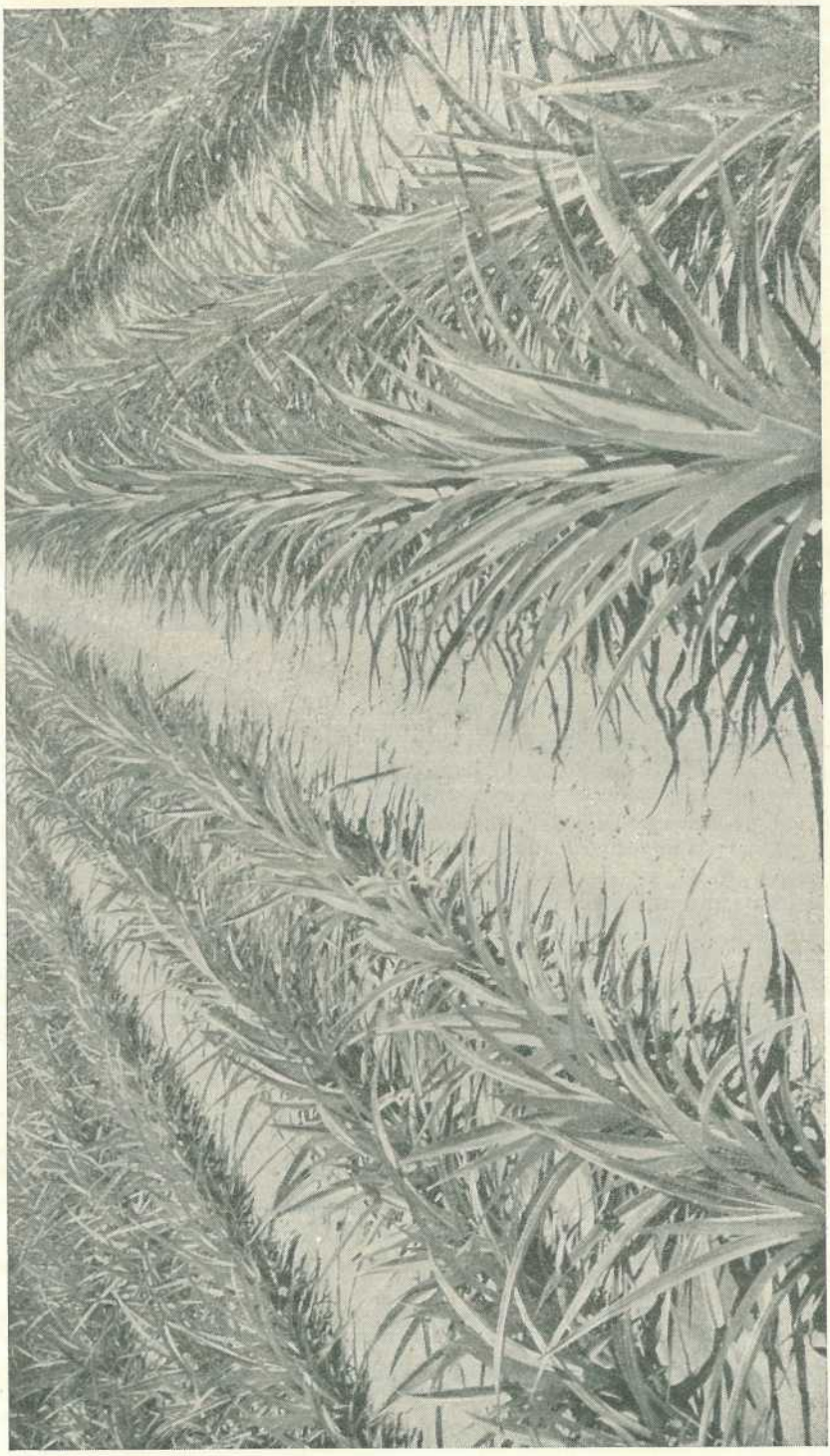


Plate 14.

Vigour in Slips. Left, plants not selected for vigour. Right, plants selected for vigour.

As the slips are pulled, the small pinelet at the base should be snapped or cut, not screwed, off and the slips collected and stacked, base uppermost, in a single layer to dry. Stripping of the basal leaves promotes early establishment of a root system after planting.

When they are being stacked to dry, slips should be graded for size (Plate 14). This will materially assist in producing uniform stands in the field.

Plate 15.

Trimmed Suckers. Suckers may be trimmed if they are to be sent by rail or truck for long distances.

Suckers.

Suckers vary more in age and size than do either tops or slips and growth is somewhat uneven after planting. Before being planted, the tight basal leaves may be peeled off to expose the young roots and so facilitate early root establishment. They should be stacked to dry the ends before planting.

Very large suckers, or suckers which are to be transported long distances, may be lightly trimmed (Plate 15). This can be done by gathering the leaves in one hand and cutting straight across with a large knife at least 15 in. from the base. In no case should they be severely trimmed, and trimming should be practised only when it is absolutely necessary. Very large suckers may fruit prematurely soon after they are planted. The fruit so produced is invariably small and

useless; it should be broken off and the plant allowed to sucker again. It is for this reason that emphasis is placed on the desirability of grading suckers before planting.

Butts.

A butt is the stem of a plant and the term is usually applied to a mature plant which has already borne a fruit. The older the butt the less satisfactory it is for planting material on account of the depletion of its food reserves (Plate 16).

Plate 16.

Butts. The pineapple stand established from butts is usually uneven. Left, backward plants from butts. Right, forward plants.

In preparing a butt for planting, the old rooted portion is usually cut off to reduce the bulk of the planting piece. The leaves should be trimmed back close to the stem to allow better contact with the soil and to facilitate the production of new roots. After trimming in this way, butts should be allowed to dry for several days to seal off the cut surfaces.

[TO BE CONTINUED.]

Legislation for the Control of Bunchy Top in Bananas.

F. COLBORNE, Secretary, Banana Industry Protection Board.

IN Queensland, the production of bananas is seriously handicapped by pests and diseases. As a consequence, legislative controls over the crop are very far-reaching.

HISTORICAL.

The original Diseases in Plants Act was passed in 1896. At that time, and indeed up to 1921, there had been no need for legislation specifically relating to the banana industry; all requirements could be met by the general provisions of the Act. However, about the year 1913, the disease known as bunchy top (Plates 1 and 2) was introduced into northern New South Wales, probably by infected suckers from Fiji, and it soon spread to southern Queensland. The significance of the disease was scarcely appreciated until about 1922. Plantation

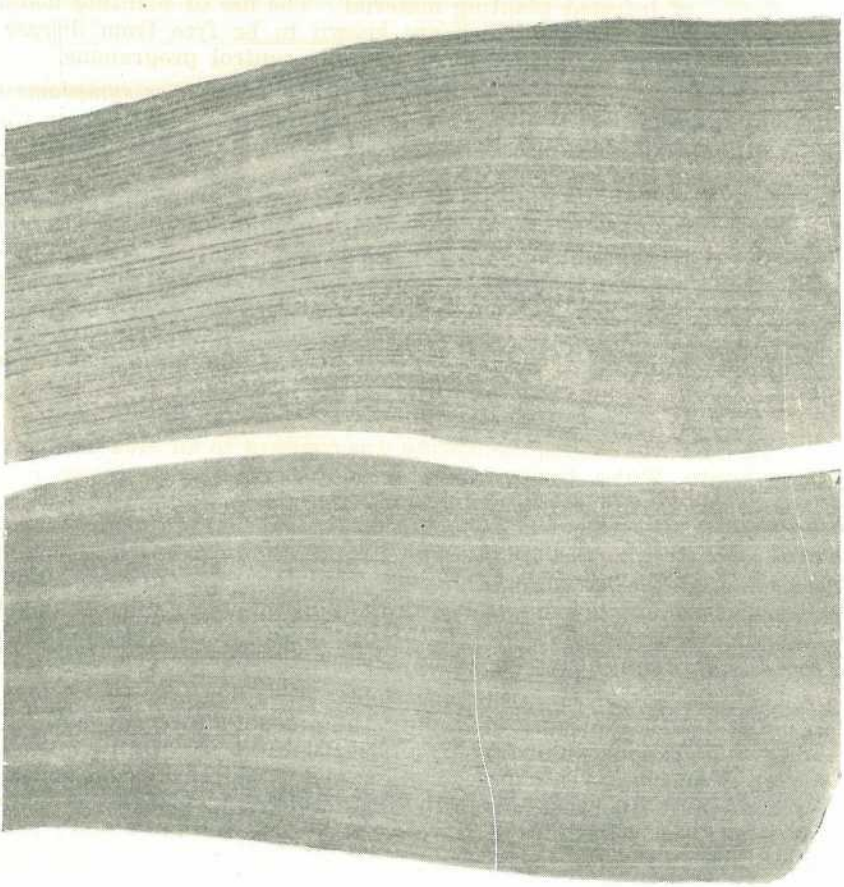


Plate 1.

Bunchy Top of Banana. The upper leaf portion shows the characteristic dark dots, dashes and lines of an infected plant. The leaf portion below it is from a normal plant.

failures then assumed serious proportions and an industry which at that time was worth more than £1,000,000 in Queensland alone was virtually faced with extinction.

In May, 1924, the Commonwealth, New South Wales and Queensland Governments appointed a Committee to investigate the disease. A few years later, Dr. C. J. Magee, who carried out investigations on behalf of the Committee, demonstrated that bunchy top was caused by a virus which is transmitted from diseased plants to healthy plants by the banana aphid. As a corollary, any hope of a cure for infected plants disappeared.

On completing its investigations, the Committee recommended to the States concerned that certain control measures should be adopted. These control measures had two main features, namely—

(1) *Restrictions on the movement of planting material.*—The rapid distribution of the disease after its original introduction into Australia was largely caused by the movement of infected planting material. The use of planting material from sources which are known to be free from disease is, therefore, a prerequisite of any control programme.

(2) *The destruction of diseased plants as soon as symptoms can be detected.*—If this is done thoroughly, plantations in which the disease has appeared can be kept in production in spite of the occasional loss of an infected stool. On the other hand, failure to eradicate diseased plants is invariably followed by the distribution of infected aphids and fresh outbreaks within the plantation. Considerable skill and experience in the field are required to recognise bunchy top in the early stages, but most growers, with practice, can become adept at detecting the disease. Thorough inspection at regular intervals is essential in commercial plantation management.

THE DISEASES IN PLANTS ACTS.

In the early 1920's, the disease was confined to an area between the New South Wales border and the Maroochy River. Many of the plantations in which it had appeared were then abandoned and these provided a reservoir from which bunchy top could spread. In order to cope with this problem, the Diseases in Plants Act was amended in 1929. A neglected or abandoned plantation was defined and the Minister was authorised to approve the destruction of banana plants if, in the opinion of an Inspector, the plantation was a potential menace to other growers, owing to its liability to harbour or spread a disease or pest.

In 1930, a proclamation under the amending Act prohibited the removal of banana plants except under the authority of a permit issued by an Inspector. This proclamation also prohibited the removal of banana plants from that part of the State which lies south of the northern boundary of the Parishes of Maroochy and Maleny to any other part of the State.

This isolation of the southern part of the State as a protective measure against the spread of bunchy top was strengthened in 1934 by the further proclamation of a Quarantine Area between the Maroochy River on the north and the Maroochy-Landsborough-Caloundra roads on the south. The boundaries of this area have since been altered and it

is now situated between the Noosa River on the north and the Maroochy River on the south. The removal of banana planting material out of this area is prohibited, thereby creating a buffer between the southern portion of the State, where bunchy top occurs, and the northern areas, where the disease is absent.

In 1933, a further proclamation was gazetted, requiring the owner of a banana plantation to destroy immediately any plants showing symptoms of bunchy top. The following method of treatment was prescribed:—pour half a pint of kerosene into the throat of the plant and allow it to trickle down over the pseudostem and attached leaf bases (killing any aphids present); completely dig out and chop up

Plate 2.

Banana Plants showing the Symptoms of a Fairly Recent Infection with Bunchy Top. Note the dipping back of the blades from the midrib in the younger leaves and the incurved and wavy condition of the margin.

the infected stool, including the attached plants and suckers. This method of destroying infected plants is an essential part of the bunchy top control programme. The work presumes, of course, that the grower can recognise the disease and appreciates the threat which it is to his own interests. In plantations where the disease has occurred, it involves weekly plant-to-plant checks through the area; nothing less will suffice.

THE BANANA INDUSTRY PROTECTION ACTS.

The original Banana Industry Protection Act was passed in 1929 with the object of making better provision for the protection of the banana industry. It brought into existence the Banana Industry Protection Board, with special responsibilities for improving and developing the industry.

In addition to advising the Minister on matters of policy, the Board meets regularly to discuss administrative problems arising from the operation of the Banana Industry Protection Act. It therefore deals with such matters as the eradication of abandoned or neglected banana

plantations, banana quarantines, the issue of planting permits and the traffic in banana planting material. The Board's Agents are stationed in all centres where bananas are an important horticultural crop. They are responsible for implementing those sections of the Diseases in Plants Acts which affect the banana grower.

The Banana Industry Protection Acts are complementary to the Diseases in Plants Acts. Each year the Board draws up a planting policy for the Minister's approval. The planting policy sets out the requirements of the Banana Industry Protection Acts and the Diseases in Plants Acts and also the obligations of the grower and of the supplier of the banana planting material.

SUMMARY OF THE LEGISLATION.

When a grower wishes to establish a new plantation or to extend an existing plantation, he must submit an application to the local Agent of the Banana Industry Protection Board indicating the area to be planted and the proposed source of planting material. If the Board approves the application, the grower will be issued with the necessary authority to remove planting material to his own plantation from the source of supply. The Board's decision will, in all cases, be governed by the legislation in force at the time.

Among other things, the legislation prescribes when plantings may be made, the grade standards for planting material, permissible sources of planting material and standards of plantation management. It also requires the eradication of old plantations which are no longer commercially profitable. The main features of the existing legislation may be summarised as follows.

Time of Planting.

In Southern Queensland, bananas may be planted only during the period between August 1 and January 31 in the following year. Plantings after January 31 are seldom a commercial success in this area and tend to become neglected.

