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

Vol. LI. 1 FEBRUARY, 1939 Part 2

Event and Comment

The Future of the Far North.

GREAT possibilities for development in North Queensland are seen by Sir John Russell, Director of Rothamstead Agricultural Research Station, England, and he has expressed great faith in the future of this State generally. Sir John, who was one of the British delegates to the Science Congress at Canberra, toured the North recently, and, at the invitation of the Minister for Agriculture and Stock, Hon. Frank W. Bulcock, has reported on the impressions he formed in the course of his travels in tropical Queensland.

As Sir John Russell sees it, the main problems of the Far North are the proper exploitation of the rain forest, a survey of the suitability of coastal plains for culture, a search for suitable alternative crops to sugar-cane, and the possibilities of new industries.

He said in his report he was sure that there were great possibilities of development. North Australia, while tropical, differed in many respects from the tropics of India or of Africa, north of Rhodesia. In the latter places it was impossible for white men to settle and bring up families, but in North Queensland they could do so easily, and the children looked very well. They had not the pasty faces one saw in other hot countries. It was clearly possible for men of British and North European stock to run the country.

The adoption of a White Australia policy gave a special character to the Queensland tropics and raised a number of special problems. One could not transfer results obtained in other tropical countries direct to North Queensland. They would be valuable and suggestive for the experimental stage, but would only be misleading to farmers. The problem must be worked out on the spot.

The main problems which impressed Sir John Russell as urgent were:—

(1) The proper exploitation of the rain forest or scrub. This was undoubtedly a rich store of agricultural possibility, but it could easily be wasted. Close co-operation between the Lands Department, the Forestry Department, and the Agricultural Department would be needed to ensure its best utilisation. He had seen acres that had been cleared and abandoned and became a mass of lantana; others were showing distinct signs of soil erosion, which might easily become worse. Some control over clearing was, he thought, essential.

(2) A survey to show how much of the coastal plains would be suitable for seeding down to pasture land, and what parts of the adjacent hill country could be cleared of "scrub" for conversion into pasture, fruit, or horticulture, or other cultures.

(3) Continued search for improved varieties of sugar-cane, of maize and other local crops, also for suitable leguminous plants as fodder or green manure crops; fertilizer and management investigations regarding these crops.

(4) Investigation in pasture management, including destructive pests.

(5) Studies of crops not yet widely grown which might, however, become important as other changes occurred. There seemed, for example, possibilities of establishing a fruitgrowing industry as transport developed. Certain fibres, such as ramie, might also be grown, and special crops such as insecticidal plants.

The search for improved varieties of cane, maize, and other crops was already in hand on lines that appeared to be quite sound.

The question now arose: How were these problems best tackled? Sir John Russell's report continued.

In his view the ideal procedure, if it were possible, would be to establish an Institute of Tropical Agriculture in North Queensland on the lines of the Waite Institute, at Adelaide, and to take steps to obtain close co-operation between the two institutions. The independence thus obtained would enable the staff to get better results more quickly than in any other way.

The Tully scheme arose out of an observation by Mr. Brice Henry that his cattle preferred *Panicum muticum* to other grasses available. A group of well-chosen men, working at an experimental station and radiating their activities out over the whole tropical area, would, he felt sure, accomplish a great deal for the development of North Queensland.

Referring to the Tully scheme, Sir John said that the pastures that he had seen were excellent, and he had seen also some very nice cattle that could produce admirable beef.

The three problems, it seemed, were: How much land in the plains and under "scrub" could be converted into pasture, how long would the pasture last, and what steps could be taken to prevent or delay deterioration; and would supplies of suitable young cattle be available?

"There are great possibilities in the North," said Sir John in conclusion. "I have great faith in the future of Queensland, and have sent one of my sons to Gatton College with a view to his settling in the State. I shall always be interested in its progress."

Agricultural Organisation in Queensland.

UNLESS careful thought is given to the economics of Agriculture by a completely representatve and deliberative body with jurisdiction throughout the State, and charged with the duty of safe-guarding those aspects of agriculture which are continually in jeopardy, primary industry cannot prosper. That dictum was the keynote of the presidential address delivered by the Minister for Agriculture and Stock, Hon. Frank W. Bulcock, at the inaugural meeting of the re-constituted Council of Agriculture. The Minister went on to say that there is now a greater need than ever for one voice on the major problems of agriculture. No one unit could speak so effectively as the Council of Agriculture on behalf of the whole organised structure of the producing industries in Queensland. The future of agriculture, he believed, was in the economic sphere more particularly, although the cultural side had, too, its own peculiar problems. After all was said and done, the Department of Agriculture and Stock was eminently competent to look after the cultural side of primary industry, but in the economic field no one could deny the fact that there were certain tendencies to-day that would have to be watched with the utmost care and the Council of Agriculture would have to be prepared to submit economic difficultes as they arose to the minutest examination. At the present time, there are questions of quotas and restrictions, about which they had not to worry in former years. Therefore, it was more than ever necessary that the producers of Queensland should be able to speak with one authoritative voice on the matters which concerned so closely their material progress and prosperity. The Council of Agriculture under its old constitution had made a valuable contribution to the welfare of the land industries. As its president and as Minister he had been able to speak on behalf of organised agriculture, as well as on behalf of the Government, and he was in a position to say that the deliberations of the old council on real national problems had produced excellent results from the farmers' point of view. The job of members of the new council was no sinecure, for the closest study and understanding of the economics of modern agriculture were required of them. By its organisation on a commodity basis and by its co-operation with the Department of Agriculture and Stock, the position of agriculture in the State would be greatly strengthened by the activities of the council. In his Department were several young men trained in the economics of marketing and the combined knowledge of the two bodies, and its application to the problems of the day must result in many substantial benefits to the producers of Queensland.

The Culture of the Grape Vine in Queensland.

F. L. JARDINE, Department of Agriculture and Stock, Stanthorpe.

IN the course of the last thirty-five years, many instructive articles relating to vine growing have been prepared by officers of the Department of Agriculture and Stock in this State, and their helpful writings dealing with all branches of viticulture, as well as their personal advice in the field to growers, has aided, to a considerable extent, in establishing this branch of primary production in Queensland.

In preparing this article, the chief objective has been to place the latest information on the subject before growers in order that they may be kept up-to-date and in line with present-day methods and ideas. By design, no attempt has been made to enter upon a very lengthy description of the various subjects dealt with, but rather has the writer endeavoured to describe briefly and lucidly the more important problems to be faced in vine growing. For older and more experienced growers, there should be something of interest in this article, whilst it is hoped that a perusal of its contents will assist the less experienced to avoid some of the pitfalls awaiting the amateur, or those about to embark upon the industry for the first time.

EARLY HISTORY OF THE GRAPE VINE.

The cultivation of the grape vine dates back to the earliest ages; fossilized grape vines, leaves and seeds, and the remains of ancient wine presses unearthed at various times disclose the antiquity of viticulture. It is claimed that winemaking was an art known to the Egyptians 5,000 to 6,000 years ago, and there is evidence of the early cultivation of the grape vine in Persia, Syria, and other Asiatic countries. The Greeks and Romans gave special attention to viticulture, even regarding the culture of the vine and its produce as being of national importance. Eventually, the vine found its way to central and western Europe.

In France, Spain, Portugal, Italy, and the southern parts of Germany, it has been, and still is, a source of great wealth and in some districts its cultivation probably exceeds that of all other primary products.

In the course of time, the vine has found its way to every country where the climate is sufficiently conducive to its cultivation. In the northern hemisphere it is grown with profit within the parallels 25 to 45 degrees, while south of the equator it is cultivated between 20 to 40 degrees.

The vine can grow to a great age and attain surprising dimensions under favourable conditions. Early writers quote vines of enormous size whose trunks were as large as a man's body; some of the vines on the Barbary Coast possessed trunks eight or nine feet in circumference, while the great doors of the Cathedral of Ravenna were made of vine-tree planks. The famous English vine growing under glass at Hampton Court Palace, is a splendid specimen of the Black Hamburg variety. It is approximately 170 years of age and continues to bear an astonishing quantity of fruit annually, its record crop being over 2,000 bunches.

The vines just alluded to are mainly of historic interest; nevertheless, they show that, with skilful treatment, the grape vine, when grown in a climate and soil congenial to its development, can attain a great age and remain highly productive.

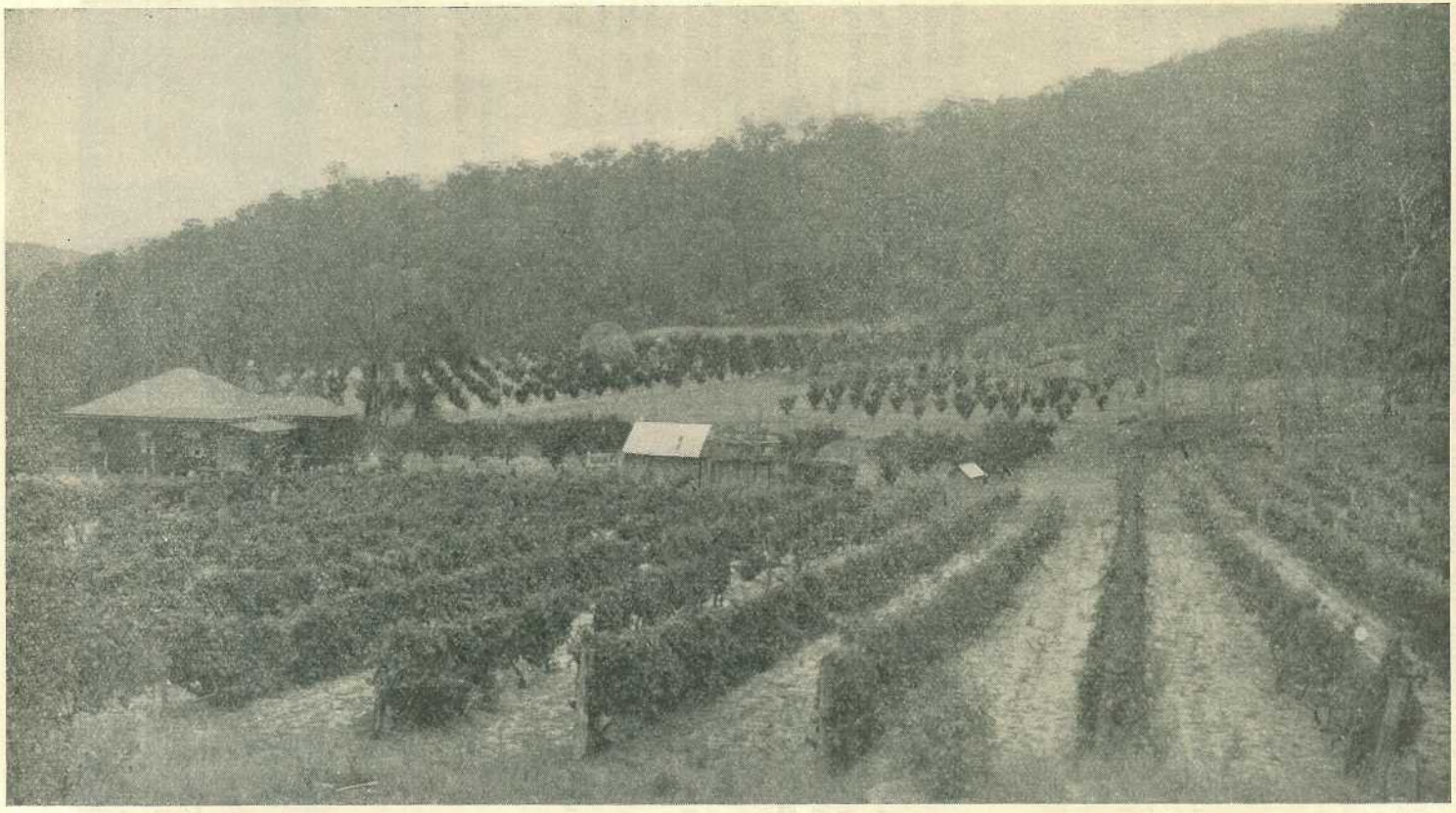

Plate 55.
A Stanthorpe orchard amongst the hills, showing vineyard in the foreground.

In Queensland, the behaviour of the average vine in the vineyard is the most important consideration, the essential point being that vineyards should be established only in those parts where the vines will thrive and become profitable. The great extent of the State, possessing as it does a wide range in temperature and rainfall, makes it imperative that anyone desiring to engage in viticulture for a livelihood seek only those areas that offer natural advantages in both temperature and rainfall or in irrigation facilities.

Although the grape vine has been cultivated in Queensland for a considerable time, the greatest progress has been made in the industry during the past twenty years. (Plates 55 and 56.) During that time, many of the established holdings have extended their acreage, whilst an influx of new growers has brought the present area under vines to quite considerable proportions. There is much good land available in partially exploited and in unexploited districts, suitable for grape-growing, that will, no doubt, be planted in the future.

GRAPE VINE SPECIES AND VARIETIES.

The grape vine belongs to the family *Vitaceæ* and to the genus *Vitis*. All the European varieties of grapes, of which there are a great many, belong to the one species, *vinifera*, and are botanically termed *Vitis vinifera*. In addition to the vinifera varieties, there are the American vines, of which there are various species, each species embracing a number of varieties.

European vines are the more important and are more universally grown than the American vines. The former include a great number of varieties suitable for every purpose, whether it be for a high-class dessert fruit, winemaking, raisin production, or for carriage over long distances, either by land or by sea.

The European varieties succeed best in the dry, inland areas, on the tablelands, and in the more temperate parts of this State. They do not as a rule flourish in the coastal and more humid areas, where they are usually attacked to such an extent by the fungous diseases peculiar to the vine as to render them unprofitable.

American vines and their fruit differ from the European varieties in many respects, apart from being less susceptible to disease. The former are readily recognised by their vigorous growth, the canes being

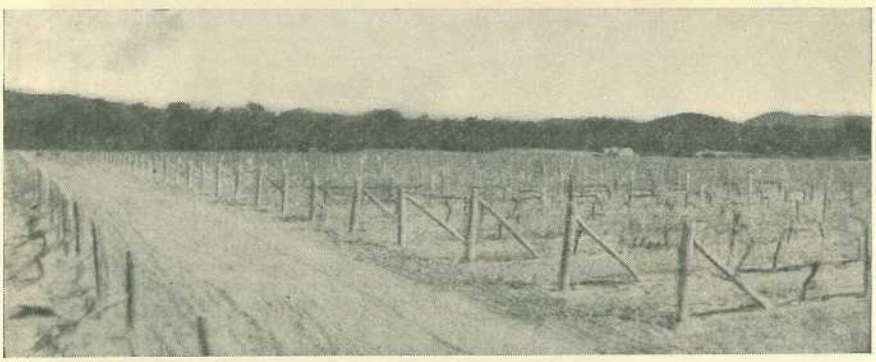

Plate 56.
Vineyard in winter garb.

more slender and the nodes further apart than in most European varieties; furthermore, their leaves are usually downy or felted on the under-surface, and not so deeply lobed, while the serrations or teeth are less pronounced. The fruit itself is distinct, the flesh being of a gelatinous nature, from which the skins are easily separated, while a characteristic "foxy" flavour is particularly noticeable in some varieties.

It is not intended to describe each of the species of American vines, a number of which serve no useful purpose, nor to discuss their varieties, hybrids and seedlings.

Some of the varieties of the different American species are cultivated for winemaking and for the table, and are thus direct producers of fruit; the fruit is generally considered inferior to that of the European varieties, and the wine produced from them is not of good quality. Nevertheless, they will thrive in parts of this State where the climate is unfavourable to the cultivation of the European vines.

Many American vines are phylloxera resistant, some more so than others, in that they are able to withstand the attack of the phylloxera aphid, though their fruit is rarely of commercial value. They do, however, serve a very useful purpose in providing a rooting system upon which to grow European vines, which would succumb, if grown on their own roots, in areas subject to phylloxera.

COMMERCIAL VARIETIES OF THE GRAPE VINE.

European and American grapes together embrace a great range of varieties. The climate of this State is unsuitable to many of them, whilst a great number are of little commercial value; consequently, only a limited number are recommended for planting.

Growers are advised to cultivate only those that thrive best in their district, that crop well, and have a good market value, and to avoid planting unknown varieties, except, perhaps, a few vines for trial purposes.

The following list of European varieties in order of preference is submitted for general guidance for planting in this State:—

Coast South from Rockhampton.

Early.	Mid Season.	Late.
Madelleine Royal	Muscat Hamburg	Servant
Ferdinand de Lesseps	Black Hamburg	
Chaouch	Royal Ascot	
	Cinsaut	

North of Rockhampton.

Madeleine Royal	Muscat Hamburg	
Ferdinand de Lesseps	Black Hamburg	
Chaouch	Royal Ascot	

Stanthorpe and Western Highlands.

Chaouch	Muscat Hamburg	Waltham Cross
Canon Hall Muscat	Gros Colman	Purple Cornichon
Golden Chasselas	Red Malaga	Red Hannepot
White Wax	Cinsaut	Servant
	Royal Ascot	Flame Tokay
	Black Hamburg	Belas Blanco
	Black Prince	Dorodilla
		Gordo Blanco
		Black Malaga
		White Ladies Finger
		Red Ladies Finger
		Centennial
		Gros Guillaume
		Henab Turki

STRUCTURE OF THE GRAPE VINE.

The roots, trunks, arms, canes, leaves, flowers, and fruit together form the complete grape vine; each part has its own particular function to perform, and so closely are they allied that, unless they act in complete harmony with one another, one or more of the individual parts, if not the complete vine itself, must eventually suffer. An injury to one part of the plant can produce a serious effect upon another. For instance, should the rooting system become impaired by accident or some other cause, the growth of the canes will be greatly retarded. A premature leaf fall can have an adverse effect on the ripening of the fruit; too drastic use of the saw or secateurs at pruning time often results in an over-vigorous growth of canes at the expense of fruit, while an unnecessarily light pruning can produce weak growth, supporting an over-abundance of inferior fruit. Vines that have reached the full-bearing stage have definite duties to perform during their growing period, i.e., from the time the sap commences to rise in the spring until they become defoliated in the winter. From the time of bud burst in the spring, growth proceeds rapidly until the fruit is approaching its full size, although still green. At this stage vegetative growth practically ceases and the vine, drawing on the nutriments it has already stored up, nourishes and brings to full maturity the fruit it is bearing. From then on until leaf fall the duty of the vine is to impart the necessary reserve food it still possesses to the canes and buds until they are sufficiently mature to enable normal growth to commence again the following spring. Having completed its summer cycle, the vine sheds its leaves and remains in a dormant state until warm weather again causes the sap to rise.

The roots of the vine are of three kinds, namely, the primary or main roots which produce secondary or lateral roots, which in their turn develop tertiary roots. The growing tips of the roots are furnished with root hairs which, as the name suggests, are very fine and are of the utmost importance to the vines, because it is through them that the plant foods in solution in the soil are absorbed. The root system also serves as a foundation that supports the aerial parts of the vine against storms and wind.

The annual cane growth of the vine consists of fruit-bearing canes and water shoots. The reader will find in Plate 57, figure A, an illustration showing a length of cane with leaf stalks, buds, and tendrils. Figure B, of the same plate, shows the cane bisected to disclose the internal structure and shows the large amount of pith, constituting the core, also the formation of the nodes.

Fruit-bearing canes arise from the buds of the previous year's growth, and on them the vine produces its annual crop of fruit. Water shoots arise from the dormant buds on the older portions of the vine, and may appear on any portion above ground level. They bear little or no fruit until the second year, and this is a point that should be borne in mind when pruning. When the balance between roots and the aerial portion of the vine is upset, as may happen following too severe pruning or the death through injury of a portion of the plant, these water shoots are apt to appear. Such shoots may then be of use in providing an outlet for excessive vigour, and may, therefore, often be regarded as an indication of a healthy condition of the vine. They serve other useful purposes as, for instance, when appearing about ground level or from the trunk, they can often be utilised to reform injured or unprofitable vines. Should they arise at convenient places along the main arms they may be kept to replace overgrown or worn out spurs. If not

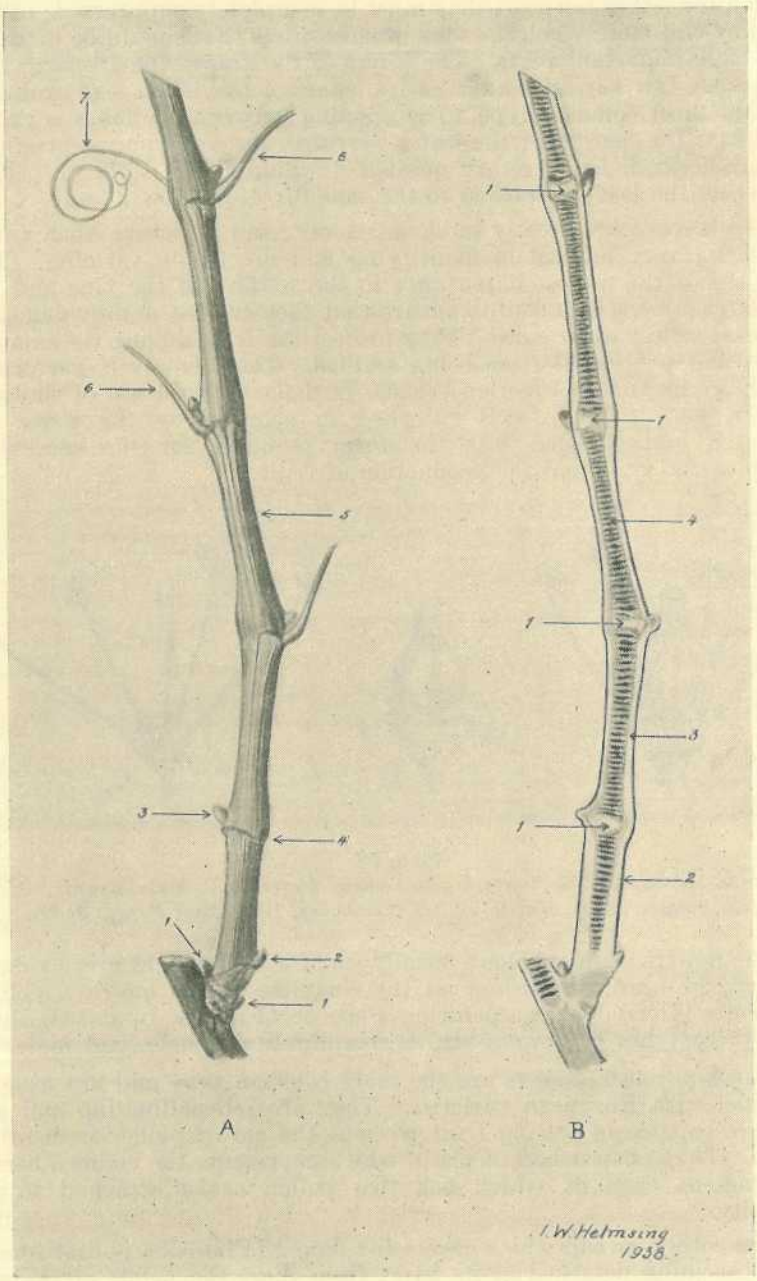

Plate 57.

A—1. Base bud.
2. First bud.
3. Second bud.
4. Node.
5. Internode.
6. Petiole or leaf stalk.
7. Tendril.

B—1. Hard woody divisions separating internodes.
2. Bark.
3. Wood.
4. Pith.

required for either purpose, they must be completely suppressed; otherwise they will merely rob the vine of substances that should be directed to the more important parts. The leaves of the grape vine are large and lobed; very few varieties have entire leaves, a five-lobed leaf probably being the most common type. The opening between the lobes is called the sinus. The margin of the leaf is serrated, the serrations, or teeth as they are termed, being either pointed or blunt. The stalk or petiole supporting the leaf is attached to the cane directly below a bud.

The leaves vary greatly in shape, colour, and structure, such variations being very helpful in identifying and describing varieties. The leaves are of the utmost importance to the welfare of the vine and the greatest care must be taken to ensure that they are not unduly damaged by disease or any other cause. They protect the fruit during the summer months and prevent it from being scalded. They, however, perform a much more important function because in them, with the aid of sunlight and air, certain plantfoods absorbed in solution by the roots are elaborated and changed into the form required for the successful growth of the vines and the production of fruit.

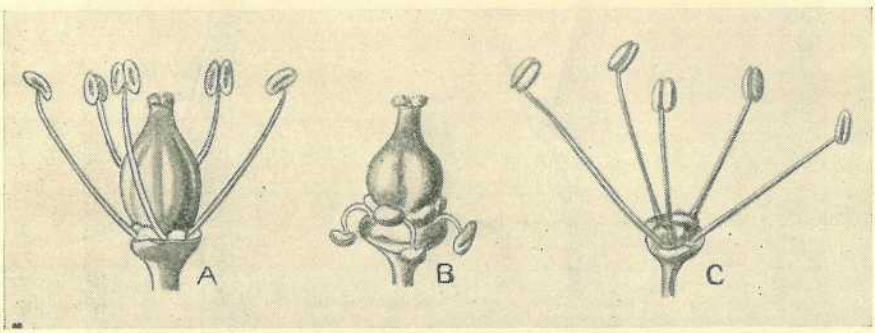

Plate 58.
A. Hermaphrodite flower. B. Female flower. C. Male flower.
(*After Babo u. Mach, Handbuch des Weinbaues*, 1923, *Paul Parey, Berlin.*)

The flowers of the vine are usually small and of a light green colour. They are grouped in clusters on the complete flower bunch which is botanically referred to as a panicle. Plate 58 (Figs. A, B, and C) illustrates three types of flowers viz., hermaphrodite, female, and male.

Hermaphrodite flowers are the more common type and are usually associated with European varieties. They are self-pollinating and are therefore capable of setting fruit without the aid of pollen from other flowers. They possess both a pistil, which represents the embryo berry, and stamens each of which has two pollen sacks attached to its extremity.

The corolla or cap which covers the flower (Plate 59) is first forced off by becoming detached at its base; from there the petals of the cap gradually curl upwards until it is finally shed. The stamens then spread themselves and later, when the sacs split open, pollen is released about the neck or opening of the pistil; from there it finds its way to the ovules, which eventually develop into the seeds of the fruit. Male flowers have no pistil, hence they are unable to set fruit. Female flowers actually have stamens but they are bent downwards, consequently the pollen is not released about the opening of the pistil. These flowers

are nevertheless capable of producing fruit provided they are pollinated either by themselves or from adjacent flowers. Male and female flowers are more common amongst American vines.

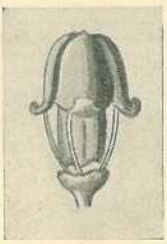

Plate 59.

Opening bud. (*After Babo u. Mach, Handbuch des Weinbaues*, 1923, *Paul Parey, Berlin.*)

Tendrils and bunches are closely related to each other; indeed tendrils may be regarded as inflorescences which have failed to develop into bunches of fruit. They occasionally have odd berries or a bunch of fruit attached to them; their chief object, however, is to support the annual growth by affixing themselves to adjacent objects.

Tendrils, like bunches, occur on the canes at the nodes and opposite the buds. They arise further along and towards the ends of the canes, while the bunches appear nearer the base.

CLIMATIC REQUIREMENTS.

Climate is the most important factor governing the successful culture of the vine; being a deciduous plant it requires a climate the winter of which is sufficiently long and severe to ensure a period of complete rest in a dormant state.

The grape vine is capable of withstanding many degrees of cold when it is completely defoliated; though intense cold, such as is experienced in Northern Europe, can kill vines outright. The summer should be warm and comparatively dry in order to ensure a perfect ripening of the fruit, but excessive heat may cause severe scorching of fruit and foliage, especially in those varieties whose fruit is subject to sunscald.

Vines growing in districts with a liberal summer rainfall usually suffer from diseases and the fruit is often lacking in sugar and colour.

In Queensland the grape vine can be successfully grown in many districts. The southern portion of the State is generally considered the most suitable, especially inland from the coast on the Darling Downs and on the highlands further west. The area surrounding Stanthorpe known as the Granite Belt produces a wide range of varieties, including many choice table grapes. This area is recognised as the chief grape producing centre of this State. The Roma district also grows excellent table and wine varieties. Parts of Western Queensland are capable of producing high quality berries, though in some of the dry areas irrigation is necessary. The climate of the West is favourable to the development of a high sugar content in the fruit which is highly desirable for the production of raisins. The higher altitudes of Northern Queensland grow a limited number of varieties, while some parts of Central Queensland, extending west from Rockhampton, produce some excellent grapes of the Muscat type.

The coastal districts, possessing a relatively high humidity during the summer months, are favourable to the development of diseases, while the mildness of the winter interferes with the dormancy of the vines. However, bordering the extreme southern coastline, particularly in the areas close to Brisbane, grapes are grown to some extent successfully. A limited number of varieties are cultivated, chiefly the hardier American vines, though a few of the European varieties are proving satisfactory.

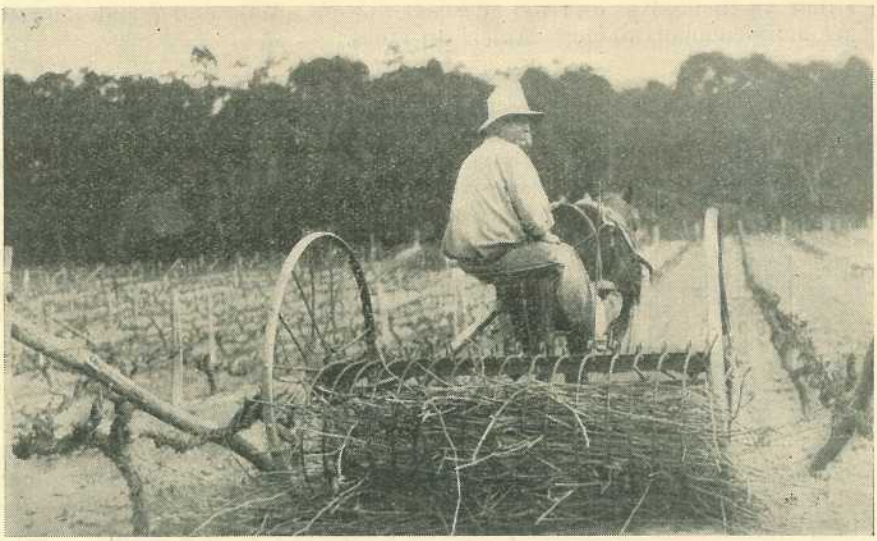

Plate 60.
An economical method of collecting prunings.

SOIL REQUIREMENTS.

The vine is a very accommodating plant, and will adapt itself to a great variety of soils. A most important feature, however, and one which is essential to the welfare of the plant is that of drainage. Grape vines will not tolerate wet situations or land that has an underlying hard pan of impervious clay holding water about the roots. Soils of this nature should be avoided at all costs, otherwise failure is almost inevitable.