Grade Standards for Planting Material.

Planting material usually consists of either suckers or bits. A saleable sucker is an offshoot from a corm which is not less than 12 months old; it must be not less than three inches in diameter at its thickest point. A saleable bit is a portion of a mature corm with a well-developed, undamaged "eye" above the surface of the corm; the bit should be at least 4 in. x 3 in. x 3 in. in size, with the eye centrally placed on one side.

Permitted Sources of Planting Material.

The permitted sources of planting material have been defined for a new plantation, an extension of an existing plantation and the quarantine area on the North Coast. Details are as follows:—

For a New Plantation:—

(*a*) Planting material may be obtained only from a plantation which has been approved by the Board. The Board's approval is governed by the incidence of bunchy top in any particular district. In districts where the disease does not occur, approval is formal. In districts where the disease has been recorded, however, the Board will only approve a plantation as a source of planting material when it has been

free from bunchy top for a specified period and plantation management has been efficient. Current requirements in the quarantine area and in the inspectional districts of Caboolture and Brisbane are given below; in other districts where bunchy top has been recorded, plantations are normally only approved as sources of planting material when they have been free from the disease for a period of not less than six months.

(*b*) Planting material may be removed from a plantation where thrips or beetle borer is prevalent only when it is not available from a clean area. Such material must be in the form of pared suckers or bits.

(*c*) Planting material may not be removed from one Banana Agent's district to that of another Agent except with the prior approval of the Banana Industry Protection Board. The Board may approve such an application if suitable material is not available locally.

For an Extension of an Existing Plantation:—

Planting material from an existing plantation may be used for an extension of that plantation, if—

(*a*) the existing plantation is well cared for and pests and diseases are being satisfactorily controlled;

(*b*) the proposed extension of the plantation is not in close proximity to another plantation which is infected with bunchy top and a potential source of infection for the new area.

Within the Quarantine Area and the Inspection Districts of Caboolture and Brisbane:—

The Quarantine Area for bunchy top is situated on the North Coast, the northern boundary being a line approximately west of the mouth of the Noosa River and the southern boundary line approximately west of the mouth of the Maroochy River. Within this area, planting material for both a new plantation and an extension of an existing plantation must come from a well-managed plantation which has been free from bunchy top for at least the preceding 12 months.

The same conditions apply in the Inspectional Districts of Brisbane and Caboolture.

STANDARDS OF PLANTATION MANAGEMENT.

When plantation management is inefficient, control measures for bunchy top are usually not applied thoroughly. There are several criteria of inefficient management, chief among which are the following:—

(*a*) The presence of weed growth in such quantities that the grower is unable to patrol the plantation with ease and readily detect abnormal plant behaviour.

(*b*) Failure to remove surplus sucker growth which not only impoverishes the parent plant but also indicates a lack of any desire by the grower to produce a commercial crop for the longest possible period.

(*c*) The absence of vigorous plant growth.

The inefficient and negligent grower is mainly responsible for serious outbreaks of bunchy top and its persistence in areas where the disease has been recorded. The Banana Industry Protection Board therefore

insists that growers shall comply with the normal requirements of efficient plantation management, and the penal clauses in the Diseases in Plants Acts are enforced whenever necessary to safeguard the interests of the industry as a whole. The Board expects growers to locate bunchy top in their plantations, to destroy any infected plants in the manner prescribed and to report outbreaks to its Agents. If they do this, the work of the Board's Agents will be considerably simplified.

Eradication of the Plantation.

When a banana plantation ceases to be commercially useful, it must be totally eradicated. In the early days of the banana industry, production was somewhat speculative, plantations being established and later abandoned when the returns from the fruit did not cover the expenses incurred in maintaining them. No attempt was made to dig out and destroy the plants unless the land was required for other purposes. As bananas were planted in hilly and often inaccessible country, the remains of old plantations persisted for many years among a dense mass of weeds and saplings before they were eradicated. Such plantations were a major source of concern to the Board when control measures for bunchy top were first brought into operation, and the fact of their existence lengthened the period required to get the industry back on to a sound footing after the bunchy top disaster of the 1920's.

It is, therefore, now an obligation of the occupier (the person growing the crop) to eradicate an old banana plantation. If the occupier fails to comply with this provision of the Acts and, for any reason, legal proceedings cannot be taken against him, the responsiblity for eradicating the area falls on the owner of the land. In order to protect the interests of both the owner and the lessee of land on which bananas are to be grown, the lease should be properly drawn up and executed. In many such leases now in force, it is stipulated that a proportion of the rent shall be repayable to the lessee at the expiry of the lease, provided the bananas on the leased area have been eradicated to the satisfaction of the Board's Agent.

Points to Remember.

The Grower:—

(1) Apply for a planting permit at least four weeks before the proposed planting date.

(2) Patrol the plantation every week during the spring and summer and every fortnight during autumn and winter for bunchy top infected plants or plants showing other abnormalities.

(3) Treat bunchy top plants immediately with kerosene, then dig out the stools, and notify the local Agent of the Board of the outbreak as soon as possible.

(4) Regard plants with abnormal leaves as suspect bunchy top plants until the position has been checked by an Agent of the Board.

The Landholder:—

When leasing land for banana growing, protect your own interests with a properly executed lease in which your responsibility as the lessor and/or that of the lessee, for eradicating the plantation when it is no longer commercially profitable, are clearly defined.

PLANT PROTECTION

Tobacco Pest Control Schedule for the 1953-54 Season.

W. A. SMITH, Entomologist, Science Branch.

FOR some time this Department has been carrying out tests with a large range of materials to find a substitute for lead arsenate sprays in tobacco fields. This pest control schedule introduces on a commercial scale the new insecticide dieldrin, which is highly toxic to the tobacco looper*. The pests with which the present schedule is concerned include looper, budworm,† cluster caterpillar,‡ leaf miner,§ and stem borer,¶ in the seedbed and in the field, and also seed-harvesting ants. Additional measures will be required if root-knot nematode, cutworms or wireworms are likely to be field factors limiting yields.

CONTROL SCHEDULE.

In Seedbeds.

Prepare the seedbed sites early and eliminate as many weeds as possible.

Sterilize the beds and paths before planting. This may be achieved in varying degrees by firing, steaming or fumigating with DD.

Spread a layer of medium grade river sand to a depth of one-eighth of an inch on the beds after planting, as protection against seed-harvesting ants.

Two weeks after germination, or earlier if obviously necessary, commence light weekly spraying with 0·1% DDT. The spray should be directed horizontally from each side of the bed and should be applied after the last watering for the day.

Give the seedlings a thorough spraying with DDT a day before pulling for transfer to the field.

In the Field.

During the first three weeks after transplanting, weekly routine spraying with DDT should be made. A dust may be used but a spray is more effective. **If looper is present use an additional spray of 0·05% dieldrin.**

---

* *Plusia argentifera* Gn.
† *Heliothis armigera* (Hb.).
‡ *Prodenia litura* (F.).
§ *Gnorimoschema operculella* (Zell.).
¶ *Gnorimoschema heliopa* (Low.).

In subsequently relaxing the frequency of spraying, the grower should be guided by his own observations on the presence of young stages of the leaf pests. Fortnightly applications of 0·05% dieldrin may prove sufficient if the spraying is thorough. Complete cover should be the objective—that is, both sides of each leaf should receive a film of insecticide. Since the value of dieldrin in controlling leaf miner, cluster caterpillar and budworm is not known sufficiently well, it may be found necessary to use an occasional DDT spray. If budworm is the only pest operating, the budworm dry bait, restricted to the hearts of the plants, will give the most economical control; alternatively, the tops of the plants may be sprayed rapidly with DDT.

Insecticides and insecticide strengths recommended for use in tobacco fields are as follows:—

(1) *DDT.*—Strength of spray, 0·1%, preferably in the emulsion form; strength of dust, 2%.

(2) *Dieldrin.*—The spray should contain 0·05% active ingredient (for example, dilute a 15% concentrate to 1 in 300).

(3) *Lead Arsenate.*—To prepare budworm dry bait, thoroughly mix 1 lb. lead arsenate with 20 lb. bran, pollard or maize meal.

WARNINGS.

To avoid the risk of undesirable taints and residues, insecticides should be used on tobacco only when necessary. Dieldrin should not be used in excess of the recommended rate, particularly during the week before harvesting.

A health risk is involved if dieldrin is inhaled, ingested or absorbed through the skin. Care should be taken to avoid inhaling this insecticide or being unduly wet by spray. Splashes of the concentrate should be washed off immediately with soap and water and any clothes which are splashed should be changed immediately and not worn again until they have been washed.

The Honey Flora of South-Eastern Queensland.

S. T. BLAKE (Botanist) and C. ROFF (Adviser in Apiculture).

(Continued from page 369 of the June Issue.)

Scribbly Gum.

Botanical Name.—*Eucalyptus micrantha* DC.

Other Common Names.—White gum, sugar gum, cabbage gum.

Distinguishing Features.—This tree (Plates 24-26) has a white, smooth bark marked by numerous scribbly lines.

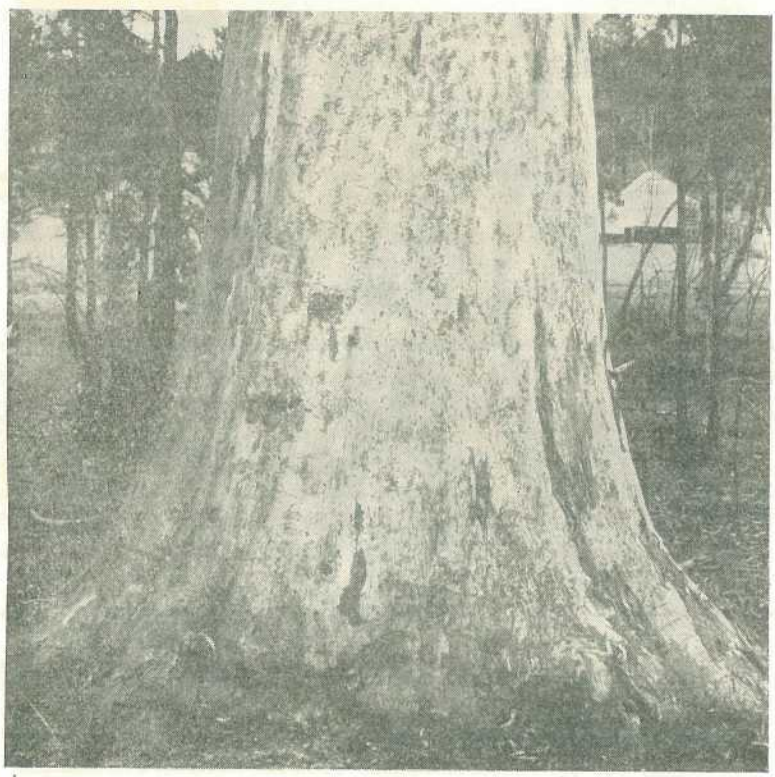


Plate 24.

Scribbly Gum (Eucalyptus micrantha). Portion of trunk. Mount Gravatt.

Description.—A tree up to 80 ft. high with smooth white bark marked by numerous dark wriggly lines like scribble marks. The leaves are curved and shorter on one side than the other at the base, mostly 4-6 in. long and about 4-8 times as long as wide. The flowers are produced in small bunches beside the leaf-stalks and are slightly less than $\frac{1}{4}$ in. wide when fully open. The lid of the bud is very small and rounded. The seed-capsules are nearly hemispherical, about $\frac{1}{4}$ in. wide and a little shorter, with a small opening.

Distribution.—Moreton and Wide Bay Districts, usually on sandy hillsides. It extends northwards to Rockhampton and is also in coastal New South Wales. There are other scribbly gums in New South Wales and they are very difficult to distinguish from one another.

Usual Flowering Time.—July to October.

Colour of Honey.—Medium amber.

Importance as Source of Honey.—Minor.

Importance as Source of Pollen.—Nil to minor.

Plate 25.

Scribbly Gum (Eucalyptus micrantha). From left, branchlet with capsules; coppice leaf; branchlet with flower buds.

General Remarks.—It is claimed by many beekeepers that scribbly gum never yields nectar. This belief is due to the limited amount of honey from this species being masked in a natural blend with choicer honeys from more prolific species flowering at the same time. Pure samples are, however, obtained at odd intervals. The tree is useful only as a supporting nectar-producing species amongst the better-class honey flora.

The rather dark honey from scribbly gum is never better than second grade; the flavour is strong, verging on bitter, and the density is weak. It granulates slowly with a coarse brown grain.

Plate 26.

Scribbly Gum (Eucalyptus micrantha). Mount Gravatt.

Flooded Gum.

Botanical Name.—Eucalyptus grandis W. Hill ex Maiden.

Other Common Name.—Rose gum.

Distinguishing Features.—This is a tall, straight tree (Plates 27-28) with smooth white bark except for 6-10 ft. (rarely more) of rough flaky bark at the base and spreading (not drooping) green leaves paler beneath.

Description.—This is often a very tall, straight tree up to 120 ft. or more with about 6-10 ft. (rarely more) of rough flaky bark at the base and smooth white bark on the rest of the tree. The crown is usually rather dense. The leaves are spreading, dark green above and somewhat shining, paler on lower surface, about 4-6 in. long and about 4-6 times as long as wide. The flowers are produced in small bunches on flattened stalks besides the leaf-stalks and are between $\frac{1}{2}$ in. and $\frac{3}{4}$ in. wide when fully out; the lid is conical and somewhat pointed, as long as, and somewhat wider than, the rest of the bud. The seed-capsules are widest near the top and usually gradually taper to the short stalks, about $\frac{1}{4}$ in. long and wide, with the valves slightly projecting and curved inwards.

Distribution.—Wetter places of the coastal belt, often along streams and at the edges of scrub, sometimes on hillsides forming forests with scrub box. It is known from as far north as the Atherton Tableland and is in northern New South Wales.