Soils of a granitic nature are particularly suitable and generally speaking good, deep, loose, light to medium soils are preferable to the heavier loams. The last mentioned, in areas with a liberal rainfall, are apt to produce over-vigorous vines with little fruit; the dense foliage on such vines is very susceptible to disease and the fruit is soft and lacking in colour and sugar.

In this State, especially in the inland districts, a deep soil permits the roots of the vine to go well down to the levels containing moisture and this is of great importance to them during rainless periods. Shallow soils on the other hand require to be kept thoroughly cultivated in order to conserve soil moisture, whilst the crops should be regulated in order that the vines will not be overburdened with small fruit. Shallow soils often have the advantage of hastening the maturity of the fruit, and by thus enabling the crop to be placed on the early market enhances its value.

LOCATION OF THE VINEYARD.

The site of the vineyard is another important consideration, though it is not possible to fix any hard and fast rule that will ensure the selection of the ideal site in any part of the State. However, there

are certain primary features that will serve as a guide and which must be considered when deciding upon a site for the vineyard.

The importance of well-drained land has already been mentioned as also the fact that wet and swampy situations must be avoided. Consideration must also be given to the avoidance of areas usually subject to severe hail, or late frosts, and which are exposed to strong winds.

In the cooler parts of Queensland a warm situation is necessary in order to ensure that the fruit will reach perfect maturity. A situation in such parts with a northerly, north-easterly or north-westerly slope will receive the maximum of the sun's rays. Gentle hillside slopes of this type are ideal. Where late spring frosts and high winds are to be feared timber shelters, protecting the vines from the rising sun, will help to minimise frost injury and will also serve as windbreaks.

In the warmer areas a cooler aspect is often preferable, *e.g.*, south, south-east or south-west.

The direction in which to trellis the vines is another matter for consideration, but usually the general lie of the land and the most economical method of establishing and working the vineyard decides this point. However, where the summer temperature is high, grapes are less exposed to sunburn where the rows run from east to west.

SOIL PREPARATION.

The preparation of the soil prior to planting must be thorough. In virgin soil the land must first be carefully cleared of standing timber, brush and stumps, and all roots run and brought to the surface. When these have been burnt off, stump holes should be filled in and the land levelled off when it is ready to receive the first ploughing. This having been completed, one or possibly two harrowings will be necessary when all stray roots and other debris can be gathered into heaps and burned.

A cross ploughing can now be given, the depth being regulated so that none of the subsoil is brought to the surface, after which the land should be worked down to a fine tilth by cultivation.

It is advisable to allow the land to lie fallow for some weeks before a final ploughing. This ploughing should be very thorough and at this stage subsoiling is recommended.

The method of subsoiling is as follows:—A mould-board or disc plough of the single furrow type is followed directly in the same furrow with a subsoil plough, the latter breaking up the subsoil as deeply as possible, care being taken that none of it is brought to the surface of the land. The extra expense and labour incurred in subsoiling is more than compensated for by the benefit derived by the vines. Subsoiling tends to promote a more deeply rooted plant which is better equipped to withstand the extra strain imposed upon it in dry periods, and in consequence it has a direct influence in prolonging the life of the vine. The land at this stage can be pegged out in readiness for planting.

PLANTING.

The vineyard may be established by either of two methods, namely, by planting cuttings directly into their permanent places, or by planting rooted cuttings.

The first method would appear the more simple and providing the land has been recently cleared and well-prepared it is quite satisfactory. However, if the land has previously been under crops or if grass and weeds have been allowed to seed on it, it can prove to be not only an expensive but an arduous task to keep weed growth constantly suppressed in order that the cuttings may thrive. In this class of land rooted cuttings are recommended for planting.

When planting cuttings into land that is well supplied with moisture the quickest and most simple method is with the aid of a bar. The bar is sunk to a depth sufficient to take the cutting which is then placed in the hole, with one bud about ground level and one above the ground. The bar is again inserted into the ground an inch or two from the cutting, this time at an angle, and the soil is then forced towards the cutting in such a manner as to seal it completely from the base up. The second hole made by the bar can be filled in by tramping. When planting in land that is inclined to be dry it is advisable to water the cuttings in. The cutting is placed in the hole made by the bar; the hole is then filled with water and allowed to remain until the water has soaked away. The hole can then be firmly closed by hand.

In planting cuttings it is a common practice to set two cuttings at each peg. Should both strike, one is removed and may be used to replace misses and weaklings.

If rooted cuttings are to be used for planting they should be lifted carefully from the nursery so that their roots are not damaged unnecessarily. Being extremely tender the young vines should not be exposed to the sun, but kept covered with a damp sack and planted as soon as possible. The roots should be carefully examined and any broken and damaged pieces neatly trimmed, while long roots should be shortened back and any arising about ground level completely removed.

The pruning at transplanting consists of selecting the strongest and most upright growing cane and shortening this back to two buds. The rest of the canes are cut completely away.

The young vine is planted at about the same depth as that at which it was growing in the nursery. The roots should be evenly spaced and when filling in the hole the soil must be well tramped about them. Should the land be dry water can be placed in the bottom of the hole before planting, or better still, added when the hole has been about two-thirds refilled with soil.

The distance apart at which the vines may be planted depends upon the class of soil, and the rainfall. In the dry inland areas European vines grown on the trellis system can be planted at from 5 to 8 feet apart, and usually 10 feet between the rows, whilst if grown as bush vines they should be planted on the square 6 to 8 feet apart. Where there is a good rainfall and the soil is heavier the vines can be planted more closely.

American vines are always grown on a trellis. Being stronger growers than European vines they require to be planted 10 feet to 12 feet apart in the rows.

TRELLISING.

The trellis should be well constructed with posts of durable hardwood split from matured trees; plain galvanised fencing wire will last longer than ordinary black iron wire, especially in the coastal districts where the corrosive action of the air is greater than in the inland areas.

The ordinary post and wire fence is the method usually adopted in this State for trellising vines; the wires can be either run through the posts or attached to them by a light gauge galvanised wire. The use of staples for attaching the wires to the posts is not recommended; it may appear the easiest method in the first instance, but it often entails endless attention in later years by renewing staples that become detached.

The straining posts at the end of the rows should be at least 8 inches in diameter and 2 feet 6 inches to 3 feet in the ground, leaving 4 feet above the ground; 5 x 4 ordinary trellis posts are used well rammed into the ground to a depth of 18 inches to 2 feet, and may be set approximately 18 feet apart. The straining posts must be stayed to keep them upright. The stays can be set into the ground by either backing them with heavy stones or by butting them hard up against the first trellis post 8 inches to 1 foot below the surface of the soil; the uppermost end of the stay is let into the straining post midway between the second and top wires.

The first wire is set at a height of 20 to 22 inches from the ground, and should pass through the end post to connect with a wire strainer by means of which the bottom wire may be tightened when necessary. (Plate 61.)

Plate 61.
An up-to-date three-wire trellis; note strainer on first wire.

The second wire is 12 inches from the bottom one and the top wire 12 inches from the second; as the middle and top two wires merely support the annual cane growth of the vines there is no need to attach them to strainers. The bottom wire, however, bears the weight of the vines and the fruit, consequently it is necessary to keep it taut in order to prevent sagging.

REPLACING MISSING VINES.

The propagation of grape vines by layering is an operation usually adopted to fill up vacant spaces in the vineyard. (Plate 62.) After the second year from planting the replacing of missing vines becomes increasingly difficult and uncertain. Those replacements made with cuttings that do survive are usually dwarfed and unprofitable. It is possible, however, to successfully replace missing vines at any age by layering.

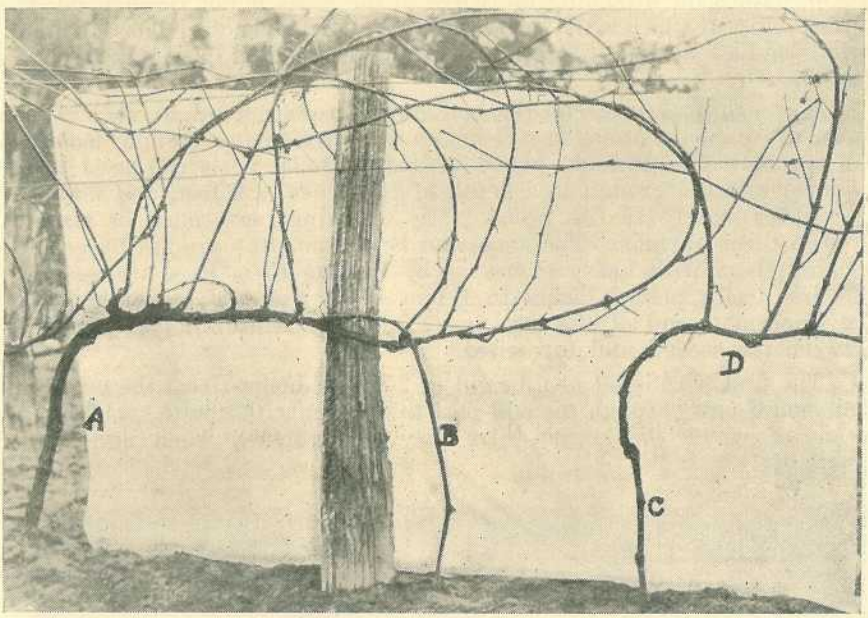

Plate 62.
Method of replacing missing vines by layering.

Layering is a simple operation, and may be carried out as shown in Plate 62. A strong cane (B) of the previous year's growth is selected from a neighbouring vine (A) and, without severing, it is bent down and buried where the new plant is to grow, in a trench 8 to 15 inches deep, according to the class of land. The extremity of the vine (C) is allowed to protrude above the surface with a sharp bend, leaving two buds out of the ground. The following summer the portion in the ground makes roots, and also is nourished by the mother vine. The end (C) puts forth growth and makes the new vine (D). The only care necessary to these layers during the growing season is to remove all growth from the cane (B) between the mother plant and where it enters the ground, leaving only that growing from the extremity of C for the new vine (D).

After the second season B is severed at ground level and the new vine may be permitted to carry a reasonable crop.

It is advisable to attend to this matter while the vines are dormant. Misses in a vineyard, apart from the unsightly appearance, are most unprofitable.

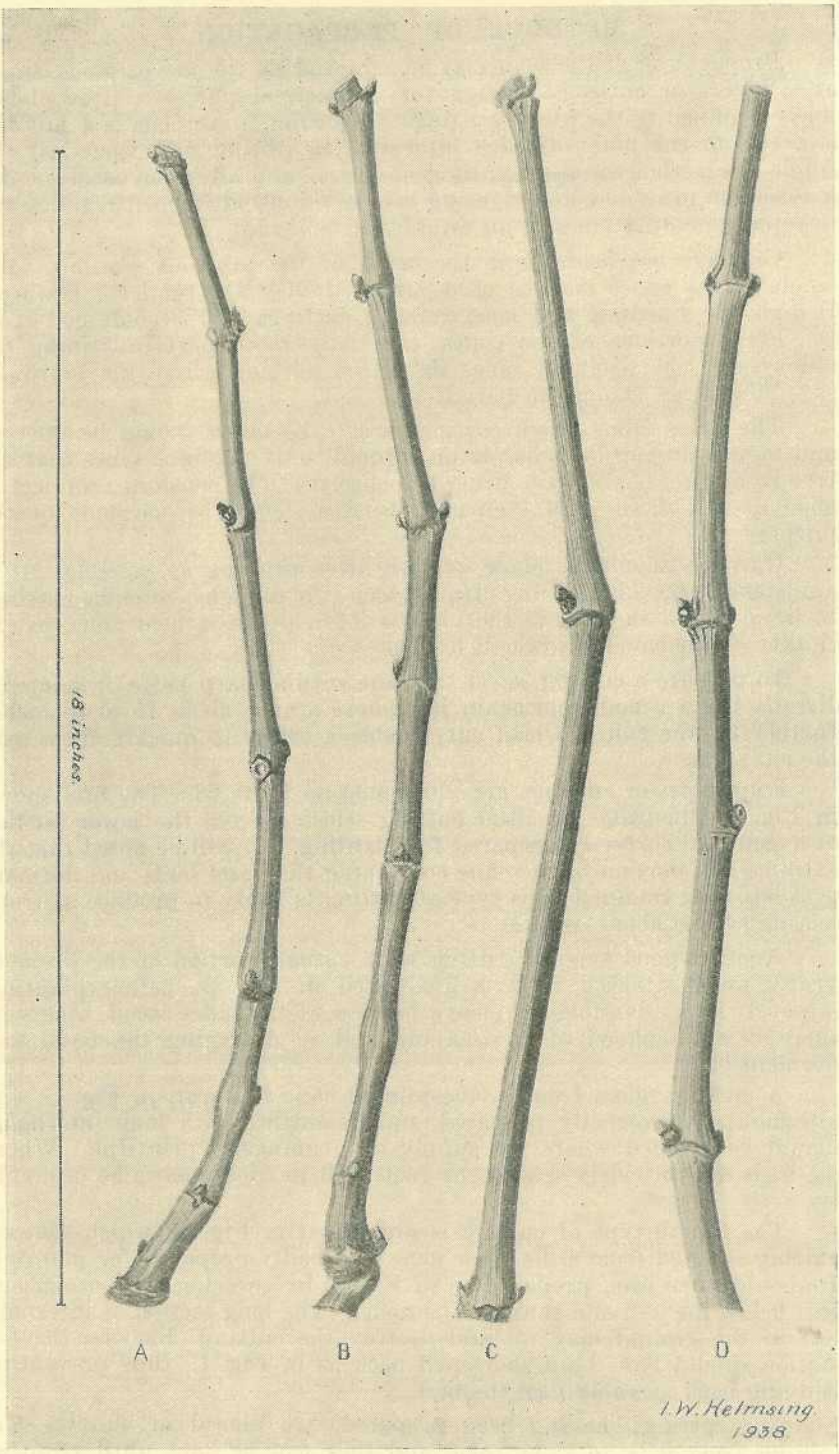

Plate 63.
A and B. Two good types of cuttings.
C. Long-jointed cutting, undesirable.
D. Badly prepared cutting.

METHODS OF PROPAGATION.

Propagation of the vine may be achieved by the use of seeds, single eyes, layers or cuttings, though for commercial purposes it is almost solely confined to the use of cuttings. Growing from seeds is a practice best left to the plant breeder interested in raising new varieties; the single eye method entails a great deal of care and attention consequently it is seldom practised, and layering is only employed when it is necessary to replace missing vines in an established vineyard.

Cuttings are made from the canes of the previous season. The whole of the canes may be used provided they are properly matured, though the sturdiest and most reliable cuttings will be obtained from the lower portions of the canes, especially those parts adjoining the old wood. Short-jointed canes should be selected where the source of supply is large enough to permit it.

The vines from which cuttings are to be taken should be selected and tagged during the summer or autumn; only vigorous vines that are free from disease and have proved themselves to be constant croppers of good quality fruit with even-sized berries should be selected for the purpose.

Cuttings should be made as soon after pruning as possible. It is a mistake to permit prunings from which it is intended to make cuttings to lie about in the sun in the vineyard for any length of time, as the vitality of the canes is lowered by exposure.

To prepare a cutting, sever the cane with a sharp knife or secateurs directly below a node and again just above a node about 15 to 18 inches further up the cane. Clean cuts enable a callus to quickly form over the cut surface.