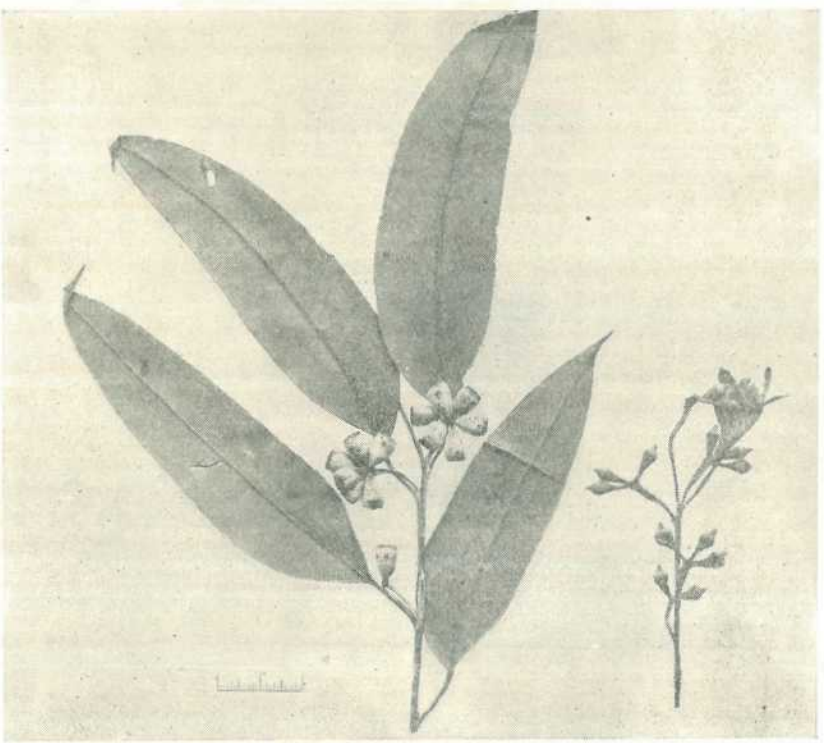


Plate 27.

Flooded Gum (Eucalyptus grandis). Left, branchlet with leaves and seed-capsules. Right, branchlet with flower buds.

In the past this species was sometimes confused with the Sydney blue gum (*Eucalyptus saligna*). The two trees are often much alike but the latter has a rather narrower lid to the bud and widely spreading valves to the seed-capsule. In Queensland *E. saligna* is known only from the neighbourhood of Pechey and Crow's Nest, where it is called "woolly butt," but it possibly occurs elsewhere on the western slopes of the Main Range.

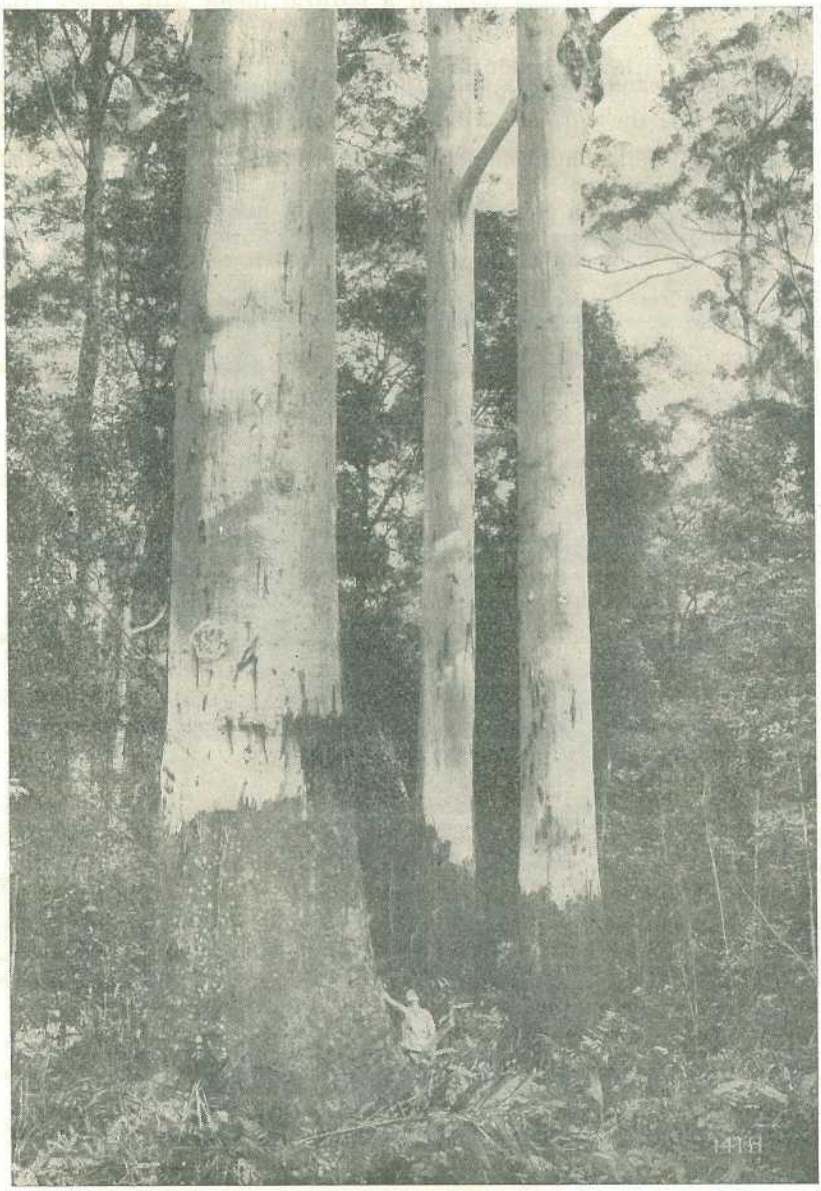


Plate 28.

Flooded Gum (Eucalyptus grandis). Eumundi district.
[*Photograph by Forestry Sub-Department.*

Usual Flowering Time.—March to May.

Colour of Honey.—Medium amber.

Importance as Source of Honey.—Minor.

Importance as Source of Pollen.—Medium.

General Remarks.—Although this tree blossoms regularly, and at times heavily, it is a shy-yielding species. A small surplus is gathered occasionally, usually in the form of a natural blend with honey from other species flowering at the same time.

Good quantities of pollen are obtained and as a result beekeepers with apiaries in flooded gum localities find that colonies maintain strength during the normally adverse autumn and early winter periods.

The honey is strong, somewhat unpleasant in flavour and of weak density. It granulates fairly quickly, is slaty in colour, and has a soft, smooth grain. In the comb, honey from this tree is much lighter coloured than the subsequently extracted and stored product.

Plate 29.

Moreton Bay Ash (Eucalyptus tessellaris). Left, branchlet with seed-capsules. Right, branchlet with flower buds.

Moreton Bay Ash.

Botanical Name.—Eucalyptus tessellaris F. Muell.

Other Common Name.—Carbeen.

Distinguishing Features.—This is a tree (Plates 29-31) with the bark on the lower part of the trunk dark grey or blackish and neatly cracked into small square or oblong pieces, elsewhere smooth, pale grey or whitish, and with narrow drooping leaves.

Description.—A tree up to 60 ft. or more in height; the bark on the lower or greater part of the trunk is dark grey and neatly cracked into small square or oblong pieces about $\frac{3}{4}$ in. long; the bark on the upper part of the tree is smooth, pale grey or whitish, shed each year, sometimes with darker grey patches before it is shed. The leaves are about 3-6 in. long and 8-15 times as long as wide, on rather short stalks, and hang from the drooping branchlets. The flowers are produced in little bunches along the twigs mixed with the leaves and are nearly $\frac{1}{2}$ in. wide when fully out; the lid on the bud is very short

Plate 30.
Moreton Bay Ash (Eucalyptus tessellaris). Portion of trunk.

and thin. The seed-capsules are either cup-shaped or like an egg with the top cut off, with very thin walls, $\frac{1}{3}$-$\frac{1}{2}$ in. long and $\frac{1}{4}$-$\frac{1}{3}$ in. wide, but they are very fragile and are not often seen.

Distribution.—Widely spread in south-eastern Queensland, chiefly on sandy soils, but the trees are usually scattered. It is found throughout the eastern half of Queensland and in northern inland New South Wales.

Plate 31.
Moreton Bay Ash (Eucalyptus tessellaris). Goodna.

Usual Flowering Time.—November to February.

Colour of Honey.—Medium amber.

Importance as Source of Honey.—Nil to minor.

Importance as a Source of Pollen.—Nil to minor.

General Remarks.—Many beekeepers consider that this well-known and widespread species has no value as a nectar- and pollen-producing tree. Nevertheless, there are reliable records indicating that Moreton Bay ash produces a small amount of nectar and pollen in some parts of the Darling Downs, Moreton and Wide Bay Districts. It is, however, never better than a minor supporting species amongst better-class flora.

The weak-bodied honey from this species is mildly acid in flavour. The granulating quantities are unknown.

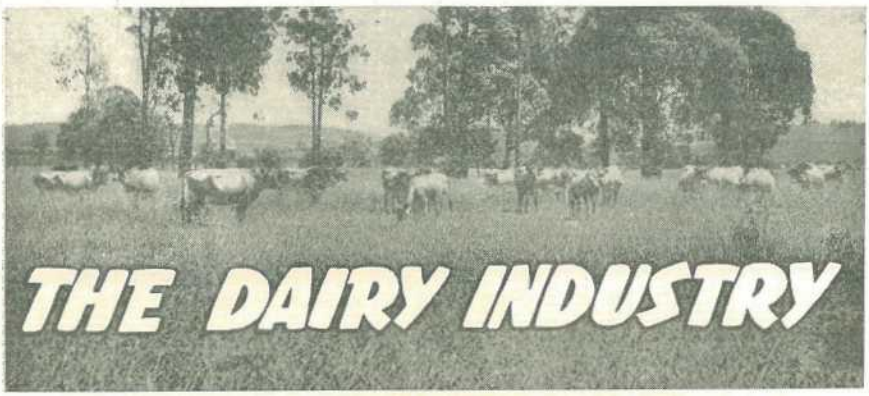
Correction.

The illustration which appeared as mugga in Plate 17 in the June issue of the journal was of white bloodwood. The illustration below is of a mugga tree in the Botanic Gardens, Brisbane.

[TO BE CONTINUED.]

TUBERCULOSIS-FREE CATTLE HERDS.
(AS AT 17th JULY, 1953.)

Breed.	Owner's Name and Address.
Aberdeen Angus ..	The Scottish Australian Company Ltd., Texas Station, Texas
	F. H. Hutton, " Bingegang," Dingo
A.I.S.	M. E. & E. Scott, " Wastlebrae " A.I.S. Stud, Kingaroy
	F. B. Sullivan, " Fermanagh," Pittsworth
	D. Sullivan, " Bantry " Stud, Rossvale, *via* Pittsworth
	W. Henschell, " Yarranvale," Yarranlea
	Con. O'Sullivan, " Navillus" Stud, Greenmount
	H. V. Littleton, " Wongalea" Stud, Hillview, Crow's Nest
	J. Phillips and Sons, " Sunny View," Benair, *via* Kingaroy
	Sullivan Bros. " Valera " Stud, Pittsworth
	Reushle Bros., " Reubydale " Stud, Ravensbourne
	H. F. Marquardt, " Chelmer " Stud, Wondai
	W. G. Marquardt, " Springlands," Wondai
	A. C. and C. R. Marquardt, " Cedar Valley," Wondai
	A. H. Sokoll, " Sunny Crest " Stud, Wondai
	W. and A. G. Scott, " Welena" A.I.S. Stud, Blackbutt
	G. Sperling, " Kooravale " Stud, Kooralgin, *via* Cooyar
	C. J. Schloss, " Shady Glen," Rocky Creek, Yarraman
	W. H. Thompson, " Alfa Vale," Nanango
	S. R. Moore, Sunnyside, West Wooroolin
	H.M. State Farm, Numinbah
	D. G. Neale, " Groveley," M.S. 195, Pittsworth
	Edwards Bros., " Spring Valley " A.I.S. Stud, Kingaroy
Ayrshire	L. Holmes, " Benbecula," Yarranlea
	J. N. Scott, " Auchen Eden," Camp Mountain
	" St. Christopher's " and " Iona " Studs, Brookfield road, Brisbane
	E. Mathie and Son, " Ainslie " Ayrshire Stud, Maleny
	C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
Friesian	C. H. Naumann, " Yarrabine" Stud, Yarraman
Guernsey	C. D. Holmes, " Springview," Yarraman
	A. B. Fletcher, Cossart Vale, Boonah
	W. H. Doss, Degilbo, *via* Biggenden
Jersey	Queensland Agricultural High School and College, Lawes
	J. S. McCarthy, " Glen Erin " Jersey Stud, Greenmount
	J. F. Lau, " Rosallen " Jersey Stud, Goombungee
	G. Harley, Hopewell, Kingaroy
	Toowoomba Mental Hospital, Willowburn
	Farm Home for Boys, Westbrook
	F. J. Cox and Sons, " Rosel " Stud, Crawford, Kingaroy Line
	R. J. Browne, Hill 60, Yangan
	P. J. L. Bygrave, " The Craigan Farm," Aspley
	R. J. Crawford, " Inverlaw " Jersey Stud, Inverlaw, Kingaroy
	P. H. F. Gregory, " Carlton," Rosevale, *via* Rosewood
	E. A. Matthews, " Yarradale," Yarraman
	A. L. Semgreen, " Tecoma," Coolabunia
	G. & V. Beattie, " Beauvern," Antigua, Maryborough
	L. E. Meier, " Ardath " Stud, Boonah
	A. M. and L. J. Noone, " Winbirra" Stud, Mt. Esk Pocket, Esk
	W. S. Conochie and Sons, " Brookland " Stud, Sherwood road, Sherwood
	Estate of J. A. Scott, " Kiaora," Manumbar road, Nanango
	F. W. Verrall, " Coleburn," Walloon
	C. Beckingham, Trouts Road, Everton Park
	W. E. O. Meier & Son, "Kingsford" Stud, Alberton, *via* Yatala
	G. H. Ralph, " Ryecombe," Ravensbourne
polled Hereford ..	W. Maller, " Boreview," Pickanjinnie



Survey of Group Herd Recording Data, 1948-1952.

S. E. PEGG and C. H. CLARK, Herd Recording Section, Division of Dairying.

HERD recording is practised by dairy-farmers as a basis for herd improvement. Much valuable information can be made available to the dairying industry as a result of analysing the data collected from the members of the scheme.

The Group Herd Recording Scheme commenced in 1948 and the data up to 30th September, 1952, have been surveyed. As this period covers better-than-average, average and below-average seasons, it is considered that the information is fairly representative of what may be expected to occur over a period of years.

Effect of Month of Calving on Production.

This survey has been conducted to indicate the best months in which to calve cows in order to obtain best production, and the information has been presented for the whole of the State as well as for districts.

The average yields of milk and butterfat for the cows calving in the various months are given in Table 1, together with the number of lactations and the percentage of lactations for each month.

From Table 1 it is apparent that for the State as a whole the most profitable months in which to have cows calving are July, August and September, but the results for some districts show a slight departure from this trend.

On the Atherton Tableland the most favourable months are shown to be August and September, when the average butterfat production is 185 lb. and 183 lb. respectively. There is little variation for the months of May to July and October to January, but productions for cows calving in February and March are considerably lower.

There are insufficient cows represented in the Mackay, Port Curtis, Upper Burnett and Central Burnett districts to draw definite conclusions, but the trends may be seen from the figures given in the table.

In the South Burnett district the most favourable period for calving is spread over the four months July to October inclusive, whilst in

TABLE 1.

Effect of Month of Calving on Average Production, 1948–52.

District.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
All Queensland ..	lb. 2,895	lb. 126	lb. 2,837	lb. 126	lb. 2,929	lb. 127	lb. 3,097	lb. 134	lb. 3,269	lb. 141	lb. 3,372	lb. 145	lb. 3,484	lb. 150	lb. 3,510	lb. 151	lb. 3,412	lb. 149	lb. 3,290	lb. 143	lb. 3,165	lb. 138	lb. 2,981	lb. 130
	5,853* (6·96)†		4,518 (5·37)		4,403 (5·23)		4,290 (5·10)		4,663 (5·54)		6,072 (7·22)		7,794 (9·26)		9,247 (10·99)		10,204 (12·13)		10,736 (12·76)		9,235 (10·97)		7,140 (8·48)	
Atherton Tableland	3,922	170	3,626	169	3,538	153	3,797	163	3,937	168	4,052	174	4,087	176	4,384	185	4,228	183	4,021	175	3,889	171	3,985	173
	565 (7·72)		493 (6·74)		470 (6·43)		501 (6·85)		490 (6·70)		580 (7·93)		634 (8·67)		625 (8·54)		692 (9·46)		858 (11·73)		762 (10·42)		645 (8·82)	
Mackay	2,194	103	2,108	100	2,312	105	2,236	99	2,056	90	2,000	90	2,275	104	2,280	103	2,196	102	2,417	111	2,383	112	2,401	114
	78 (9·84)		57 (7·19)		85 (10·72)		67 (8·45)		51 (6·43)		68 (8·58)		76 (9·58)		81 (10·21)		76 (9·58)		58 (7·31)		43 (5·42)		53 (6·68)	
Port Curtis ..	1,075	48	1,143	52	1,033	49	1,266	56	1,491	64	1,244	54	2,104	92	2,544	119	2,567	115	2,240	100	1,843	82	1,350	59
	71 (7·11)		35 (3·51)		16 (1·60)		17 (1·70)		19 (1·90)		42 (4·21)		24 (2·40)		114 (11·42)		114 (11·42)		159 (15·93)		210 (21·04)		177 (17·74)	
Upper Burnett ..	3,202	135	2,643	113	3,241	140	3,244	139	3,440	147	3,922	164	4,174	170	4,112	170	4,152	172	3,981	164	3,889	161	3,316	137
	244 (7·41)		162 (4·92)		175 (5·32)		144 (4·37)		216 (6·56)		269 (8·17)		330 (10·02)		373 (11·33)		380 (11·54)		349 (10·60)		347 (10·54)		303 (9·20)	
Central Burnett ..	2,183	93	1,898	83	1,473	61	1,606	67	2,025	88	1,980	85	1,969	87	2,629	118	2,733	121	2,563	113	2,497	107	2,147	91
	173 (10·94)		88 (5·56)		87 (5·50)		66 (4·17)		78 (4·93)		94 (5·94)		84 (5·31)		164 (10·37)		181 (11·44)		231 (14·60)		192 (12·14)		144 (9·10)	
South Burnett ..	2,578	106	2,555	105	2,590	108	2,942	121	3,086	126	3,050	125	3,281	134	3,141	130	3,194	133	3,207	133	2,976	122	2,839	117
	688 (6·84)		536 (5·33)		503 (5·00)		556 (5·53)		598 (5·95)		742 (7·38)		930 (9·25)		1,110 (11·04)		1,251 (12·44)		1,233 (12·26)		1,079 (10·73)		828 (8·24)	
South-Eastern Queensland	2,629	119	2,588	119	2,696	121	2,795	125	2,993	134	3,126	138	3,153	142	3,266	147	3,112	144	3,031	140	2,915	134	2,759	126
	2,492 (6·64)		1,930 (5·14)		1,761 (4·69)		1,772 (4·72)		1,987 (5·29)		2,718 (7·24)		3,595 (9·58)		4,214 (11·23)		4,705 (12·54)		4,934 (13·15)		4,208 (11·21)		3,211 (8·56)	
Eastern Downs	3,426	144	3,440	147	3,440	147	3,702	160	3,827	163	4,053	173	4,156	175	4,105	173	3,982	166	3,746	156	3,711	156	3,480	147
	1,170 (7·08)		930 (5·63)		1,009 (6·11)		858 (5·19)		926 (5·61)		1,152 (6·98)		1,530 (9·26)		1,882 (11·40)		2,018 (12·22)		2,053 (12·43)		1,727 (10·46)		1,261 (7·64)	
Western Downs ..	2,653	105	2,475	101	2,705	111	2,758	111	3,165	128	3,113	125	3,475	141	3,376	134	3,409	138	3,244	128	3,086	123	2,769	111
	372 (6·12)		287 (4·72)		297 (4·89)		309 (5·08)		298 (4·90)		407 (6·70)		591 (9·72)		684 (11·25)		787 (12·95)		861 (14·17)		667 (10·97)		518 (8·52)	

* Number of cows calved in month.

† Percentage of all cows.

South-eastern Queensland and the Western Downs the most favourable months are July to September. The best period is a little earlier on the Eastern Downs, being from June to August.

Table 2 shows for the whole of the State the average production of all cows which calved during each quarter of the year.

TABLE 2.

Production According to the Time of Calving.

Time of Calving.	Percentage of Calvings.	Average Production.	
		Milk.	Butterfat.
		Lb.	Lb.
1st quarter (Jan.–Mar.)	17·56	2,887	126
2nd quarter (Apr.–June)	17·86	3,261	140
3rd quarter (July–Sept.)	32·38	3,466	150
4th quarter (Oct.–Dec.)	32·21	3,166	138

The table shows that the average production per cow for those calving in the July to September quarter of the year is 19% higher than that of cows calving in the first quarter, 7% higher than that of those calving in the second quarter, and 9% higher than that of those calving in the fourth quarter.

This information emphasizes the possibilities of increasing production by adopting "seasonal calving" and having as great a proportion of the cows as possible calve in the third quarter of the year. Seasonal calving has been adopted in many countries, and production per cow has shown appreciable improvement as a result. New Zealand is perhaps the country which is best known for the widespread adoption of this practice.

Many farmers have been averse to calving their cows in late winter and early spring months, during which pastures are usually poor, but the results of this survey definitely show the advantage to be gained.

Cows which calve in the July to September period obtain the benefit of the flush growth of grass usually experienced from January to March after they have been in production from 4-6 months, and it serves to prolong the length of lactation and increase the production for the lactation period. Cows which calve during the first quarter of the year are usually mated as the nutritive value of the grass is waning, and pregnancy during a time of poor feed tends to shorten the lactation period and lower the production of the animal.

It is realised that suppliers of market milk cannot afford to allow their supply to drop below a certain quantity at any portion of the year and therefore are not in the position to adopt the practice of calving a large number of cows within the one quarter. However, it is considered that such producers could obtain higher and cheaper production by eliminating all calvings in the first quarter of the year, which as the table shows is significantly the worst time of the year in which to have cows freshen.

Plate 1 depicts in graphical form the effect of the month of calving on production. It shows for the period 1948-52 the average production of milk and butterfat for cows calving in the various months, and the average production of butterfat according to the month of calving for

TABLE 3.

Effect of Month of Calving on Average Length of Lactation, 1948–52.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
All Queensland	days. 194 5,853* (6·96)†	days. 199 4,518 (5·37)	days. 206 4,403 (5·23)	days. 216 4,290 (5·10)	days. 224 4,663 (5·54)	days. 228 6,072 (7·22)	days. 229 7,794 (9·26)	days. 226 9,247 (10·99)	days. 218 10,204 (12·13)	days. 209 10,736 (12·76)	days. 205 9,235 (10·97)	days. 197 7,140 (8·48)
Atherton Tableland	221 565 (7·72)	231 493 (6·74)	222 470 (6·43)	236 501 (6·85)	237 490 (6·70)	239 580 (7·93)	239 634 (8·67)	241 625 (8·54)	242 692 (9·46)	232 858 (11·73)	224 762 (10·42)	223 645 (8·82)
Mackay	180 78 (9·84)	185 57 (7·19)	185 85 (10·72)	189 67 (8·45)	193 51 (6·43)	197 68 (8·58)	200 76 (9·58)	198 81 (10·21)	190 76 (9·58)	203 58 (7·31)	193 43 (5·42)	191 53 (6·68)
Port Curtis	98 71 (7·11)	109 35 (3·51)	128 16 (1·60)	148 17 (1·70)	159 19 (1·90)	133 42 (4·21)	171 24 (2·40)	173 114 (11·42)	190 114 (11·42)	176 159 (15·93)	149 210 (21·04)	109 177 (17·74)
Upper Burnett	183 224 (7·41)	165 162 (4·92)	197 175 (5·32)	198 144 (4·37)	211 216 (6·56)	221 269 (8·17)	226 330 (10·02)	222 373 (11·33)	221 380 (11·54)	209 349 (10·60)	203 347 (10·54)	187 303 (9·20)
Central Burnett	158 173 (10·94)	146 88 (5·56)	146 87 (5·50)	168 66 (4·17)	178 78 (4·93)	192 94 (5·94)	199 84 (5·31)	239 164 (10·37)	214 181 (11·44)	192 231 (14·60)	178 192 (12·14)	156 144 (9·10)
South Burnett	184 688 (6·84)	185 536 (5·33)	193 503 (5·00)	208 556 (5·53)	215 598 (5·95)	216 742 (7·38)	221 930 (9·25)	220 1,110 (11·04)	209 1,251 (12·44)	206 1,233 (12·26)	192 1,079 (10·73)	191 828 (8·24)
South-Eastern Queensland ..	197 2,492 (6·64)	203 1,930 (5·14)	214 1,761 (4·69)	223 1,772 (4·72)	234 1,987 (5·29)	240 2,718 (7·24)	238 3,595 (9·58)	235 4,214 (11·23)	222 4,705 (12·54)	211 4,934 (13·15)	211 4,208 (11·21)	205 3,211 (8·56)
Eastern Downs	201 1,170 (7·08)	207 930 (5·63)	207 1,009 (6·11)	212 858 (5·19)	218 926 (5·61)	220 1,152 (6·98)	222 1,530 (9·26)	217 1,882 (11·40)	212 2,018 (12·22)	207 2,053 (12·43)	207 1,727 (10·46)	197 1,261 (7·64)
Western Downs	172 372 (6·12)	165 287 (4·72)	190 297 (4·89)	194 309 (5·08)	205 298 (4·90)	205 407 (6·70)	213 591 (9·72)	207 684 (11·25)	206 787 (12·95)	194 861 (14·17)	185 667 (10·97)	174 518 (8·52)

* Number of cows calving in month.

† Percentage of all cows.

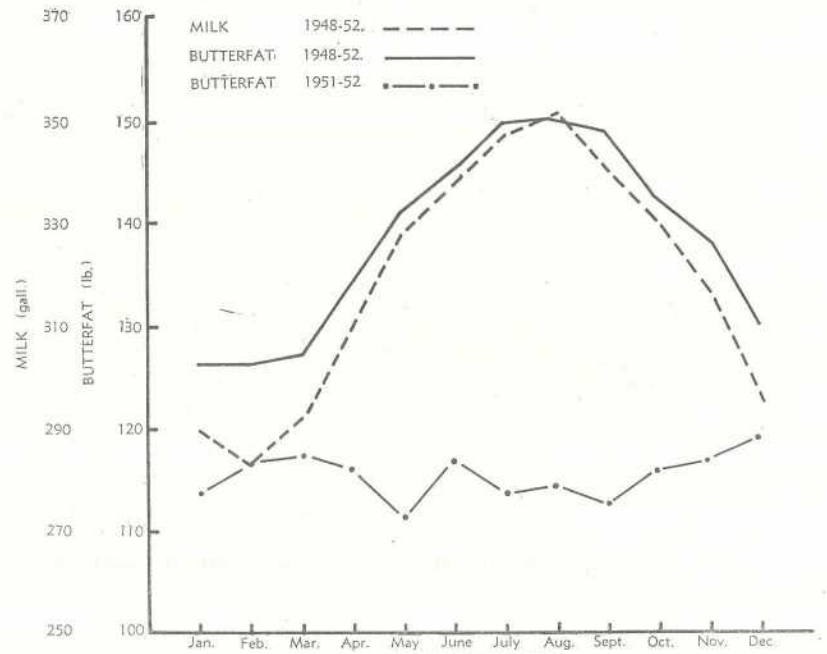


Plate 1.

Graph Showing the Effect of Month of Calving on Average Production. Milk and butterfat production are shown for all cows for the period 1948-52, and butterfat also for cows recorded in 1951-52.

1951-52. Because of the drought conditions which prevailed during 1951-52, the graph for that year not only shows abnormally low production for all months but also differs in shape from the average for 1948-52.

Since the first survey showing the effect of the month of calving on production was published a number of farmers in the State have adopted " seasonal calving."

Effect of Month of Calving on Length of Lactation.