Four types of cuttings are illustrated on Plate 63. The first shown in Fig. A illustrates an ideal cutting selected from the lower portion of a cane and correctly prepared for planting. It will be noted that the extreme end portion of the cane containing the basal buds and dormant eyes has been retained; this type of cutting is likely to produce a strong rooting system about its base.

Another good type of cutting with a small portion of the previous year's wood attached to it is illustrated in Fig. B; before planting, however, it is advisable to remove portion of the older wood, otherwise there is a likelihood of it decaying and so damaging the basal and dormant buds.

A cutting taken from a long-jointed cane is shown in Fig. C, and although it is correctly prepared, such a cutting with long internodes should be avoided where the supply of prunings is plentiful. Where the buds are so widely spaced the roots will in consequence be unevenly set.

The fourth type of cutting is illustrated in Fig. D, which shows a cutting selected from a desirable cane, but badly prepared for planting. It should have been prepared as in Fig. C by severing the bottom end just below the bud and through the node. The long section of internode left in the ground may rot and destroy the cutting; likewise the top section should have been shortened back as in Fig. C, thus preventing it dying back, possibly past the bud.

The cuttings, having been prepared, are placed in bundles containing from fifty to sixty each, and they can be kept until required for planting by burying them horizontally with a covering of at least

6 inches of soil, or they can be heeled in on the angle leaving 3 to 4 inches showing above the ground. Cuttings will keep best if preserved in a cool, shaded sandy soil that is damp though not wet.

New land should be used for rooting the cuttings. The soil should first be broken down to a fine tilth by repeated ploughings and harrowings. When ready to plant, nursery rows may be made by ploughing deep furrows in which the cuttings are set 3, or 4 inches apart, and at an angle of 45 degrees to ground level. The furrows are then filled in and the soil well firmed, leaving two buds out of the ground, the bottom one at about ground level. If the soil is very dry the cuttings should be watered before the furrow is completely filled in.

GRAFTING.

Cuttings are best grafted in late winter, i.e., during August at Stanthorpe, about a month before they are required for planting out. Field grafting and bench grafting of young-rooted vines is performed in the spring, i.e., during September at Stanthorpe. The whip-tongue graft and the cleft graft are the two best-known methods, and these will be described.

The Whip-tongue Graft.

The whip-tongue graft is applied chiefly to young phylloxera-resistant vines and cuttings; the stock and scion, which should be of the same diameter, are spliced together in the manner shown in Plate 64.

The stock is prepared by making a clean upward sloping cut just above a node, because it is at this point that most of the knitting tissue

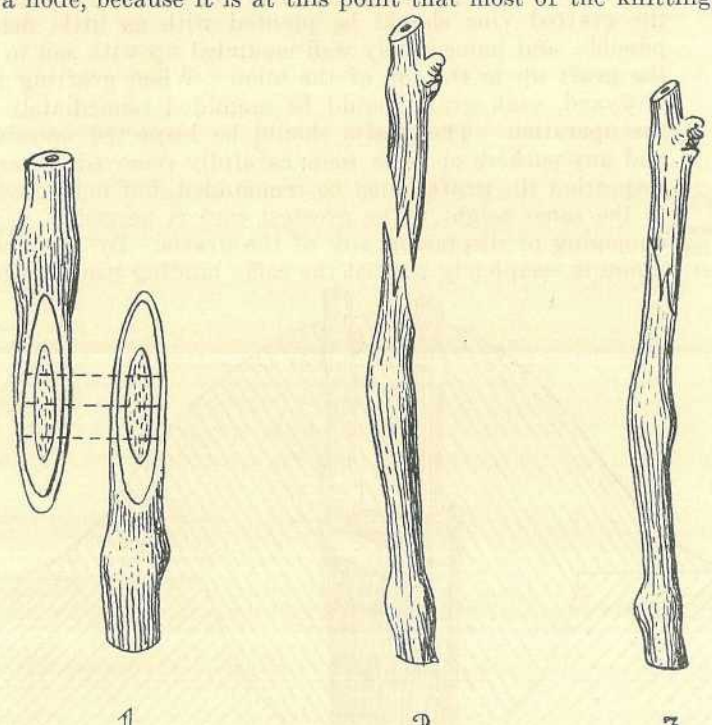

Plate 64.

Whip-tongue Graft.

1. Section of stock and scion.
2. Preparing stock and scion with tongues opened.
3. Graft united ready for the ligature.

is formed. A correspondingly clean cut in a downward direction to the same bevel is made on the scion directly below a node. A longitudinal slit at least one-quarter of an inch in depth, following the grain of the wood, is now made in the stock and scion at about a third of the way down from the point of the cut surface; in removing the knife blade it is given a twist in order to open the slits, when the tongues thus formed can be fitted firmly into the clefts, making a perfect fit between stock and scion. The graft is now bound with raffia to hold the scion in position.

Plate 65.
Scion prepared for cleft graft.

Cuttings after being grafted should be stratified by burying them horizontally in a moist sandy soil. First place a layer of grafts about 2 inches deep in the bottom of the trench and cover them with a thin layer of moist sandy soil. Now place another layer of grafts and scatter with soil, and so on until the trench is filled, when it can be covered with soil to a depth of 6 inches. At the end of the winter, when knitting tissue will have formed, the grafts can be carefully lifted and planted out with the union just below the surface. A small mound of soil one-quarter of an inch above the top bud will prevent the scion from becoming too dry.

Rooted cuttings of resistant vines can be bench-grafted after having been lifted from the nursery and prior to setting them into their permanent place in the vineyard, or they may be grafted in the vineyard if the cuttings were originally planted in their permanent position. In the case of the former the grafted vine should be planted with as little delay as possible, and immediately well mounded up with soil to cover the graft up to the top of the scion. When grafting in the vineyard, each graft should be mounded immediately after the operation. The grafts should be inspected occasionally and any suckers or scion roots carefully removed; after each inspection the grafts must be remounded, but not necessarily to the same height. The greatest care is necessary to avoid damaging or displacing any of the grafts. By the time the union is completely formed the raffia binding usually becomes

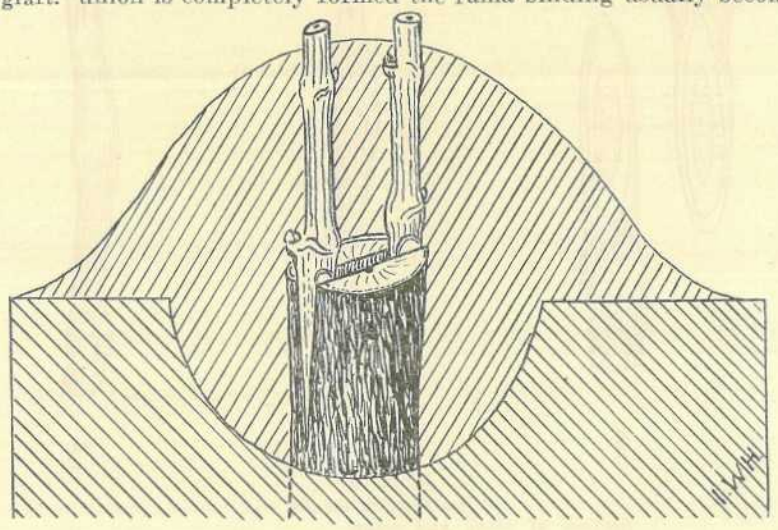

Plate 66.
Large stock fitted with scions (*after F. de Castella*).

rotten and breaks away itself. It is as well, however, to inspect a few vines occasionally to be quite sure that such is the case, otherwise the unions will become choked.

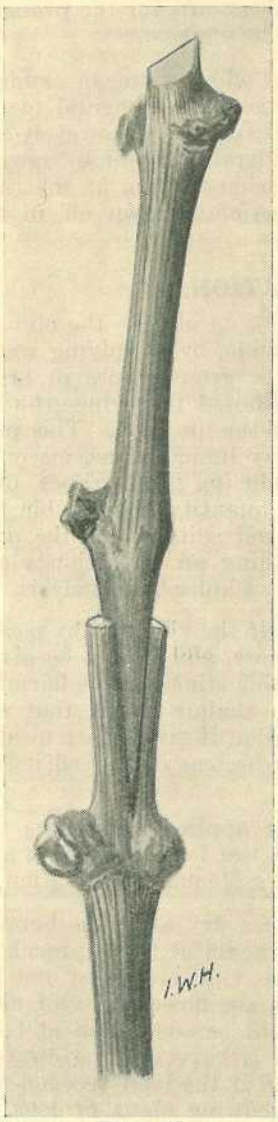

Plate 67.
Cleft-grafting, cuttings on cuttings (*after Romeo Bragato*).

Plate 68.
Cleft - grafting on young rooted stocks (*after Romeo Bragato*).

The Cleft Graft.

The cleft graft (Plates 65, 66, 67, and 68), unlike the whip-tongue graft, can be used on stocks of varying dimensions, from cuttings up to aged vines. Vines up to eight years old graft more successfully and form more perfect unions than older plants. Aged vines with large trunks can be grafted with two scions; the results, however, are in most cases disappointing, as portion of the stock usually dies back before the grafts can cover the saw cut, and the vine is forced into an early decline. Cleft grafting is best performed in the early spring, when the sap commences to rise. The cuttings for grafting are kept in the same manner as those required for planting. The stock is prepared by sawing it off about ground level, leaving a straight section as free from knots as possible. The stock is then cleanly split with a strong knife (Plate 69) or chisel to receive the scion. The scion, which consists of two buds, is prepared to a wedge shape, commencing just below the bottom bud. The stock is now forced open and the scion neatly inserted so that the inner barks or cambium layers on each side of both stock

and scion unite perfectly. The graft is then mounded up with earth to the top of the scion. It is essential that the stock be not split beyond the depth required by the scion. To avoid the split running too deeply, a ligature of fairly stout twine is first placed round the stock, the ends of the twine being retained to bind the graft after the scion has been fitted. On older vines it is unnecessary to tie the graft, for the pressure of the cleft itself is sufficient to hold the scion in position.

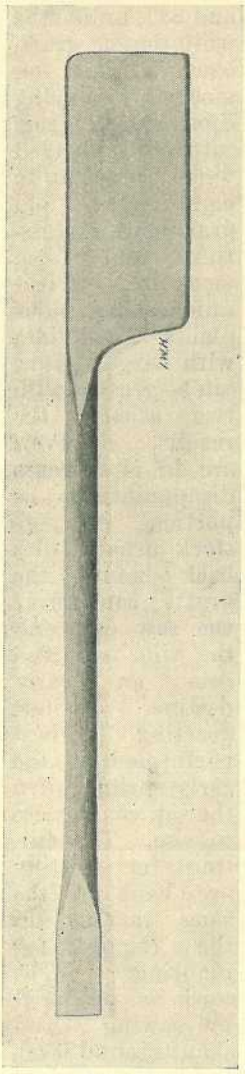

Plate 69.
A handy tool, half natural size, for cleft - grafting large vines.

Old vines when sawn off continue to exude a large quantity of sap, which is detrimental to the graft. The bleeding, as it is termed, however, can be obviated to some considerable extent by sawing the vine off a week beforehand; then at the time of grafting a further section is sawn off to the required height.

IRRIGATION.

Though it is impossible to change the climate to suit the vine, it is possible, by supplying water by means of irrigation, to grow grapes in areas where the rainfall is so limited that vine-growing would otherwise be out of the question. This particularly applies to the dry inland areas, many of which are capable of producing good grapes, provided water in sufficient quantity is available for irrigation. All water is not suitable for the purpose, and before establishing an irrigation plant it is advisable to submit samples for analysis.

Water is best applied to the vineyard by means of furrows between the rows, and should be given judiciously. Repeated applications can be harmful to vines on some of the shallow lands that are inclined to hold the water, but if given when needed most and before the vines become distressed it can be most beneficial.

Water should not be applied sparingly; the land should be thoroughly wet to a good depth and the moisture retained by systematic cultivation.

Should the land become dry after the harvest it should be watered, and again at the approach of spring if necessary. The vineyard must not be irrigated while the vines are flowering, and also, if possible, watering should be suspended at least a month before the crop is harvested. However, these are golden rules, and if the land becomes too dry and the vines are showing signs of lack of sufficient moisture, irrigation should be used as required.

CULTIVATION.

The turning over of the land by ploughing during the dormant period has the beneficial effect of aerating the soil and keeping it in a good physical condition. It helps the retention of subsequent rainfall and promotes the development of soil bacteria favourable to the plants' growth.

Shallow cultivation, usually performed during the warmer months, aids in the suppression of weeds, which draw moisture from the soil and interfere with the growth of the plant. Cultivation following a fall of rain or after the vineyard has been irrigated not only prevents the surface of the land from becoming caked, but by creating a soil mulch preserves the moisture, much of which would otherwise escape by evaporation.

Winter cultivation, performed while the vines are in a state of dormancy, should be differentiated from summer cultivation, which is performed during the period of active growth.

Plate 70.
Tractor cultivation.

Winter cultivation is best carried out with the plough in order that the soil be thoroughly turned over. It is undesirable to plough deeply as damage may be caused to the roots. Seldom is it necessary to go deeper than 6 inches, and if the surface roots have already been suppressed at planting time there should be little danger of damaging them.

One winter ploughing is usually sufficient; some growers, however, prefer to plough twice, but whether the land receives one or two ploughings it should be harrowed down to a fine tilth towards the approach of spring.

Where dry land farming is the routine method, and this is usually the case in the grape areas of this State, regular shallow summer cultivation is necessary. The reasons for cultivating during the summer have already been outlined. Usually 2 to 3 inches will suffice, but it is imperative that the surface soil be loosened after every fall of rain or where irrigation is employed after the vineyard has received a watering.

Cultivation should be avoided while vines are in bloom and setting their fruit, and at a time when late frosts are to be feared.

FERTILIZING AND MANURING.

The fertilizing and manuring of the vineyard does not always receive adequate attention. Some vineyards are consequently unprofitable owing to shortage of the various plant foods required by the vine. Fertilizing and manuring might be defined as the addition to the soil of various substances that can maintain or increase its fertility, and it therefore requires consideration by every grower.

It has been estimated that the amount of mineral food annually removed from an acre of soil in the vineyard is approximately, from 80 lb. to 90 lb. of potash, from 48 lb. to 64 lb. of nitrogen, and from 32 lb. to 40 lb. of phosphoric acid. Obviously such losses cannot go on indefinitely, and some attempt must be made to maintain the fertility of the vineyard. The variation in the readily available plant foods in different soil types makes it difficult to suggest any hard and fast fertilizer dressing for all soils. The grower must be guided largely by his own observations, but it is better to err on the safe side and apply a complete fertilizer containing the three chief plant foods, i.e., nitrogen, phosphoric acid, and potash, rather than to stint the vines. By this means the vines are at liberty to draw their nutriment according to their requirements.

Nitrogen must be used with discretion. A too-vigorous soft growth, produced by an excessively heavy application of nitrogen, is no more desirable than is a weak growth; a good average growth of canes should be the aim of the vigneron. He should, however, make sure that any lack of vigour is due to nitrogen deficiency, and not to bad drainage, overcropping, disease, or some other factor before applying nitrogenous fertilizer. In many vineyards a yearly application per acre of the following complete fertilizer is used with benefit:—1 cwt. sulphate of ammonia or nitrate of soda, 2 cwt. superphosphate, and ¾ cwt. sulphate of potash. This works out at about ½ lb. of the mixture to each vine.