The average length of lactation of cows varies according to the month of calving. It ranges from 194 days for cows which calved in January to 229 days for cows which calved in July. The months with the highest average lengths of lactation are June, July and August, with 228, 229 and 226 days respectively.

The average length of lactation of cows calving in the various months and in the various districts is shown in Table 3, together with the number and percentage of cows calving in each month.

Table 4 shows the average length of lactation for all cows for the whole of the State according to the quarter of the year.

TABLE 4.

Length of Lactation According to Time of Calving.

Time of Calving.	Average Length of Lactation.
	Days
1st quarter (Jan.–Mar.)	199
2nd quarter (Apr.–June)	223
3rd quarter (July-Sept.)	224
4th quarter (Oct.–Dec.)	204

This table shows that the average length of lactation for cows calving in the third quarter is 12% higher than that of cows calving in the first quarter of the year, 10% higher than that of those calving in the fourth quarter, and only one day longer than that of those calving in the second quarter of the year.

It would appear that the influence of early summer storms and the later general summer rains on the pastures has the effect of prolonging the lactation period of cows calving in the second and third quarters, whilst cows calving in the fourth and first quarters have their lactation periods shortened by the dry winter and spring conditions experienced in this State.

The months which tend to give the longest lactation periods vary slightly from district to district, as will be seen from Table 3.

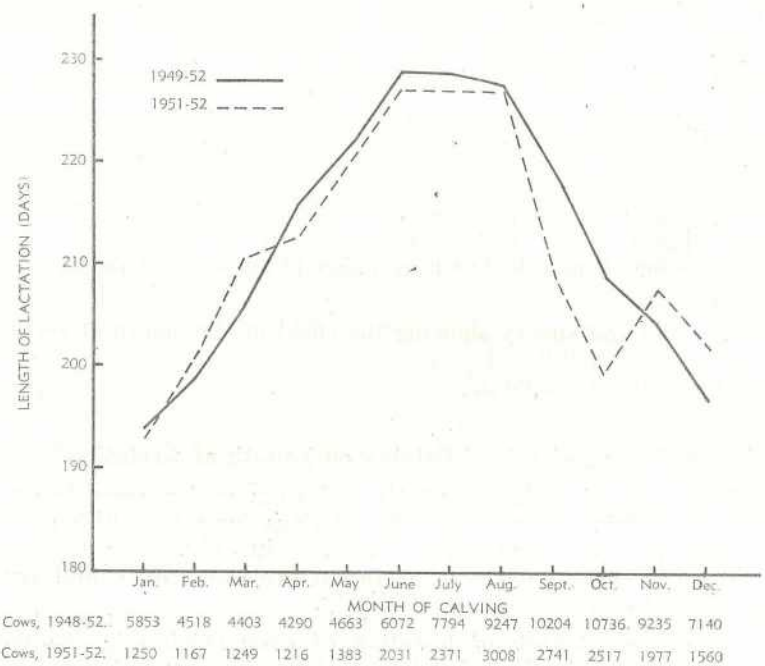


Plate 2.

Graph Showing the Effect of the Month of Calving on the Average Length of Lactation. The lactation period is shown for all cows for the period 1948-52 and for cows recorded in 1951-52.

In Plate 2 the variation from month to month is presented in graphical form for the 1948-52 period. The average length of lactation for the season 1951-52 is also shown.

Effect of Length of Lactation on Production.

The maximum recorded length of lactation in Queensland under the Group Herd Recording Scheme is 270 days. Table 5 shows the average production of cows which milked for various lactation periods for the whole of the State and for various districts.

A study of Table 5 shows that 30% of the cows milked for a full lactation period of 270 days for an average production of 180 lb. butterfat, whilst 20% milked for a period of less than six months. The average production per cow of the latter group was 63 lb. butterfat, or a loss of 117 lb. butterfat compared with the production of cows which milked for the full period. The value of the loss at present prices for commercial butter is £28 10s. per cow.

An examination of the information given in Table 5 shows the average production of cows milking for various periods to be as follows:—

Days.	Percentage of Cows.	Butterfat.	Percentage of the Average Production for 270 days.
		Lb.	
270	30·07	180	100
240	19·35	163	90
210	18·91	142	79
180	11·27	115	64
150	7·62	90	50
120	5·26	66	37
90	3·52	45	25
60	2·44	29	16
30	1·56	14	8

It is obvious that considerable production is lost through cows not milking for a full lactation period and the reasons for the short lactation period should be sought. They appear to be:—

(1) Low Standard of Nutrition.—This can be obviated by the conservation of adequate supplies of fodder in the form of ensilage and hay; planting a succession of suitable fodder crops for grazing; the establishment of improved pastures; and improved methods of pasture management.

(2) Calving Cows at any Period of the Year.—Greater production can be obtained by mating the cows so that they will calve during the most favourable months of the year. (See previous section on "The Effect of the Month of Calving on Production.")

(3) Control of Sire.—Many farmers allow the bull to run with the herd and frequently the period between calvings is only 10 months. Cows should have a dry period of at least two months before calving.

(4) Some strains of dairy cattle appear to have an inherited trait for milking for a short lactation period. Such strains or families should be eliminated from the herd.

TABLE 5.

Average Production Per Cow According to Length of Lactation, 1948–52.

District.	30 days.		60 days.		90 days.		120 days.		150 days.		180 days.		210 days.		240 days.		270 days.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
All Queensland	lb. 338 1,404* (1·56)†	lb. 14	lb. 695 2,196 (2·44)	lb. 29	lb. 1,098 3,177 (3·52)	lb. 45	lb. 1,572 4,739 (5·26)	lb. 66	lb. 2,138 6,869 (7·62)	lb. 90	lb. 2,720 10,156 (11·27)	lb. 115	lb. 3,318 17,046 (18·91)	lb. 142	lb. 3,764 17,446 (19·35)	lb. 163	lb. 4,097 27,117 (30·07)	lb. 180
Atherton Tableland	394 55 (0·71)	17	775 113 (1·46)	32	1,158 143 (1·85)	49	1,675 232 (3·00)	73	2,289 373 (4·83)	98	2,985 624 (8·07)	127	3,674 1,533 (19·83)	157	4,164 1,758 (22·75)	179	4,580 2,898 (37·49)	199
Mackay	276 23 (2·89)	15	543 34 (4·27)	25	949 50 (6·28)	42	1,215 63 (7·91)	56	1,763 75 (9·42)	79	2,041 118 (14·82)	94	2,427 160 (20·10)	111	2,989 137 (17·21)	136	3,138 136 (17·08)	144
Port Curtis	334 54 (4·44)	16	601 82 (6·75)	26	936 126 (10·38)	41	1,366 168 (13·83)	61	2,044 220 (18·11)	92	2,435 131 (10·78)	107	2,598 168 (13·83)	115	2,904 146 (12·02)	130	3,312 120 (9·87)	149
Upper Burnett	416 86 (2·44)	17	875 104 (2·95)	36	1,348 137 (3·89)	54	1,880 212 (6·02)	78	2,693 362 (10·28)	111	3,164 441 (12·52)	129	3,925 606 (17·21)	163	4,499 602 (17·10)	188	4,739 971 (27·58)	200
Central Burnett	301 73 (4·56)	12	649 75 (4·69)	27	1,086 130 (8·13)	45	1,497 152 (9·50)	61	1,905 222 (13·88)	80	2,477 185 (11·56)	105	2,771 232 (14·50)	122	2,975 173 (10·81)	131	3,267 358 (22·37)	145
South Burnett	328 232 (2·12)	14	618 311 (2·84)	24	1,088 446 (4·07)	43	1,514 667 (6·08)	61	2,117 972 (8·86)	85	2,697 1,479 (13·48)	109	3,354 2,081 (18·97)	136	3,654 1,922 (17·52)	152	3,982 2,859 (26·06)	165
South-Eastern Queensland	293 515 (1·29)	13	614 812 (2·03)	26	977 1,168 (2·93)	43	1,420 1,811 (4·54)	62	1,880 2,688 (6·73)	84	2,388 4,140 (10·37)	107	2,899 7,265 (18·19)	130	3,353 7,963 (19·94)	151	3,637 13,568 (33·99)	167
Eastern Downs	396 245 (1·36)	16	855 404 (2·25)	35	1,272 620 (3·45)	51	1,835 964 (5·36)	75	2,481 1,379 (7·66)	102	3,215 2,169 (12·05)	134	4,023 3,581 (19·90)	168	4,438 3,626 (20·15)	187	4,916 5,006 (27·82)	212
Western Downs	391 121 (1·93)	14	776 251 (4·00)	29	1,165 357 (5·68)	44	1,653 470 (7·48)	63	2,278 578 (9·20)	88	2,878 869 (13·84)	112	3,515 1,339 (21·32)	141	4,003 1,119 (17·82)	164	4,316 1,176 (17·72)	177

* Number of cows with lactation period shown.

† Percentage of all cows.

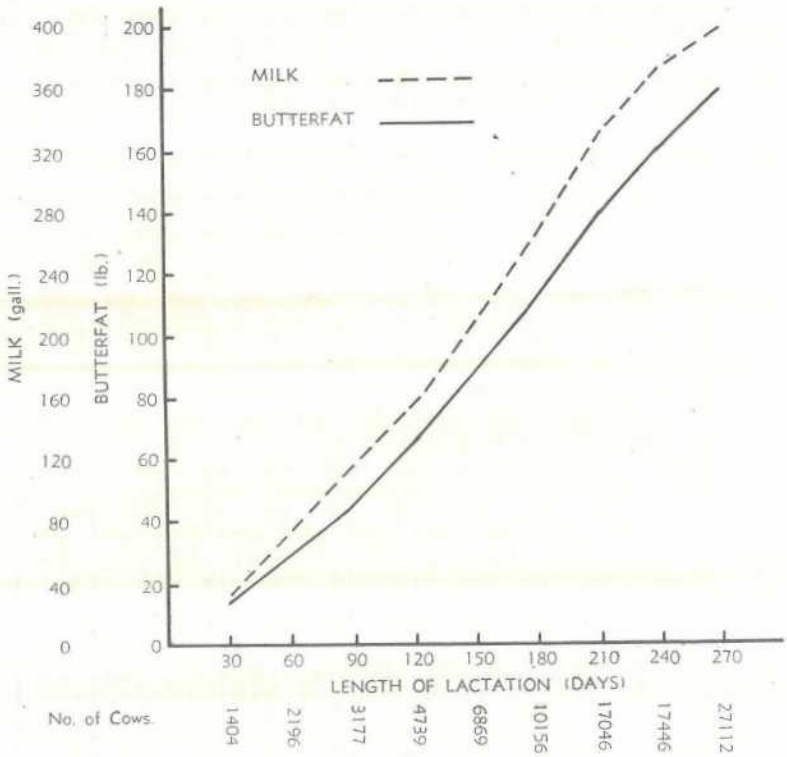


Plate 3.

Graph Showing Production of Milk and Butterfat According to the Length of Lactation, 1948-52.

Plate 3 depicts the average production according to length of lactation.

Relationship of Test to Production.

A survey carried out by the New Zealand Dairy Board has shown that within breeds there is a strong correlation between the butterfat content of the milk and the yield of butterfat, and it has been shown that if the standard of nutrition is high, a sound method of raising the level of butterfat production would be for farmers to breed from cow families which combine better-than-average tests with high milk yield.

Most dairy-farmers in this State supply butter or cheese factories and are paid according to the amount of butterfat supplied. It is therefore necessary for them to give consideration to the higher-testing cow families in their herds, provided such tests are associated with high milk yields.

Suppliers of market milk are paid a flat rate per gallon irrespective of the butterfat content and they are therefore concerned only with the amount of milk produced, provided it contains not less than the prescribed standard of butterfat. These suppliers may be forced to give more attention to the butterfat content of the milk in the future

TABLE 6.

Production According to Test. All Cows, 1948–52.

District.	Under 3·0%		3·0%–3·4%		3·5%–3·9%		4·0%–4·4%		4·5%–4·9%		5·0%–5·4%		5·5%–5·9%		6·0%–6·4%		6·5% and over.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
All Queensland	1,786	50	3,218	106	3,615	135	3,389	142	3,151	147	3,081	156	2,690	166	2,639	162	1,956	132
	896*		6,867		20,064		24,466		18,339		12,701		4,929		1,519		431	
	(0·99)†		(7·61)		(22·24)		(27·12)		(20·33)		(14·08)		(5·46)		(1·68)		(0·48)	
Atherton Tableland	2,653	76	4,181	138	4,655	174	4,322	181	3,663	172	3,324	172	3,023	171	2,851	175	2,002	135
	35		534		1,786		2,048		1,499		1,112		511		150		56	
	(0·45)		(6·91)		(23·10)		(26·49)		(19·39)		(14·38)		(6·61)		(1·94)		(0·73)	
Mackay	375	32	2,258	76	2,471	92	2,367	99	2,160	101	2,177	113	2,304	131	1,815	112	894	60
	2		22		101		207		234		152		51		24		7	
	(0·25)		(2·75)		(12·63)		(25·88)		(29·25)		(19·00)		(6·38)		(3·00)		(0·88)	
Port Curtis	783	34	1,738	57	2,150	81	2,090	89	2,034	96	1,946	100	1,895	107	958	58	1,035	70
	11		40		218		361		323		175		65		17		6	
	(0·90)		(3·29)		(17·93)		(29·69)		(26·56)		(14·39)		(5·35)		(1·40)		(0·50)	
Upper Burnett	2,129	58	3,430	113	4,061	153	3,914	164	3,500	164	3,187	165	3,147	174	2,505	154	1,539	105
	31		224		999		1,320		611		266		55		18		8	
	(0·88)		(6·34)		(28·28)		(37·37)		(17·30)		(7·53)		(1·56)		(0·51)		(0·23)	
Central Burnett	970	27	1,879	62	2,209	83	2,344	93	2,508	118	2,372	123	2,210	124	1,812	111	1,170	82
	16		101		368		487		365		182		52		24		5	
	(1·00)		(6·31)		(23·00)		(30·44)		(22·81)		(11·38)		(3·25)		(1·50)		(0·32)	
South Burnett	1,639	46	2,950	98	3,378	126	3,158	134	2,902	136	2,678	138	2,301	130	2,147	132	1,592	109
	186		1,259		3,365		3,073		1,642		973		366		113		40	
	(1·69)		(11·43)		(30·54)		(27·89)		(14·90)		(8·83)		(3·32)		(1·03)		(0·37)	
South-Eastern Queensland	1,907	53	3,073	101	3,186	119	2,973	126	2,975	140	3,055	153	2,468	163	2,573	158	1,999	136
	229		2,035		5,987		9,776		10,249		7,702		2,895		856		231	
	(0·57)		(5·09)		(14·98)		(24·46)		(25·65)		(19·27)		(7·24)		(2·14)		(0·58)	
Eastern Downs	1,981	55	3,580	120	4,150	155	4,015	168	3,739	175	3,542	184	3,489	197	3,112	191	2,264	149
	197		1,643		5,110		5,481		2,680		1,789		821		281		68	
	(1·09)		(9·09)		(28·28)		(30·33)		(14·83)		(9·90)		(4·54)		(1·56)		(0·38)	
Western Downs	1,524	42	2,864	94	3,276	122	3,348	118	3,242	151	2,976	154	2,064	167	3,159	222	2,067	122
	187		1,009		2,130		1,713		736		340		113		36		10	
	(2·98)		(16·08)		(33·95)		(27·30)		(11·73)		(5·42)		(1·80)		(0·57)		(0·16)	

* Number of cows in range.
† Percentage of all cows.

if the practice of drying milk develops, as in that case milk surplus to the wholemilk demand will be paid for on butterfat and/or milk solids content.

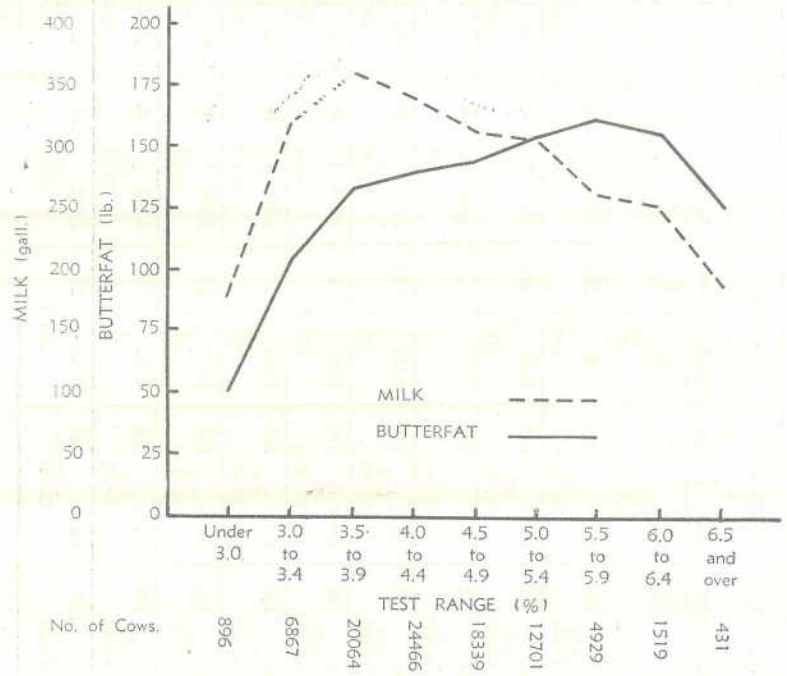


Plate 4.

Graph Showing the Relationship between Butterfat Test of Milk and Production.
The figures are for all cows recorded in 1948-52.

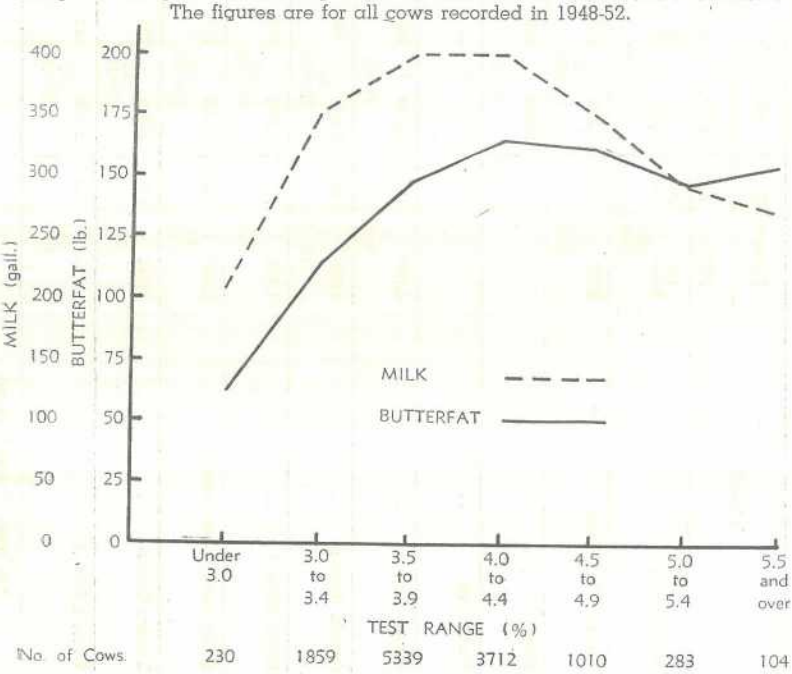


Plate 5.

Graph Showing the Relationship between Butterfat Test of Milk and Production.
The figures are for A.I.S. cows recorded in 1949-52.

TABLE 7.

Production According to Test. A.I.S. Cows, 1949–52.

District.	Under 3·0%		3·0%–3·4%		3·5%–3·9%		4·0%–4·4%		4·5%–4·9%		5·0%–5·5%		Over 5·5%	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
All Queensland	2,143	63	3,527	116	4,032	150	4,036	168	3,567	165	2,974	153	2,801	160
	230* (1·83)†		1,859 (14·83)		5,339 (42·59)		3,712 (29·61)		1,010 (8·06)		283 (2·26)		104 (0·83)	
Atherton Tableland	3,351	96	4,372	145	4,937	184	4,920	205	4,528	216	4,427	225	3,875	224
	16 (0·62)		345 (13·29)		1,079 (41·58)		891 (34·34)		208 (8·02)		42 (1·62)		14 (0·54)	
Mackay	..	..	3,586	123	3,120	117	3,026	126	2,416	112	3,107	158	2,246	132
	.. ..		6 (8·82)		26 (38·24)		20 (29·41)		8 (11·76)		3 (4·41)		5 (7·35)	
Port Curtis	..	..	..	..	2,330	87	2,634	110	..	..	1,840	94	..	..
	.. ..		.. ..		9 (45·00)		8 (40·00)		.. ..		3 (15·00)		.. ..	
Upper Burnett	4,950	116	3,810	125	4,036	152	4,143	174	3,281	154	2,895	150	2,606	169
	1 (0·21)		15 (3·18)		124 (26·33)		202 (42·89)		87 (18·47)		34 (7·22)		8 (1·79)	
Central Burnett	1,885	56	1,988	65	2,544	95	2,642	110	3,062	141	1,865	96	2,198	130
	1 (0·35)		34 (11·97)		122 (42·96)		85 (29·93)		31 (10·92)		8 (2·82)		3 (1·05)	
South Burnett	1,354	38	3,592	118	4,308	160	4,016	167	3,708	170	2,664	136	3,125	176
	16 (1·65)		145 (14·98)		459 (47·42)		278 (28·72)		55 (5·68)		14 (1·45)		1 (0·10)	
South-Eastern Queensland	2,250	63	3,476	115	3,663	135	3,392	142	2,911	136	2,669	138	2,706	154
	45 (1·41)		518 (16·20)		1,347 (42·13)		845 (26·43)		272 (8·51)		118 (3·69)		52 (1·62)	
Eastern Downs	3,680	119	3,945	131	4,525	169	4,408	183	4,131	191	3,342	170	1,956	95
	40 (2·01)		211 (10·62)		888 (44·69)		658 (33·12)		155 (7·80)		29 (1·46)		6 (0·30)	
Western Downs	1,463	41	2,988	98	3,390	126	3,337	139	3,066	141	2,458	125	2,643	149
	111 (3·71)		585 (19·55)		1,285 (42·95)		770 (25·74)		194 (6·48)		32 (1·07)		15 (0·50)	

* Number of cows in range.

† Percentage of all A.I.S. cows.

TABLE 8.

Production According to Test. Jersey Cows, 1949–52.

District.	Under 3·0%		3·0%–3·4%		3·5%–3·9%		4·0%–4·4%		4·5%–4·9%		5·0%–5·4%		5·5%–5·9%		6·0%–6·4%		6·5% and over.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Fat..	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
All Queensland	573	14	2,086	70	2,589	98	2,927	124	3,064	145	3,153	164	3,059	173	2,881	177	2,079	148
	41* (0·24)†		209 (1·20)		1,086 (6·23)		3,644 (20·91)		5,310 (30·47)		4,528 (25·98)		1,911 (10·97)		552 (3·17)		147 (0·84)	
Atherton Tableland	1,020	30	3,515	120	3,464	131	3,549	151	3,485	164	3,420	178	3,073	171	3,099	190	2,245	152
	3 (0·12)		22 (0·88)		103 (4·12)		388 (15·53)		720 (28·82)		760 (30·42)		360 (14·41)		108 (4·32)		34 (1·36)	
Mackay	585	17	1,498	49	2,951	113	2,511	107	2,201	103	2,417	126	2,864	164	2,393	148	1,208	80
	1 (0·50)		3 (1·57)		4 (2·09)		34 (17·80)		61 (31·94)		59 (30·89)		19 (9·95)		8 (4·19)		2 (1·05)	
Port Curtis	..	..	..	..	1,885	73	2,630	111	3,069	145	2,659	139	2,550	146	..	..	..	..
	.. ..		.. ..		3 (5·77)		11 (21·15)		10 (19·23)		17 (32·69)		11 (21·15)		.. ..		.. ..	
Upper Burnett	1,350	36	3,553	121	3,492	130	3,617	153	3,359	158	2,832	148	1,956	111	1,463	91	1,870	128
	1 (0·23)		21 (4·88)		101 (23·49)		167 (38·84)		84 (19·53)		40 (9·30)		10 (2·33)		3 (0·70)		3 (0·70)	
Central Burnett	885	23	1,385	45	1,989	77	2,242	95	2,498	118	2,441	126	2,315	129	2,109	129	1,785	117
	1 (0·21)		9 (1·88)		43 (8·96)		152 (31·67)		159 (33·13)		75 (15·63)		24 (5·00)		16 (3·33)		1 (0·21)	
South Burnett	340	9	1,965	66	1,864	70	2,656	112	2,624	123	2,521	130	2,533	143	2,268	139	1,918	132
	3 (0·30)		19 (1·90)		104 (10·39)		243 (24·28)		305 (30·47)		210 (20·98)		83 (8·29)		26 (2·60)		8 (0·80)	
South-Eastern Queensland	361	9	1,609	54	2,190	84	2,741	116	2,995	141	3,109	162	3,038	172	2,778	171	2,127	144
	20 (0·18)		100 (0·92)		547 (5·01)		2,217 (20·30)		3,455 (31·63)		2,945 (26·96)		1,219 (11·16)		337 (3·09)		83 (0·76)	
Eastern Downs	365	9	1,514	50	3,806	144	3,669	157	3,653	172	3,757	195	3,841	218	3,853	236	1,647	108
	9 (0·89)		15 (1·48)		73 (7·19)		197 (19·41)		271 (26·70)		271 (26·70)		129 (12·71)		37 (3·65)		13 (1·28)	
Western Downs	2,035	47	2,302	76	3,047	114	3,339	141	3,260	154	3,268	170	3,090	175	3,577	221	2,065	134
	3 (0·36)		20 (2·39)		108 (12·89)		235 (28·04)		245 (29·24)		151 (18·02)		56 (6·68)		17 (2·03)		3 (0·36)	

* Number of cows in range.

† Percentage of all Jersey cows.

Table 6 shows the average milk and butterfat production of all cows within the various test ranges, while Tables 7 and 8 show the trends within the A.I.S. and Jersey breeds. This information is further depicted in Plates 4-6.

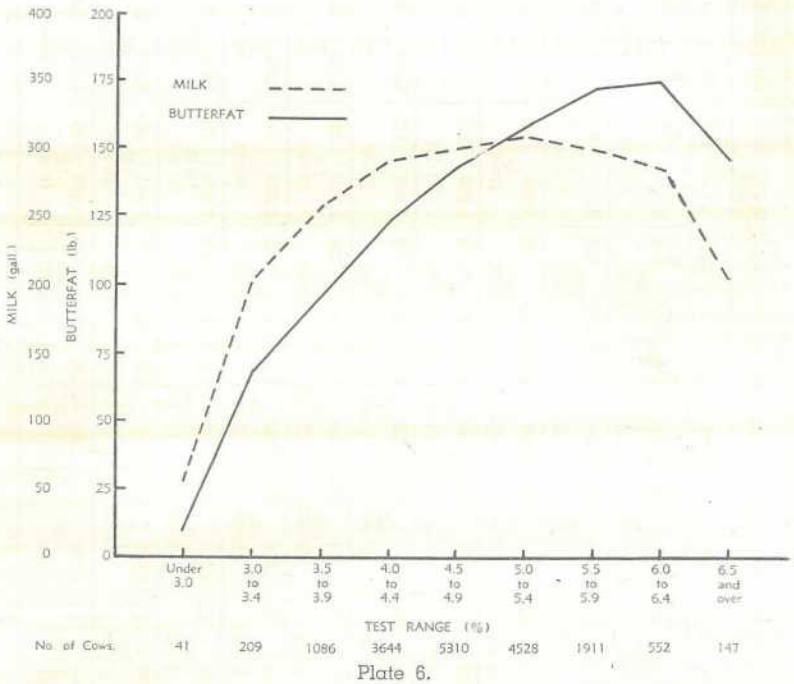


Plate 6.

Graph Showing the Relationship between Butterfat Test of Milk and Production.
The figures are for Jersey cows recorded in 1949-52.