Fertilizer is best applied in late winter or early spring in order to be available to the vines when they commence spring growth. It may be applied by spreading along the second and third furrows to a depth of 6 inches, or even less, and by then turning it under with the plough. On the other hand it can be broadcasted over the land, after which it is either ploughed or cultivated in.

In addition to the application of artificial fertilizers, green manuring during the winter is recommended, especially for light sandy soils. Dun field peas, lupins, golden tares, wheat, barley, and black winter rye are suitable green manure crops in the Stanthorpe district. Soils deficient in lime will benefit by periodic applications of air-slaked lime or finely ground limestone.

Unless the land is kept in a good state of tilth by cultivation, especially during the growing period of the vines, it would be unreasonable to expect highly beneficial results from the application of fertilizers or from the ploughing in of a green manure crop.

PRUNING AND TRAINING.

The vine is a natural creeper. A single plant on fertile soil may grow to a considerable size, and be composed of long slender growth which seldom produces an abundance of fruit. By pruning, the vigneron, however, produces a plant which assumes the shape more of a bush or shrub. The vitality is less than that of the wild parent, but it displays a greatly increased capacity to bear fruit. These changes are of vital importance to the pruner. A succession of heavy crops stimulated by faulty pruning can over-burden the vine to such an extent as to cause an early decline or even death, whereas judicious pruning ensures a payable crop of quality fruit, as well as an abundance of growth. To

maintain this balance between fruiting and vegetative growth is of the utmost importance economically to the vigneron and to the life of the vine. It is, therefore, the art of the good pruner to get maximum crops of commercial quality fruit without impairing the health and vigour of the vine. Complete knowledge of how to prune successfully can only be gained from practical experience and a close observance of the behaviour of the different varieties.

A few of the factors on which the art of pruning depends will be useful as a guide to the beginner. They are as follows:—

A. If the vigour of a vine be diminished, its production of fruit may be increased up to a certain point.

B. A cane will produce more fruit the more it departs from a vertical position.

C. The vine shows greatest vigour at the points furthest from the root.

D. The greater the number of shoots the weaker they will be individually, and conversely the fewer the shoots, the greater is the vigour of each.

E. The more abundant the fruit on the individual vine the lower is the sugar content.

The skilled pruner can decide at a glance the necessary treatment of any individual vine. No two vines are alike. and no single method of pruning can be prescribed that will meet the requirements of every vine in the vineyard. Not only each variety but also each plant of a single variety requires individual consideration. The less vigorous vines naturally are pruned harder than their stronger growing neighbours, but as already explained the requisite knowledge of the correct degree of pruning can only be gained by experience and observation.

Vines must be pruned during the winter while they are completely dormant. They must not, however, be pruned too early in the winter, but sufficient time allowed for the canes to be completely matured. Early pruning should particularly be avoided in districts subject to late frosts, as vines pruned shortly after leaf fall are the first to commence sprouting, and the young growth is very susceptible to injury; by pruning late when the sap is rising in the vines sprouting can be delayed a fortnight, or even longer, and this delay frequently tides the vines safely over a dangerous period of late frosts. Late pruning causes vines to bleed profusely from the pruning cuts, and this is considered by some vignerons to be detrimental. Opinions, however, differ upon the subject, and the view is held that less injury is done by late pruning, and some bleeding than can be done by a late frost to the young growth on vines pruned early in the winter.

The exudation of large quantities of sap would naturally suggest a weakening of the vine, but vines that have been under observation over a period of years show no ill-effects from such loss of sap either in the fruit or growth of canes.

Two different methods are practised in making pruning cuts.

In wet climates it is customary to cut through the node exposing a hard surface, which, to some extent, prevents the entry of water and

subsequent decay. (Plate 71; Fig. A.) However, in Queensland, conditions are drier, and the cut is usually made above the bud, as shown in Plate 71, Fig. 2.

The base buds, marked 1 in Plate 71, Fig. B, in many varieties of grapes do not produce fruit-bearing canes, and they are, therefore, not taken into consideration when pruning. Should the first and second buds, marked 2 and 3 in Plate 71, Fig. B, become damaged or fail to develop for any reason, the base buds are forced into growth and provide pruning wood for the following winter.

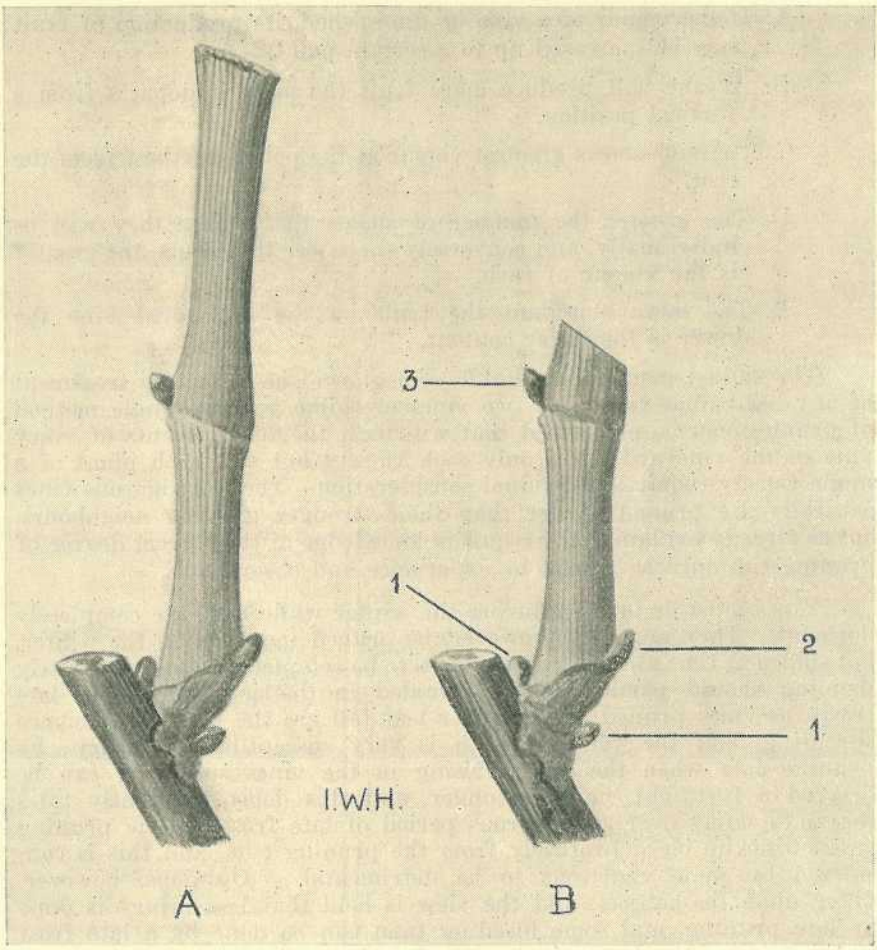

Plate 71.
Two different types of pruning cuts.

There are two methods of pruning grape vines, viz., short pruning and long pruning. Some varieties of grapes commence to bear their fruit on the canes arising from the first and second buds. They are usually termed "good croppers," and in consequence they are "short pruned" to the first two buds. The small length of cane thus left for fruit-bearing purposes is referred to as a "spur." (Plate 77.)

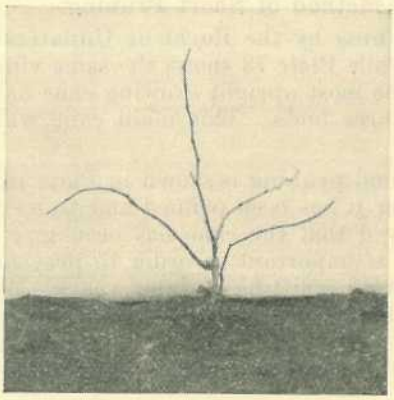

Plate 72.
A young vine before pruning.

Plate 73.
The same vine as in Plate 72 after pruning.

Other varieties produce best from the canes issuing from the fourth and fifth buds and even from eyes further along the cane. Varieties of this class are long pruned by leaving a length of cane, called a rod, with six to eight buds or even more, to bear the fruit. Again some vines possess exceptional vigour and these may be pruned to bear heavier crops than less robust varieties, being long pruned to a rod of four or five buds. In long pruning it is imperative that for every rod left for fruit-bearing purposes a spur pruned to two buds be left at its base. The spur is not required for fruit but to provide renewal wood for the following year. When pruning, the rod is completely removed, the uppermost cane of the spur is shortened to a rod while the lower cane is pruned to a spur of two buds. The same procedure is repeated at the following pruning.

There are various systems of training and pruning, in short as well as in long pruning, and these are described.

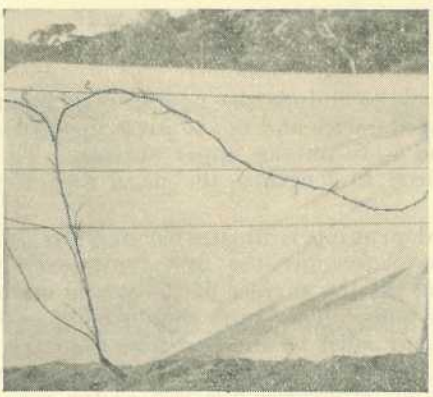

Plate 74.
A two-year-old vine before pruning.

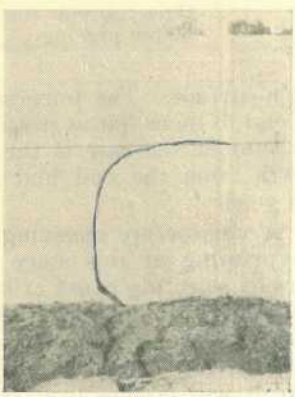

Plate 75.
The same vine as in Plate 74 after pruning.

The Royat or Unilateral Cordon Method of Short Pruning.

A young, year-old vine before pruning by the Royat or Unilateral Cordon method is shown in Plate 72, while Plate 73 shows the same vine after pruning. It will be noted that the most upright growing cane has been selected and shortened back to three buds. This main cane will form the trunk of the future vine.

A two-year-old vine before the second pruning is shown in Plate 74, while Plate 75 shows the same vine after it has been pruned and trained along the first wire. It will be observed that the cane has been given a graceful curve on to the wire. This is important in order to prevent any check to the flow of sap and to avoid splitting in later years. At the end of the cane where it is shortened back a bud is selected on the

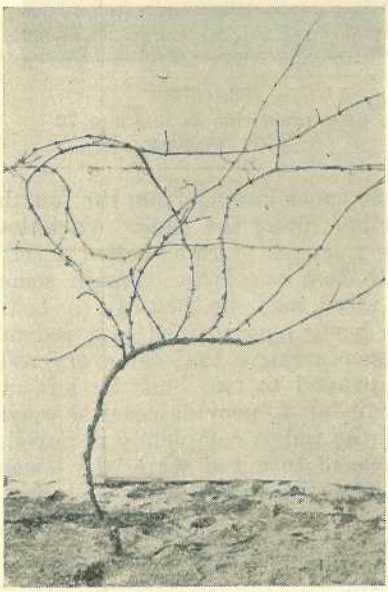

Plate 76.
A three-year-old vine before pruning.

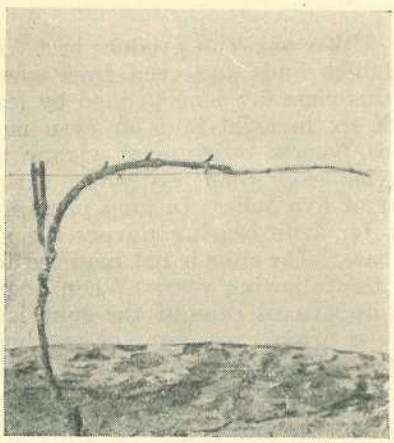

Plate 77.
The same vine as in Plate 76 after pruning, and showing the first spurs.

under surface. The purpose of this is to induce the new growth from this end to lie as flat as possible along the wire and not to grow upwards, as would be the case if the end bud were on the upper surface. The growth from the end bud is required to lengthen the main arm the next year.

A vine before receiving its third pruning is illustrated in Plate 76. The pruning at this stage consists of forming the first fruit-bearing spurs by selecting canes arising along the top surface of the young main arm, and pruning them back to two buds. The spurs should be spaced about 6 inches apart, and the first spur must be situated past the curve of the neck of the vine. If it is allowed to form at the centre of the curve it will become over-vigorous and impoverish the rest of the vine. A section of the cane from the end bud is laid down along the wire with the end bud of the new section on the under surface, as in the previous pruning. Plate 77 shows the vine after pruning.

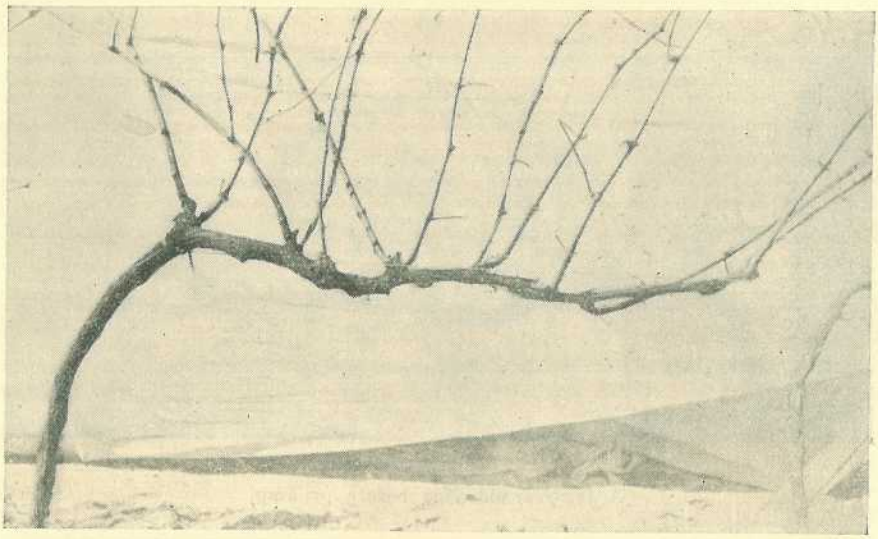

Plate 78.
A five-year-old vine before pruning.

Having formed the first spurs, the following summer two canes should be produced from each spur, i.e., one from each bud left on the spurs; at pruning the cane growing from the bottom bud of each spur, and which therefore is closest to the main arm, is selected and pruned to two buds. All other growth appearing above it is pruned off. Pruning from now on consists of treating the spurs as above mentioned, forming new spurs, as in Plate 79, and yearly laying down a section of the end cane until the vine eventually attains its full length.

When this stage is reached the last spur on the vine needs different treatment; from the two canes that appear at this point the uppermost one is pruned to several buds and tied down to meet the first spur of the adjoining vine. The lower cane is then shortened back to a spur of two buds. The following summer this spur should produce two canes, one from each bud. The next winter these two canes will be treated in the same manner as at the previous pruning.

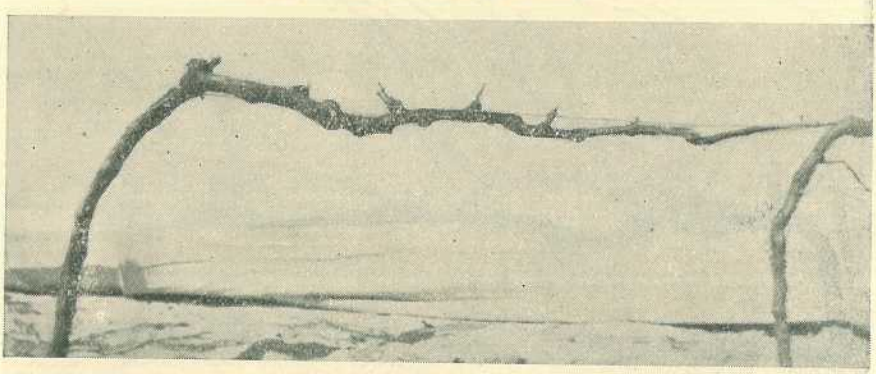

Plate 79.
The same vine as in Plate 78 after pruning.

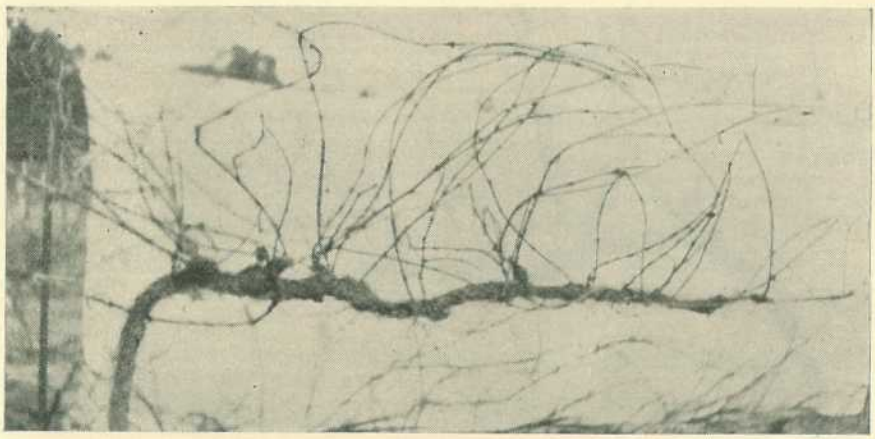

Plate 80.
A ten-year-old vine before pruning.

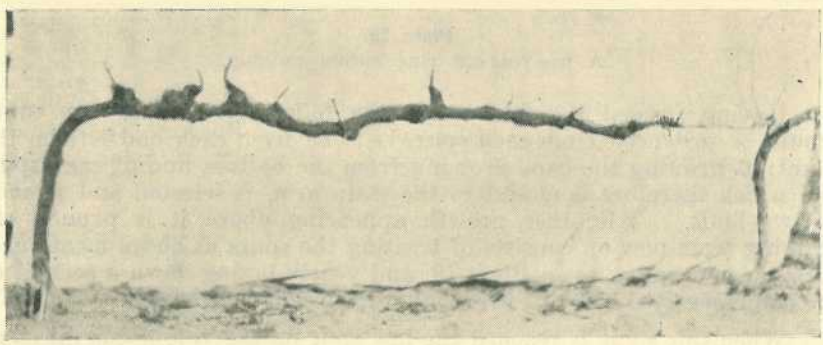

Plate 81.
The same vine as in Plate 80 after pruning.

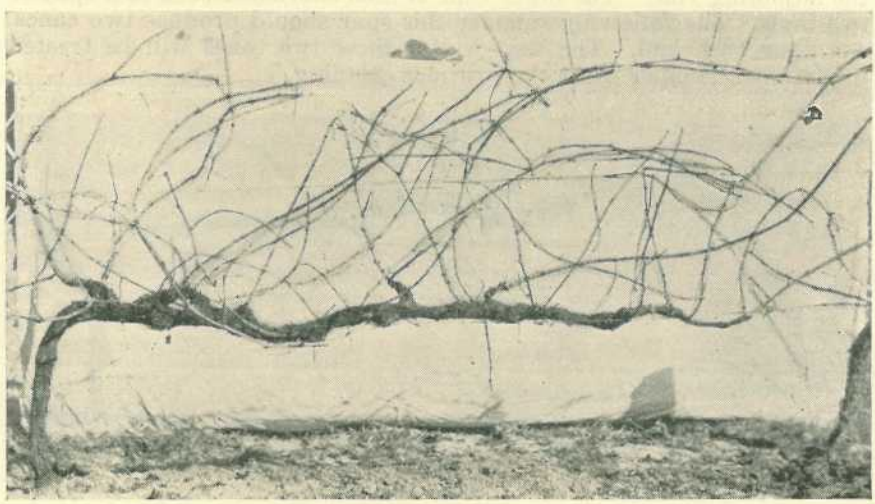

Plate 82.
The same vine as in Plate 81 four years later, before pruning.

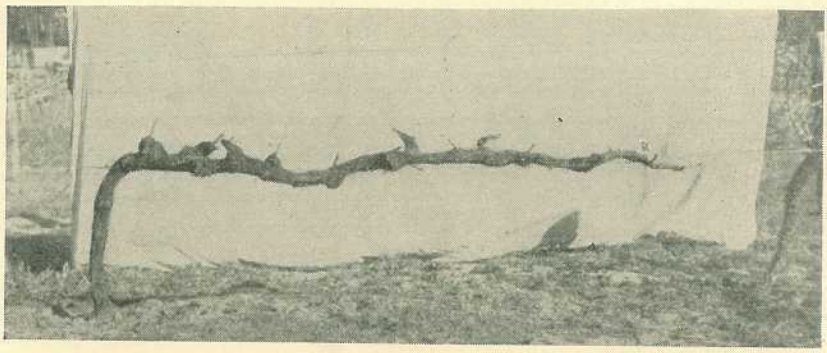

Plate 83.
The same vine as in Plate 82 after pruning; note the short spurs in comparison with those in Plate 84.

After a few years the spurs on short-pruned vines tend to become twisted and knotty and much longer than is desirable. To avoid this it is first necessary to always prune to the lower cane on the spur, as previously explained, and to preserve any water shoots appearing about the base of the spurs; these water shoots can be utilised the following year in forming fresh spurs when the old ones are removed. The spurs should be removed while they are comparatively small or before they become too large and knotty. They should never be allowed to attain such dimensions as those shown in Plate 84. To remove spurs of this type results in severe injury to the vine.

Plate 80 shows a vine before pruning at ten years of age, and Plate 81 illustrates the same vine after pruning. The illustration on Plate 82 shows the same vine four years later, and in Plate 83 it appears after having been pruned.

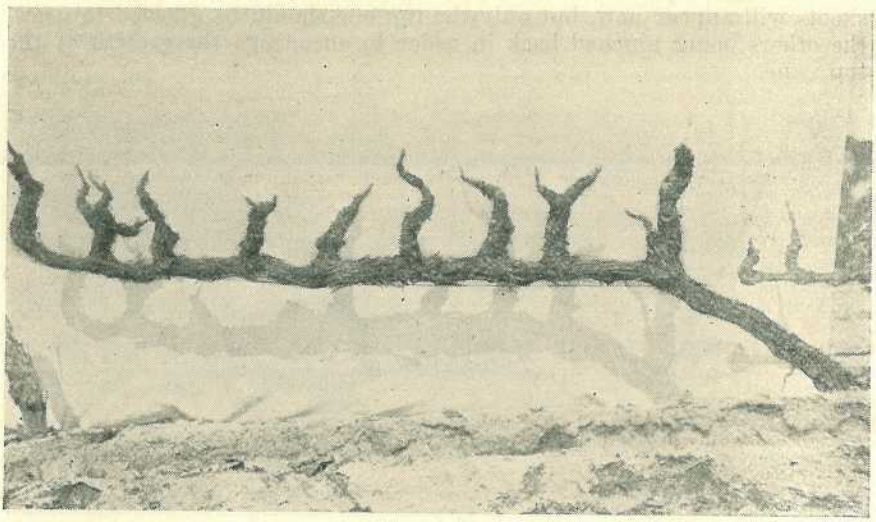

Plate 84.
A vine showing undesirable spur growth.

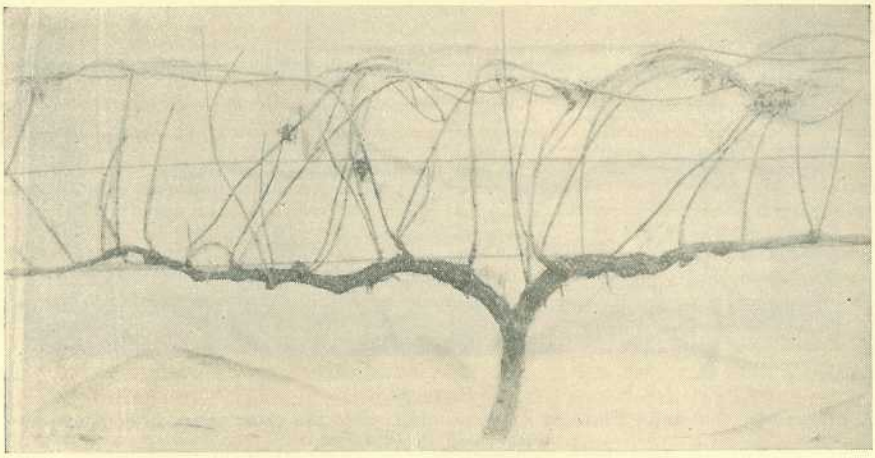

Plate 85.
Thomery Espalier.

It will be observed that the spurs on the above vine have been kept reasonably short by careful pruning, a contrast to the vine in Plate 84, which is about the same age.

Thomery Espalier or Bi-Lateral Cordon Method of Short Pruning.

The Thomery Espalier or Bi-Lateral Cordon is a two-armed vine (Plate 85). The young vine should be trained to resemble as closely as possible the letter T. The method of forming a Thomery Espalier is as follows:—

In the spring of the first year a strong, upright-growing shoot from the young plant is selected and pinched off about 4 inches below the first trellis wire; the top bud will later send out another shoot, but this shoot is again pinched back when it is a few inches long. Several shoots will appear now, but only the top one should be allowed to grow, the others being pinched back in order to encourage the growth of the top cane.

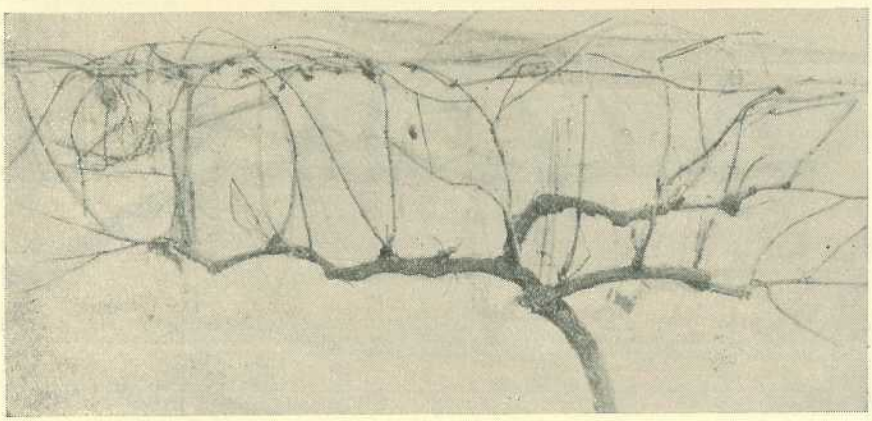

Plate 86.
A badly formed Thomery Espalier.

The following winter it will be noticed that this treatment has encouraged several buds to form close to one another on the cane just below the wire. The vine should be pruned at this point and the stem tied to the wire.

In the spring two shoots arising from about the same level can be selected and trained in opposite directions along the wire to form the main arms; all other growth should be kept suppressed. The canes arising from the two main arms are pruned to two buds as in the Royat or Unilateral Cordon method.

THE BORDELAISE ESPALIER METHOD OF LONG PRUNING.

The Bordelaise Espalier method of long pruning is suitable to strong growing and shy bearing vines, and is as follows:—A strong upright growing cane from a young vine is pruned through the node at the height of the first wire to which it is securely tied.

Several canes will now appear, and the following winter the two uppermost are shortened back to spurs, each of two buds, all other growth on the main stem being cut away.

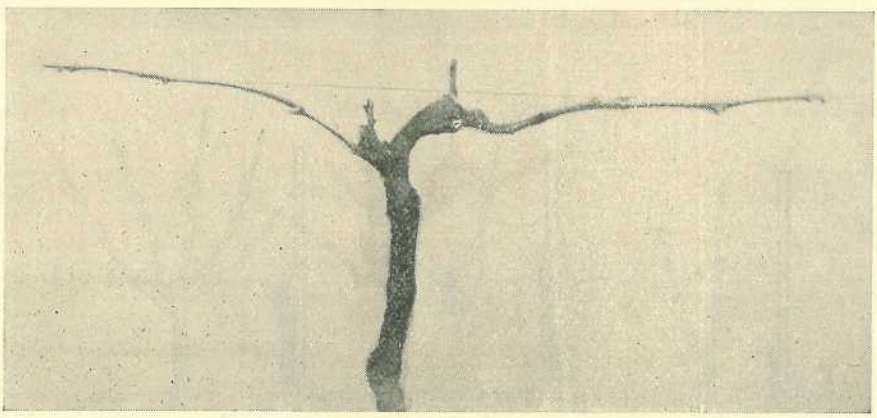

Plate 87.
Bordelaise Espalier.

By the next winter each of these spurs will have produced two canes. The top canes are pruned to short rods of four or five buds, according to the strength of the young vine, and tied down in opposite directions to each other along the bottom wire, while the lower canes are each pruned to spurs of two buds.

At the fourth pruning the rod that has borne the fruit the previous summer is completely removed, and the two canes issuing from each of the spurs are treated in the same manner as in the previous pruning.

The rods are required purely for fruit-bearing purposes, and are cut off at the following pruning. The spurs may produce fruit-bearing canes, but their chief function is to supply canes to form fruiting rods and spurs at the following pruning.

The age of the vine, its vigour, and the nature of the land on which it is growing decide the length of fruit-bearing rods it is able to support. Plate 87 illustrates a vine trained as a Bordelaise Espalier.

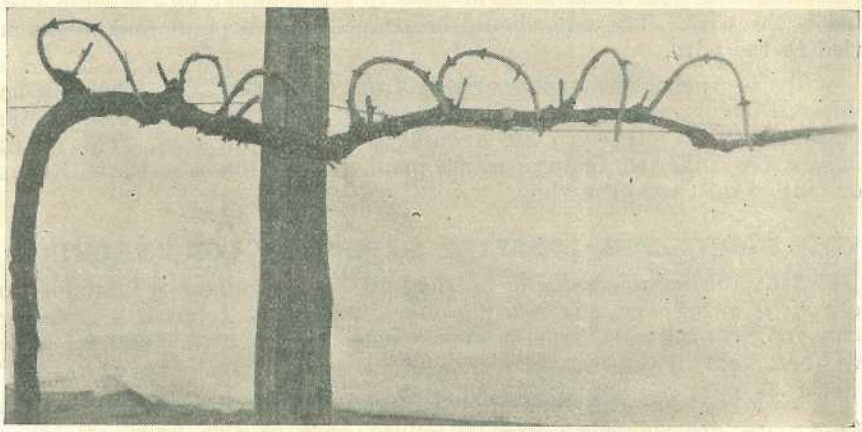

Plate 88.
Casanave Cordon.