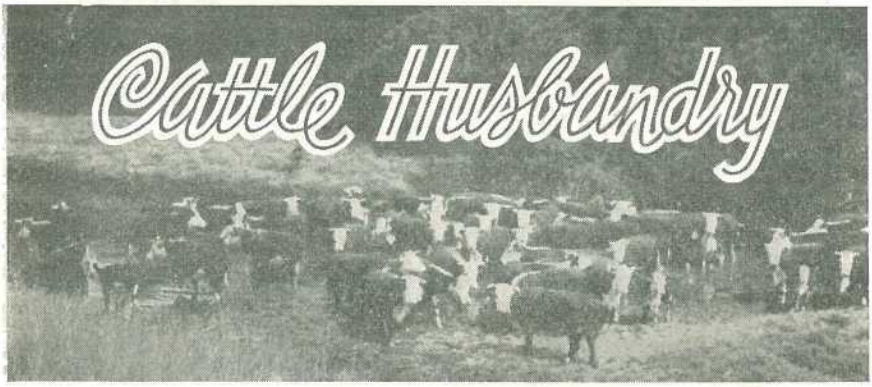
In the A.I.S. breed survey there are 12,537 lactations and it is noted that the greatest yield of butterfat (168 lb.) is in the 4·0–4·4% range, in which there are 3,712 cows (29·61%). The average production of the 70·39% of cows outside this test range was 142 lb. butterfat. Thus the cows in the 4·0–4·4% test range produced 18·3% more butterfat than cows outside this range. The highest yield of milk was from cows in the ranges 3·5–4·4%, with a production in each case of 403 gall.; 9,051 cows (72·2%) are in these ranges.

There are 17,428 lactations in the Jersey survey. It is shown that the Jersey cows in the over 5·5% ranges had the highest average production of butterfat (172 lb.); in this range there are 2,610 lactations (15·0%). This production is 22% higher than the average production of butterfat (141 lb.) from the 85% of cows below this test range. The greatest yield of milk (315 gall.) was in the 5·0–5·4% range, which comprised 4,528 lactations (26%).

It is felt that the information supplied by these surveys and discussed in this article can be of much assistance to the dairy-farmer who applies it to his herd improvement programme.

Pure-bred Dairy Cattle Production Recording.

In the list of records which appeared on page 115 of the February issue of the Journal, the butterfat production of Glengarriffe Dreamer's Coulisse for 305 days should have been 426 lb., and Glengarriffe Dreamer's Hawthorn should have appeared as a Senior 4-year-old.



A Crush Bail.

P. ROUND, Senior Adviser, Cattle Husbandry Branch.

A well constructed crush and bail reduces time and labour when cattle have to be secured for such operations as dehorning, bleeding, inoculation, castration, and branding.

The design illustrated here is a modification of many types of bail in use and can be recommended for its simplicity and effectiveness.

Two strong iron plates are required for the end of the lever and a half-inch bolt to go through the plates and the slot in the sword.

If desired, the structure can be made of bush timber and a single round post can be morticed for the lever.

Where only quiet cattle are to be handled, lighter materials than those specified can be used.

The plan and/or the gates can be reversed if desired to suit existing yards and conditions.

The two half-gates on the crush have advantages which will be obvious to the practical cattleman.

The lower half being sheeted prevents the animals' legs from slipping through the rails, and by opening the top half free access is gained to the animal when operations such as branding and inoculation are being carried out.

The gates may be swung from either the front or the rear of the last panel of the crush. It is suggested that they be swung from the front so that when a beast is released from the bail it has to back and turn about to get out of the crush. This prevents rushing, tends to quieten the beast, ensures that it does not pass close by the bail lever, and reduces risk of injury to men working the bail and the gate.

Hinged cleats can be fitted to the gates to connect them when it is desired to use them as one gate.

Where large numbers of cattle are to be handled, the race should be extended and a series of at least two forcing yards should be provided.

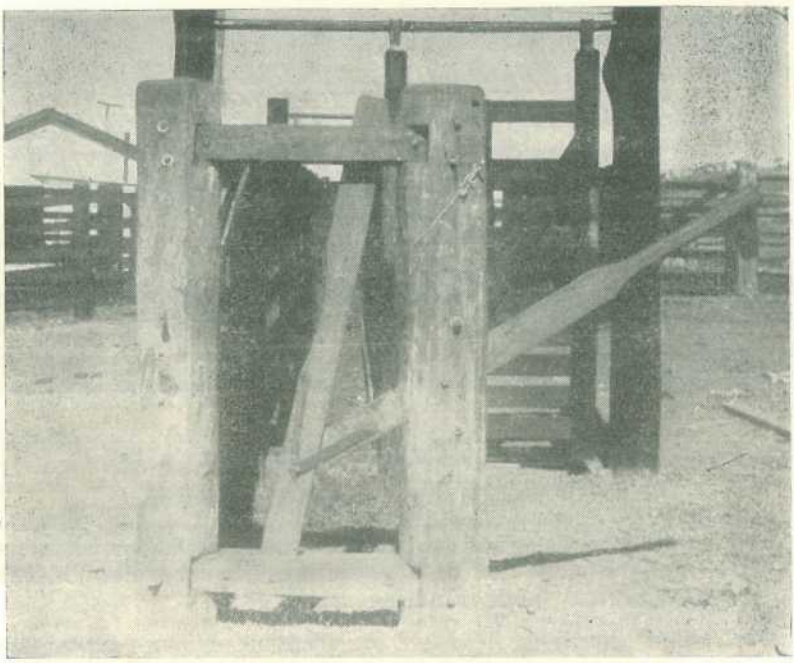


Plate 1.
Bail in Open Position.

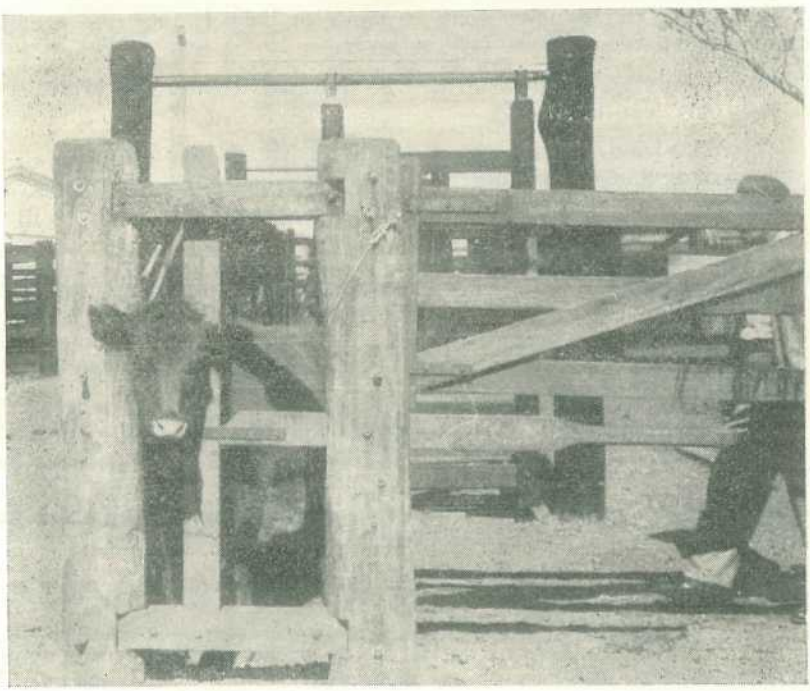


Plate 2.
Bail Closed.

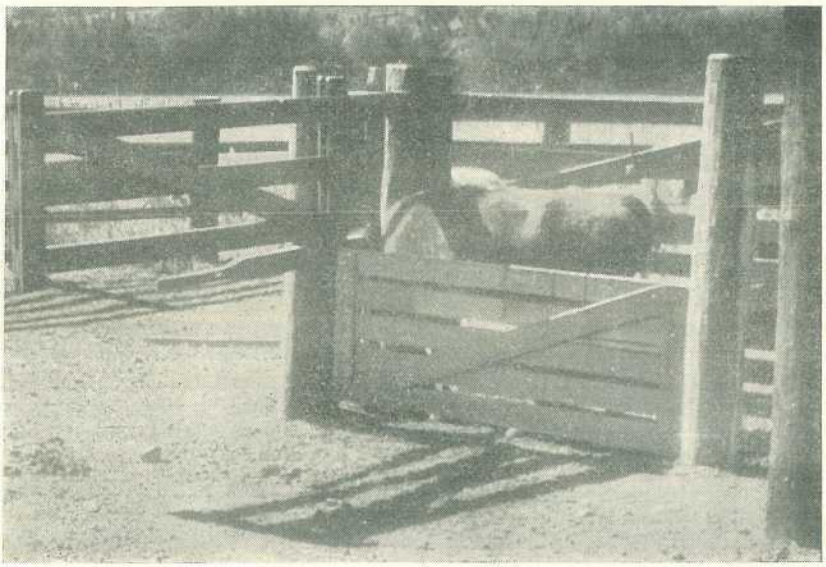


Plate 3.
View of Double Gate, with Top Portion Open.

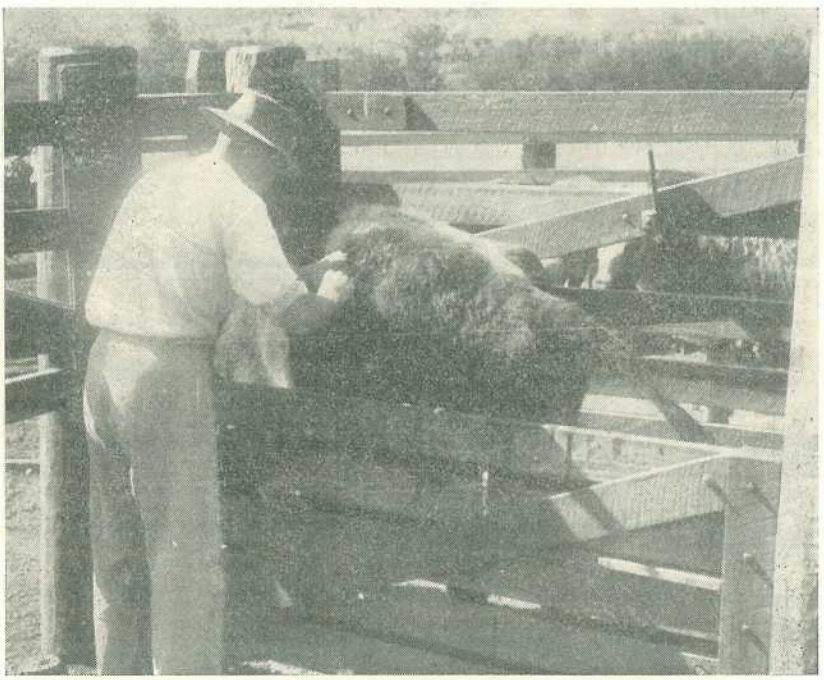


Plate 4.
Working with Cow in Double Gate.

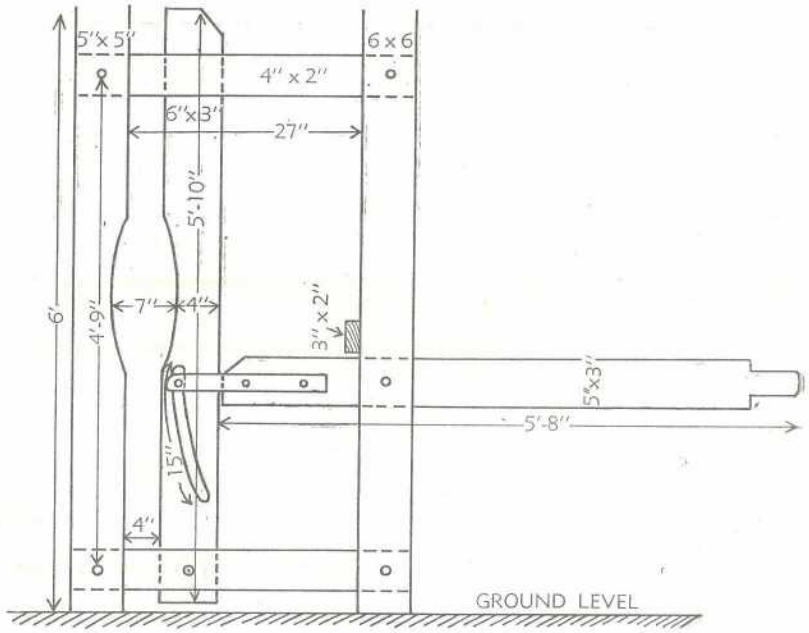


Plate 5.
Details of Lever Sword Bail.

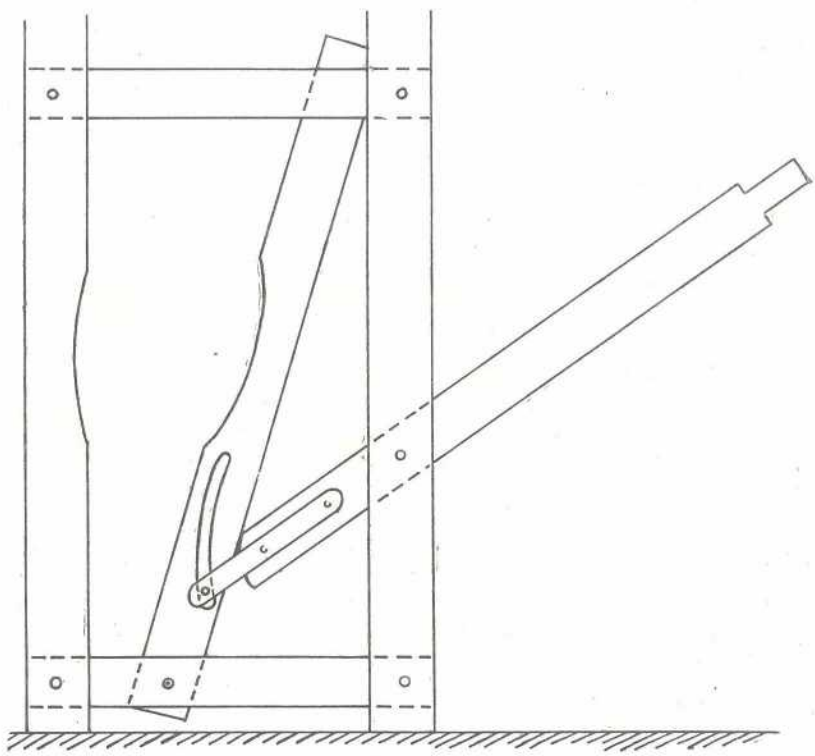


Plate 6.
Details of Bail in Open Position.