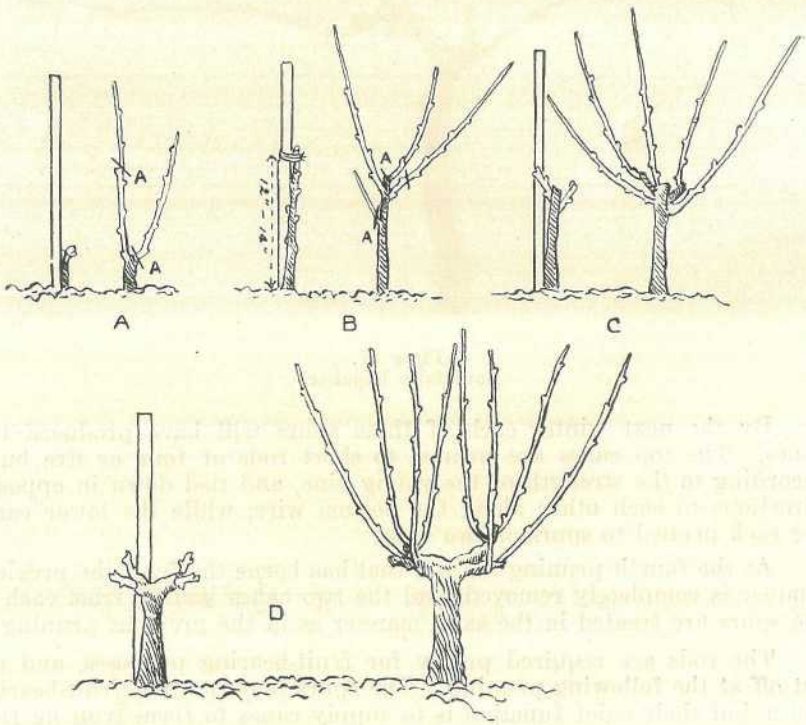

Plate 89.
Diagrammatic representation showing the formation of the bush vine.
(From Farmers' Bulletin, No. 140, Department of Agriculture, N.S.W.)

The Casanave Cordon Method of Long Pruning.

The Casanave Cordon method of long pruning, like the Bordelaise Espalier, is suitable for strong growing vines.

The young vine is trained as a Royat or Unilateral Cordon until it arrives at the stage when the main spurs are established on the vine. Plate 88 shows a vine pruned as a Casanave Cordon. It will be noticed that the uppermost cane has been pruned to a rod of five or six buds and tied down to the main arm the bottom cane being pruned to a spur of two buds. Where only one cane occurs it should be pruned to a spur.

As in the Bordelaise Espalier method the rod is retained purely for fruit-bearing purposes, and is completely removed at the following pruning. The spurs are likewise required to provide renewal wood for the following summer.

The length of the vine may vary according to its vigour.

The object of tying the rods to the main arm is to promote an even growth from each bud. If the canes were allowed to remain upright, possibly the top buds would make vigorous growth, whilst the bottom eyes remained dormant.

The Bush or Goblet System of Pruning.

The different stages in the formation of a spur pruned bush vine are illustrated in Plate 89.

It is a first essential that a stout stem or trunk be established in order that the vine may be supported against strong winds.

The illustration in Fig. A, Plate 89, shows a young vine hard pruned to two buds and the two strong canes it developed the following summer.

At the next pruning the strongest and most upright growing cane is shortened back to a height at which the head of the vine is to be formed. A long section of internode should be left above the top bud in order to tie it securely to the stake.

The height of the head of the vine varies; for wine varieties and raisin grapes grown in a hot dry district 8 to 10 inches from the ground is sufficient; for table varieties a longer stem from 12 to 16 inches is preferred.

The vine after the second pruning and the growth made the summer following in shown in Fig. B of Plate 89. At the third pruning (Plate 89; Fig. C) the first two spurs have been formed, which in turn will develop into main arms, as shown in Fig. D of Plate 89. At the fourth pruning the eight canes, as shown in the last illustration, can each be pruned to two bud spurs.

The diagrams shown in Plate 89, however, must not be taken too literally; they merely depict the various stages of training and short pruning a bush vine under ideal conditions.

The number of spurs the vine is capable of carrying will depend entirely upon its vigour and its habit of bearing fruit, and must be left to the judgment of the pruner. It is a wise procedure, though, to reduce the number of spurs if the vine is making poor growth, but where the growth is good more spurs may be allowed to remain.

Once the vine has been formed and established the pruning from then on consists of providing sufficient spurs for the annual fruiting wood, and spacing the spurs so that they will not overcrowd each other. In addition to this, any old spurs that have become knotty and elongated should be replaced by new and more vigorous growth.

As some vines do not fruit well when short pruned to spurs of two buds, it is in these cases necessary to adopt a different method of pruning and leave two or more canes of the previous years' growth from 2 to 3 feet long to bear fruit.

The Bordelaise Espalier method of pruning trellised vines can be adopted for vines trained on the Bush or Goblet method. In the case of the latter, the fruit-bearing rods instead of being tied down to the first wire are either twisted together in the form of a bow or they may be bent down and tied to the base of the opposite spur. (Plate 90.)

Plate 90.
Rod-pruned bush vine. (*After Fig.* 13, *Farmers' Bulletin, No.* 140, *Department of Agriculture, N.S.W.*)

Summer Pruning.

Summer pruning may be divided into three separate and distinct operations, namely, the removal of young shoots, pinching and topping.

Each spring, vines produce a number of superfluous shoots which, if allowed to remain, would greatly diminish the vigour of the vine. In the case of bearing vines showing too many fruit blossoms, as well as young vines, the suppression of young shoots is necessary to regulate the crop within reasonable limits.

Moreover, these shoots, if not summer pruned, will have to be winter pruned, and the latter operation inflicts a wound that is more difficult to heal over than the former.

The work is best executed when the shoots are about 10 to 12 inches long, when they can be easily removed under pressure of the thumb and index finger; at this stage they should be sufficiently developed to show which of them have fruit blossoms.

All water shoots issuing from the old wood, both arms and trunk, should be removed, unless they are needed to reform vines, replace spurs that have become elongated and knotty, or fill up a gap in the spurs.

In spur pruned vines of both bush and trellis type frequently two or even three shoots arise from each bud. Few vines can support such growth, especially if it is fruitful, and remain healthy. Where more than one shoot occurs the weakest should be removed, leaving only one at each node. One shoot to each spur would probably be sufficient for the less vigorous vines. Stronger growing kinds, though, may support two or more shoots on each spur.

The removal of young shoots of long pruned vines consists of removing the surplus shoots on the rods and preserving the strongest shoots on the spurs, in order that sturdy renewal wood be available for the following pruning, providing always that where necessary water shoots should be retained to replace spurs.

The operation of pinching is advantageous for two purposes; firstly, to assist the setting of the fruit, and secondly to balance the growth from the spurs. Some vines persist in setting their fruit very badly; by nipping off the extremities of the canes with the thumb nail when the blossoms begin to open, the nourishment that would otherwise be absorbed by the young growth is diverted to the flowers, and this often has a beneficial effect upon fruit setting. Should the pinching be done a week to ten days before the flowers commence to open the young shoots will have commenced fresh growth, which will only aggravate the trouble.

The extreme end buds of the spurs or fruit-bearing rods are usually the first to commence growth and absorb most of the sap, thus preventing the other buds from bursting. By pinching these shoots when they are a few inches long a check is given to their growth and the other buds are enabled to burst and make normal vegetation.

Vines that are not vigorous should not be pinched.

The pinching of the young shoots has its advantages as has already been explained; topping or lopping off more matured canes, however, is a practice which can easily be abused, with harmful effects to the vine as well as to the fruit. The idea of removing a considerable portion of cane growth so that the bunches may benefit by the sap that is forced into them is unsound, and very often the practice rather impairs the quality of the fruit than improves it.

The leaves are of the utmost importance to the vine; and they may be regarded as the seat of manufacture of certain essential substances that the vine and the fruit need. Consequently the source of supply thereof is reduced materially by an indiscriminate use of topping.

Topping should only be practised on healthy vines when the strong growth interferes with cultivation or harvesting.

The bunches are usually better developed and more attractive in appearance if allowed to ripen in the shade. However, if the foliage is too dense a few of the lower leaves may be removed, but this must be done with discretion.

Repruning After Frost Injury.

Spring frosts occasionally cause considerable damage to grape vines, especially in the inland and tableland districts. Early sprouting varieties and vines which come into leaf prematurely as a result of early pruning are naturally more susceptible to injury.

Unfortunately, one frost can destroy practically the entire crop of a vineyard; but, provided the damage occurs before the vines have made too much headway, it is possible, by skilful repruning, to produce a half crop or even two-thirds of an average crop that will ripen satisfactorily under normal conditions.

The buds of a grape vine appear to the unaided eye to occur singly on the vine, though two, three, or even four dormant buds are actually situated about the base of each obvious bud and there remain dormant except in the event of injury, when the most forward of them is forced into growth. This first dormant bud is capable of producing sound, normal wood, and in quite a number of varieties it is fruitful.

In a few days after frost injury the damage is clearly defined, and the work of repair should be carried out as soon as possible. The damaged shoots should be removed from the vine at a point just below their first buds, but not too close to the spur, otherwise there would be a grave danger of destroying the dormant buds at the base of the shoot.

The method of repruning depends on the extent of the damage and the stage of growth of the young shoots. In the event of the shoots being frosted when they are but a few inches in length or less, they may be killed outright, and there will be no need to touch the vines, as the dormant bud will then automatically develop; if the young canes are only partly damaged by frost and sufficiently soft to snap off under pressure of the thumb, the work can be done by hand.

Should the damage occur later, when the canes have become pithy and are inclined to tear rather than snap off, the secateurs or a sharp knife should be brought into use, otherwise there is danger of destroying the basal buds.

Occasionally some shoots showing fruit have escaped injury while the rest of the vine is badly damaged. These shoots may remain, but they must be pinched back so that the dormant eyes on the frosted spurs may develop.

Repruned vines receive a severe shock and are temporarily unbalanced; when they commence their second growth they invariably shoot from most unexpected places. Water shoots will appear along the main arms and from the base of spurs. This surplus growth must be rigorously suppressed, and only the main shoots required on the spurs retained. Should this work be neglected, the vine would result in a dense mass of slender, weak canes, producing little fruiting wood for the following pruning.

Naturally, some varieties crop more freely when repruned than others. However, repruning aims not only at producing a crop of fruit but also at stimulating the development of suitable canes capable of producing a normal crop in the following year.

The Judicious Use of the Pruning Saw.

The pruning saw should be used with discretion in the vineyard, the secateurs alone being sufficient to deal with most of the work. The improper use of the pruning saw can cause very serious damage, especially on aged vines, where often an irremediable injury is inflicted that frequently brings about an early decline.

It is necessary at times, of course, to remove worn-out growth or overgrown spurs with the saw, but in most cases the saw-cut could have been avoided if the fault had been observed in the early stages and rectified then with the secateurs. In many instances the saw-cut is mistakenly made close on to the main arms, exposing a large wound which seldom heals over but gradually dies further back into the very heart of the vine. The softer tissues of a grape vine, when exposed to the weather, naturally collapse and die back much more rapidly than those of plants of a harder nature. Thus in a large wound the young callus may not be able to cover the cut.

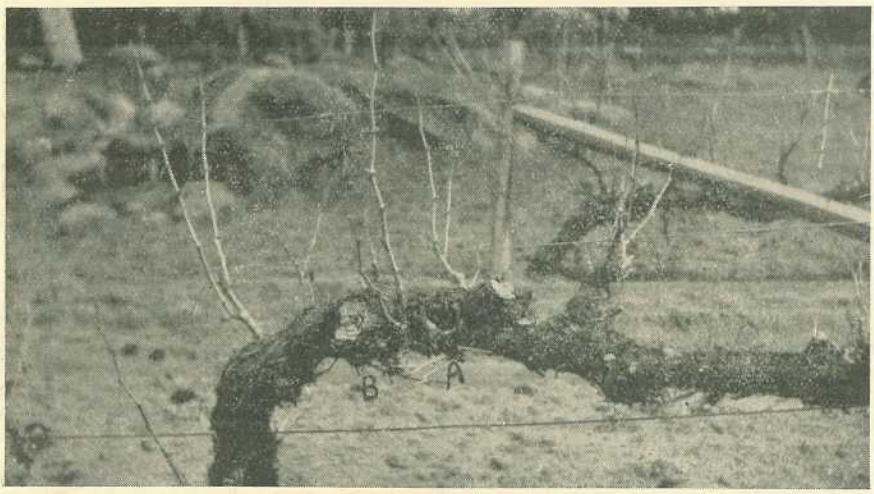

Plate 91.
Large injurious wounds made by saw-cuts too close to the main arm.

When large saw-cuts are necessary it is preferable to leave a projecting stub of about 2 inches. The following winter the dead portion of the stub can be removed, when it will be found that the surface area of live tissue exposed by the wound has been considerably reduced, and it will callus quickly. At this stage the healing process can be further expedited by protecting the wound from the weather by a good wax preparation or one of the bitumen products on the market.

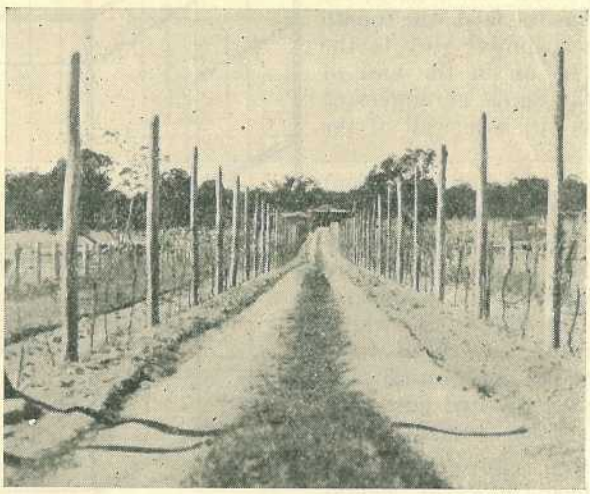

Plate 92.
A fine pergola in the making, both ornamental and commercial.

The illustration in Plate 91 shows two injuries on a vine caused through wrongful saw-cuts. The deep-seated wound A has penetrated almost through the vine, while the injury B, which was made some years later, is in a less advanced stage. It will be observed that growth has practically ceased past the injury A.

OVERHEAD TRELLISING.

Strong growing varieties, preferably with large leaves, are the most suitable for garden or drive pergolas. Various systems of training vines overhead can be employed; some, however, are rather complicated and entail a lot of time and attention in order that they do not get out of control.

A simple method is as follows:—The vines may be planted 6 feet apart in the rows; the first vine is trained to a single upright stem and taken halfway across the roof of the trellis; the second vine is trained either as a Royat or Unilateral Cordon or as a Thomery Espalier or Bilateral Cordon along the bottom wire at a height of 20 or 22 inches from the ground; the third vine is taken overhead in the same manner as the first; the fourth is trained in a similar way to the second, and so on to the end of the row. The same arrangement applies to the opposite wall of the trellis.

The trellis is wired at convenient spacings along the sides and roof.

The canes that issue from the vines on the bottom wire are trained upwards on the side wires of the trellis to shelter the walls; the vines trained overhead have bare stems from the ground, the first spur being situated just past the bend on to the roof.

Short pruning is applied to vines trained overhead; however, should they show excessive vigour, the Casanave method of long pruning may be adopted.