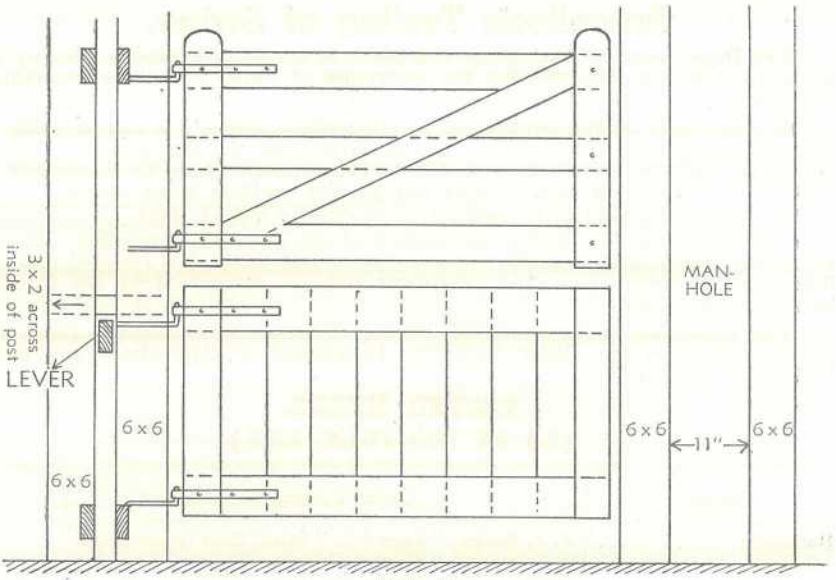


Plate 7.
Details of Double Gate, showing Bottom Gate Sheeted.

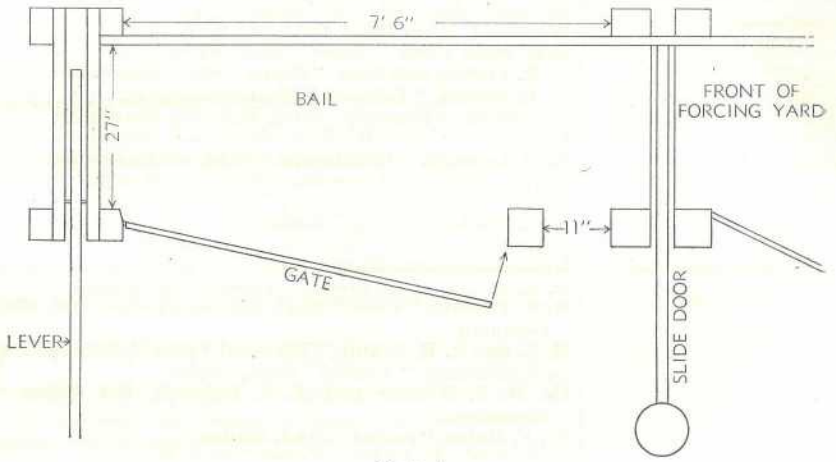


Plate 8.
Plan of Bail.

Brucellosis Testing of Swine.

The Department of Agriculture and Stock is operating a scheme whereby pig herds are tested at intervals for the occurrence of swine brucellosis (contagious abortion).

A herd listed by the Department as "brucellosis tested" is one in which all such animals as may be determined by the Director of the Department's Division of Animal Industry have been subjected to two successive tests for brucellosis, at intervals determined by him, without any positive reactors being found.

In order for a herd to be retained on the list of Tested Herds, a semi-annual or annual re-test of the herd, as determined by the Director, is required. If at a re-test any animal gives a positive reaction to the test the herd is removed from the list; it is not listed again until subsequent tests, as determined by the Director, have been carried out.

Full particulars of the Brucellosis Testing of Swine and application forms may be obtained from the Under Secretary, Department of Agriculture and Stock, William Street, Brisbane.

TESTED HERDS.
(AS AT 17th JULY, 1953.)

Breed.	Owner's Name and Address.
Berkshire	J. J. Bailey, " Lucydale " Stud, East Greenmount
	S. Cochrane, " Stanroy " Stud, Felton
	Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
	G. Handley, " Handleigh " Stud, Murphy's Creek
	J. L. Handley, " Meadow Vale " Stud, Lockyer
	R. G. Koplick, " Melan Terez " Stud, Rochedale
	O'Brien and Hickey, " Kildurham " Stud, Jandowae East
	E. Pukallus, " Plainby " Stud, Crow's Nest
	G. C. Traves, " Wynwood " Stud, Oakey
	E. Tumbridge, " Bidwell " Stud, Oakey
	Westbrook Farm Home for Boys, Westbrook
	H.M. State Farm, " Palen " Stud, Palen Creek
	A. R. Ludwig and Sons, " Cryna " Stud, Beaudesert
	H. H. Sellars, " Tabooba " Stud, Beaudesert
	F. Thomas, " Rosevale " Stud, M.S. 373, Beaudesert
	D. T. Law, " Rossvill " Stud, Trout road, Aspley
	R. H. Crawley, " Rockthorpe " Stud, *via* Pittsworth
	F. R. J. Cook, " Alstonvilla," Wolvi, *via* Gympie
	Mrs. I. M. James, " Kenmore " Stud, Cambooya
	H. L. Stark, " Florida," Kalbar
	J. H. N. Stoodley, " Stoodville," Ormiston
	H.M. State Farm, Numinbah
	V. G. M. and A. G. Brown, " Bardell," Goovigen
	R. E. Paulsen, " Crest " Stud, Binjour Plateau, M.S. 670, Gayndah
	M. G. and R. H. Atkins, " Diamond Valley " Stud, Mooloolah
	L. Puschmann, " Tayfeld " Stud, Taylor
	Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road Greenslopes
	W. F. Ruhle, " Felbar " Stud, Kalbar
	C. E. Edwards, " Spring Valley " Stud, Kingaroy
Large White	G. J. MacLennan, " Murcott " Stud, Willowvale
	H. J. Franke and Sons, " Delvue " Stud, Cawdor
	Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
	J. A. Heading, " Highfields," Murgon
	K. B. Jones, " Cefn " Stud, Pilton
	R. G. Koplick, " Melan Terez " Stud, Rochedale
	R. Postle, " Yarralla " Stud, Pittsworth
	E. J. Bell, " Dorne " Stud, Chinchilla
	L. C. Lobegeiger, " Bremer Valley " Stud, Moorang, *via* Rosewood
	H. R. Gibson, " Thistleton " Stud, Maleny

TESTED HERDS—continued.

Breed.	Owner's Name and Address.
Large White	H.M. State Farm, Numinbah K. A. Hancock, " Laurestonvale " Stud, Murgon V. P. McGoldrick, " Fairymeadow " Stud, Cooroy N. Woltmann and Sons, Wooroolin R. S. Powell, " Kybong" Stud, Kybong. *via* Gympie E. B. Horne, " Kalringal," Wooroolin S. T. Fowler, " Kenstan " Stud, Pittsworth H. L. Larsen, " Oakway," Kingaroy C. Allison, "Colrene" Stud, Lake and Reserve roads, Slacks Creek E. G. Evans, " Lauraven" Stud, Box 22, Maleny Mrs. I. G. Utting, "White Lodge," Mountain Road, Cooroy N. E. Meyers, Halpine Plantation, Kallangur Dr. B. J. Butcher & A. J. Parnwell, 684 Logan road, Greenslopes. G. I. Skyring, " Bellwood " Stud, via Pomona
Tamworth	S. Kanowski, " Miecho " Stud, Pinelands N. R. Potter, " Actonvale " Stud, Wellcamp D. F. L. Skerman, " Waverley " Stud, Kaimkillenbun A. C. Fletcher, " Myola " Stud, Jimbour Salvation Army Home for Boys, " Canaan" Stud, Riverview F. Thomas, " Rosevale " Stud, M.S. 373, Beaudesert A. J. Surman, " Namrus " Stud, Noble road, Goodna Department of Agriculture and Stock, Regional Experiment Station, Kairi E. C. Phillips, " Sunny View," M.S. 90, Kingaroy T. A. Stephen, " Withcott," Helidon W. F. Kajewski, " Glenroy " Stud, Glencoe A. A. Herbst, Bahr Scrub, *via* Beenleigh R. G. Koplick, " Melan Terez " Stud, Rochedale H.M. State Farm, Numinbah D. B. Alexander, " Debreczen " Stud, Kinleymore, *via* Murgon Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes
Wessex Saddleback ..	W. S. Douglas, " Greylight " Stud, Goombungee D. Kay and P. Hunting, " Kazan " Stud, Goodna E. Sirett, " Iona Vale " Stud, Kuraby C. R. Smith, " Belton Park " Stud, Nara H. H. Sellars, " Tabooba " Stud, Beaudesert H. Thomas, " Eurara " Stud, Beaudesert D. T. Law, " Rossvill " Stud, Trouts road, Aspley J. B. Dunlop, " Kurrawyn " Stud, Acacia road, Kuraby A. Curd, " Kilrock " Stud, Box 35, Jandow ae C. Allison, " Colrene " Stud, Lake and Reserve roads, Slacks Creek R. A. Collings, " Rutholme " Stud, Waterford M. Nielsen, " Cressbrook " Stud, Goomburra

CHANGE OF ADDRESS.

Journal subscribers notifying change of address should state their full Christian names and surname as well as their full former and new addresses.

Address all communications to the Under Secretary, Department of Agriculture and Stock, Brisbane.

ASTRONOMICAL DATA FOR QUEENSLAND.

SEPTEMBER

Supplied by W. J. Newell, Hon. Secretary of the Astronomical Society of Queensland.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES.					
Day.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	6.03	5.33	Cairns	27	31	Longreach	34	36
6	5.58	5.36	Charleville ..	27	27	Quilpie	35	35
11	5.52	5.38	Cloncurry	48	53	Rockhampton ..	9	11
16	5.46	5.40	Cunnamulla ..	29	29	Roma	17	17
21	5.40	5.42	Dirranbandi ..	19	19	Townsville ..	22	27
26	5.35	5.45	Emerald	18	20	Winton	38	42
30	5.30	5.46	Hughenden ..	33	37	Warwick	4	4

TIMES OF MOONRISE AND MOONSET.

At Brisbane.		
Day.	Rise.	Set.
	a.m.	a.m.
1	12.40	11.03
2	1.39	Noon
		p.m.
3	2.30	12.58
4	3.16	1.57
5	3.56	2.54
6	4.31	3.49
7	5.02	4.42
8	5.32	5.34
9	6.00	6.25
10	6.28	7.17
11	6.57	8.10
12	7.28	9.03
13	8.03	9.59
14	8.42	10.56
15	9.26	11.52
16	10.17	..
		a.m.
17	11.14	12.48
	p.m.	
18	12.16	1.40
19	1.22	2.29
20	2.29	3.13
21	3.36	3.54
22	4.44	4.33
23	5.53	5.11
24	7.02	5.49
25	8.11	6.29
26	9.21	7.13
27	10.28	8.02
28	11.30	8.56
29	..	9.53
	a.m.	
30	12.25	10.52

MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).

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

MINUTES LATER THAN BRISBANE (CENTRAL DISTRICTS).

Day.	Emerald.		Longreach.		Rockhampton.		Winton.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	10	30	25	45	0	21	27	53
6	14	24	29	40	4	15	33	46
11	23	14	39	30	14	5	45	34
16	30	10	45	24	20	0	53	27
21	23	14	39	30	14	5	44	34
26	12	27	27	42	1	18	29	50
30	11	29	26	44	0	20	28	52

MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS).

Day.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	5	55	35	67	19	52	5	45
3	5	52	35	65	19	50	5	44
5	10	45	37	60	22	46	9	37
7	20	36	44	55	29	40	18	31
9	29	26	50	47	35	33	25	22
11	39	17	56	42	41	27	33	16
13	47	8	63	36	47	21	39	8
15	53	4	67	33	50	19	44	5
17	54	4	67	33	51	19	44	5
19	47	8	63	36	47	21	39	8
21	37	18	55	43	40	27	31	17
23	25	30	47	50	32	35	21	25
25	13	41	39	58	24	44	12	35
27	6	51	35	64	20	50	6	43
29	5	53	35	66	19	51	5	44
30	7	52	36	65	20	50	7	44

Phases of the Moon.—New Moon, September 8, 5.47 p.m.; First Quarter, September 16, 7.49 p.m.; Full Moon, September 23, 2.15 p.m.; Last Quarter, September 30, 7.51 a.m.

On September 23 at 6 p.m. the sun will cross the equator and will then rise at true east and set at true west. On the 9th and 23rd the moon will rise and set approximately at true east and true west respectively.

Mercury.—At the beginning of the month, not far from Regulus in the constellation of Leo, will rise 15 minutes before the sun. It will be in line with the sun on the 7th, after which it will pass into the evening sky, and by the end of the month, in the constellation of Virgo not far from Spica, will set 1 hour 15 minutes after sunset.

Venus.—In the constellation of Taurus at the beginning of the month, rising 2 hours 50 minutes before the sun. About 2.30 p.m., on the 5th, the moon will pass in front of Venus. About the 23rd it will not be far from Regulus, and by the end of the month, in the constellation of Leo, will rise 1 hour 21 minutes before the sun.

Mars.—At the beginning of the month, in the constellation of Leo, will rise 47 minutes before the sun. On the 13th it will be placed near Regulus, and by the end of the month, still in the constellation of Leo, will rise 1 hour 13 minutes before sunrise.

Jupiter.—In the constellation of Taurus, will rise between 1.30 a.m. and 3 a.m. at the beginning of the month and about midnight at the end of the month.

Saturn.—Now approaching the sun rapidly, will set between 8.30 p.m. and 10 p.m. at the beginning of September and between 6.30 p.m. and 8 p.m. at the end of the month.