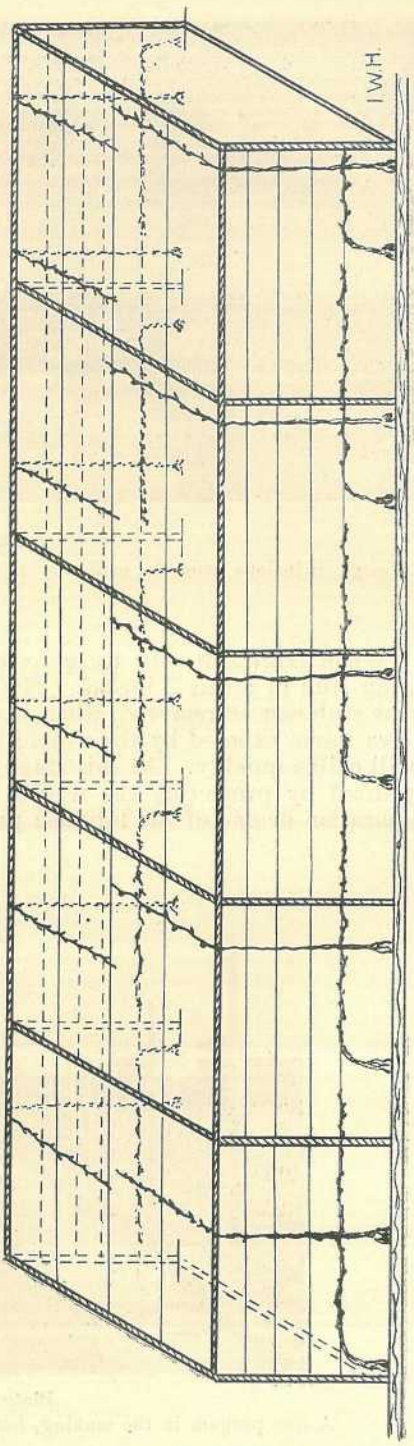

Plate 93.
Method of training overhead.

Virus Diseases of the Strawberry.

F. W. BLACKFORD, B.Sc.Agr., Assistant to Research Officer.

DURING recent years, strawberry growers in many countries have been troubled by a "degeneration" or "running-out" of certain varieties. On investigation, it was shown that virus diseases played an important part in the production of this condition. Two such virus diseases are now recognised as a major cause of losses in strawberry plantings. Both of these occur in the Southern States of Australia, where they are reported to be assuming serious proportions. Surveys made in the southern districts of Queensland have revealed that these diseases are present here also, though not, as yet, causing serious harm. It must be remembered, however, that the spread of virus diseases is insidious and their effects are seldom appreciated until the trouble is widespread and the losses are severe. It is with the object of showing how the consequences of neglect may be avoided that this article has been written. The early recognition of diseased plants and the adoption of control measures without delay should prevent the diseases becoming a serious factor in the production of the crop.

History.

The first record of a strawberry disease of a virus nature was made in California in 1922. It was later described as a "degeneration" disease, and was known as "yellows." Still later it was renamed "xanthosis" to distinguish it from such well-known diseases as cabbage yellows, caused by fungal organisms. A somewhat similar disease was described from England under the name "yellow-edge." Further work has shown that the American and English diseases are probably indentical. The disease has since been recorded from Canada, France, New Zealand, Tasmania, and Victoria, so that it is widespread.

Another virus disease, exhibiting symptoms somewhat different from those of yellow-edge was found affecting strawberries in Oregon. This disease was given the name "crinkle." It has also been recorded from Canada, England, and Victoria.

Both the abovementioned diseases occur in strawberry plantings in Queensland. Yellow-edge is more prevalent than crinkle, though in one planting the latter disease was present in a severe form in an introduced variety with the result that the plants were a total loss.

Symptoms.

Yellow-edge.—Plants affected with the virus causing yellow-edge have a sickly, pale green, stunted appearance. While the outside leaves may be more or less normal, the centre leaves are small and deformed. The leaf stalks are shortened, giving the whole plant a flat, bunched appearance. The most striking symptom, from which the disease is named, is the creamy yellow colouration extending in from the edge of the leaflets. The malformations in the centre leaves are due to the margins of the leaflets being curled or cupped upwards. Very often the whole leaflet is twisted and the margin deeply indented.

Crinkle.—Crinkle affected plants also have a dwarfed, pale green, sickly appearance. As is the case with yellow-edge, there is a shortening of the leaf stalks which gives a flat, bunched appearance to the plant. The curling of the leaves found in yellow-edge is replaced by a crinkling

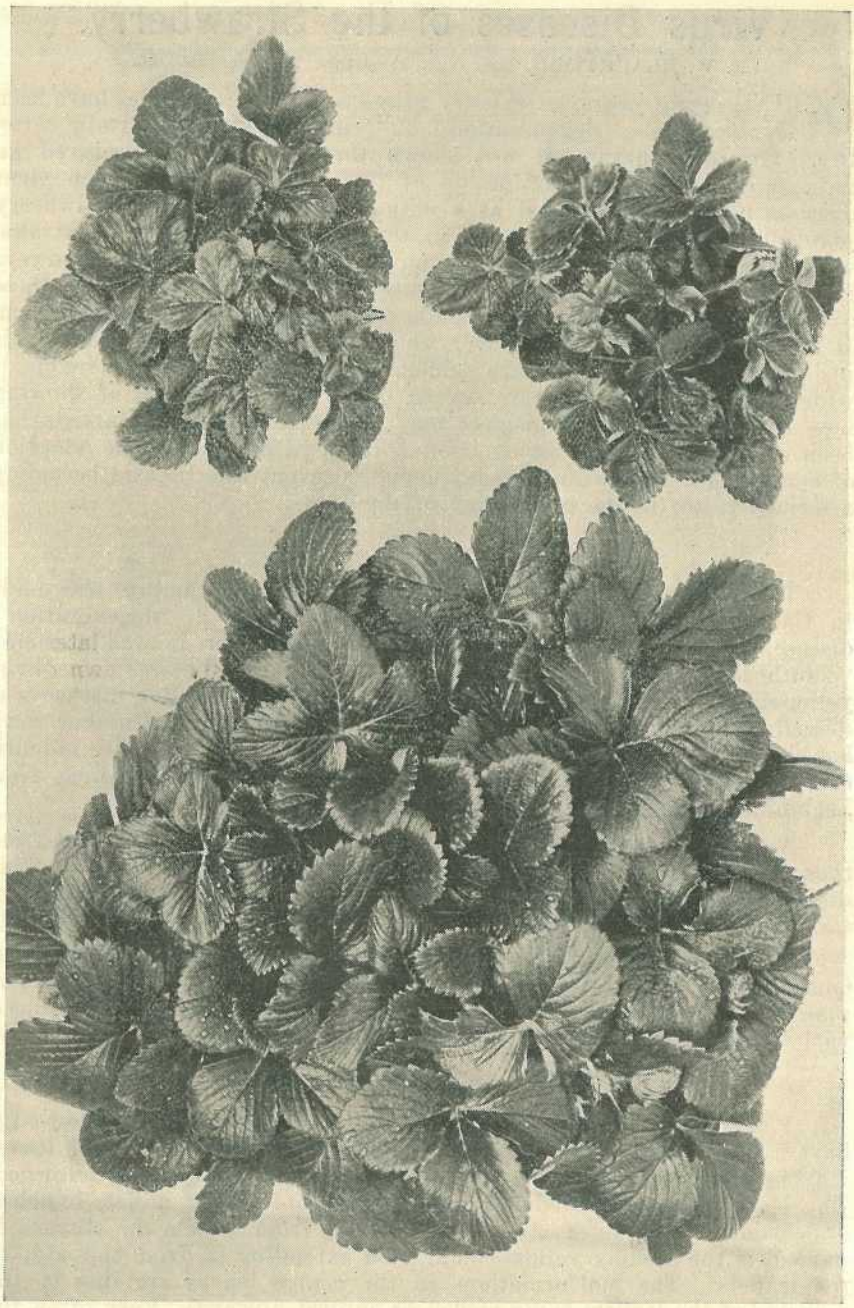

Plate 94.

VIRUS DISEASES OF THE STRAWBERRY.

Top left.—Crinkle; note mottling of leaves. *Top right.*—Yellow-edge; note deformed leaves and yellow edges. *Bottom.*—Healthy plant.

N.B.—These three plants were of the same age and were growing within a few feet of each other.

and puckering. Instead of the yellow margin, the characteristic symptom is a mottling produced by the presence of small, yellowish spots with ill-defined margins. In older spots, the centre turns a red or brown colour, so that when a leaf is held up to the light, each spot appears as a brown, dead area surrounded by a creamy yellow halo.

Plants infected with either of these diseases rarely carry a crop of fruit, and in such cases only a small crop, very often of deformed fruit, is set.

Mode of Spread.

Strawberry plants infected with one or the other of these virus diseases produce diseased runners. The planting of such diseased runners is the commonest method by which the diseases are spread. They are not transmitted through the seed and are incapable of living in the soil, so that unless infected from outside sources, seedlings, even from infected plants, are healthy.

Certain viruses are very easily spread by the contact of a healthy plant with sap from a diseased plant, but this is apparently not the case in the strawberry. Repeated attempts by overseas workers to transmit the disease by rubbing leaves with pads soaked in sap from diseased plants, pricking a healthy leaf through a diseased leaf, or injection of sap from diseased plants have proved unsuccessful. Hence, there seems no danger of carrying the disease to healthy plants on cultivation implements or on the fingers of pickers.

Transmission from a diseased to a healthy plant has been experimentally brought about by means of the strawberry aphis. Other insects and the commonly occurring red spider are not known to transmit the diseases.

Methods of Control.

In Europe and America it has been found that certain varieties of strawberries are more or less resistant to the virus diseases described above. *Fragaria chiloensis*, a wild type of strawberry, is highly resistant to yellow-edge, showing no symptoms although infected with the virus. Another wild type, *F. virginiana*, is highly susceptible, however. Varieties containing a high percentage of *chiloensis* blood are highly resistant to yellow-edge. Recent work in the United States has shown that certain strains which have been bred there show a marked degree of resistance to crinkle.

The most important varieties grown in Queensland, Phenomenal and Aurie, seem to be susceptible to both yellow-edge and crinkle. The position at present, however, does not call for such a step as the introduction of new varieties, as surveys show that it should be possible to control the diseases by other means.

As mentioned previously, the chief means of spread is by planting runners from diseased mother plants. To avoid this, the diseased mother plants should be rogued from the runner beds.

In Southern Queensland, strawberries planted in mid March are bearing towards the end of May, and the crop may continue until some time in December. The symptoms are much more pronounced during the cooler months. At temperatures above 80 deg. F. those of yellow-edge are masked and difficult to recognise. As Queensland's summer temperatures are well above this mark, the removal of affected plants should commence in winter in the early part of the picking season. The early eradication of virus infected plants has an additional benefit in that it reduces the probability of the spread of the disease within the plantation. The removal of affected plants is not a difficult

procedure when carried out at the correct time and, moreover, no loss is sustained as these plants bear little or no crop.

It is preferable that a grower should save his own runners from plants known to be free from disease, rather than use plants of unknown origin. However, in cases where virus infection has been severe, runners should be obtained elsewhere from a more healthy area.

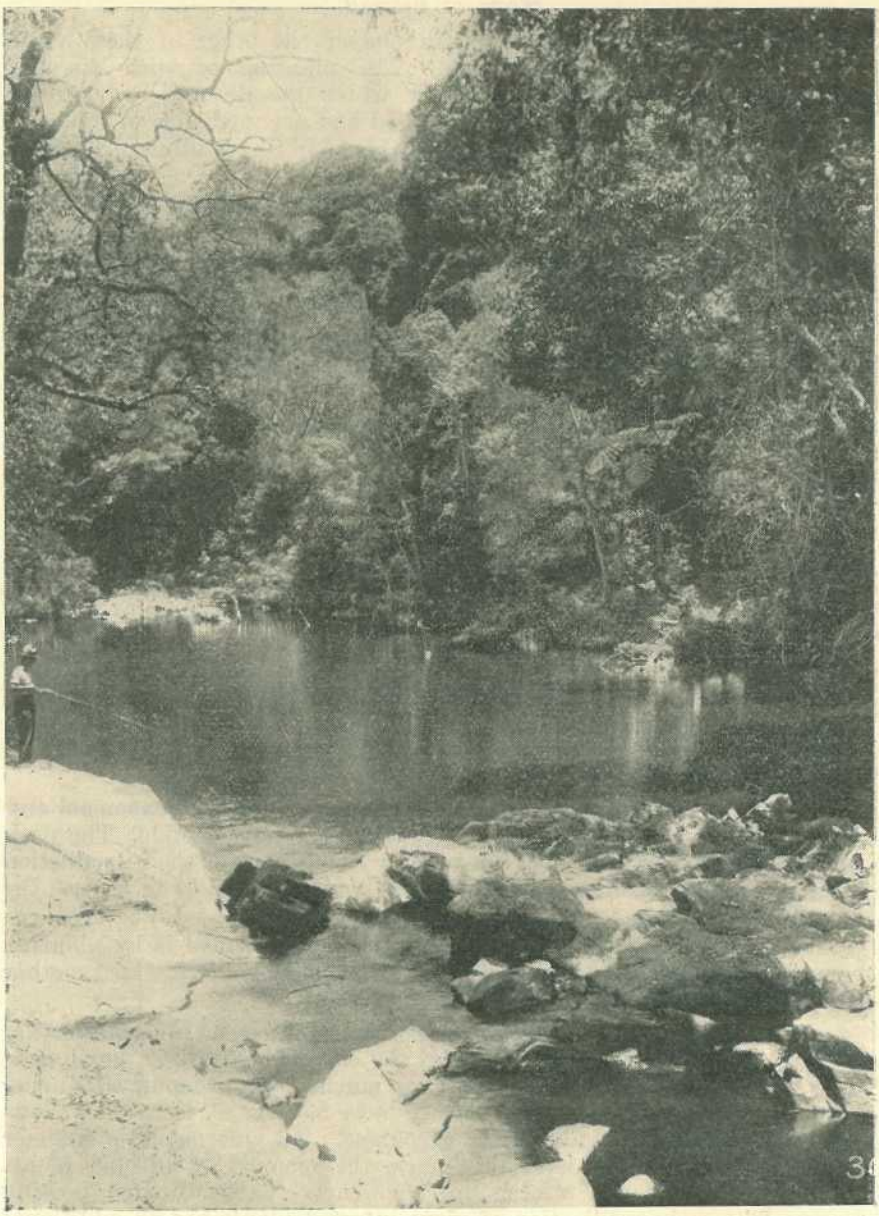

Plate 95.
QUIET JUNGLE-SHADED WATERS, EUNGELLA, NEAR MACKAY, Q.

Hints for Pig Exhibitors.

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Selection of the Show Pig.

THE aim of the stud stock breeder is to breed and exhibit animals which will win a place in the best of company. The time the exhibitor is willing to give to the preparation of his stock and the businesslike attitude he adopts generally towards the job are also important factors. He will certainly learn by experience that there are times when a few extra minutes spent and additional care in handling may mean the difference between a champion, a first, a second, a third prize, or even no prize at all. Successful exhibitors thus spare no effort to ensure having their stock ready in ample time before judging, while their ability in handling the animal when it is paraded for judgment also counts.

Admittedly some animals are easier to handle than others. Some are good feeders; some have an attractive gait and intelligence; others may be good, but stubborn. Some pigs feed well in familiar surroundings, but when placed in the show pens become restless and disgruntled in their strange environment, refuse to eat, and so rapidly lose "bloom," thus spoiling the exhibitor's chance in competition with other more docile and adaptable animals.

In selection, nothing but the very best should be considered. It is useless filling up show pens with second-grade animals. The size and importance of the show and the keenness of competition must, of course, be taken into consideration. To win a championship at a small country show is quite a different thing from winning the premier award at Brisbane, or any of the other major shows.

Studying the Schedule.

The exhibitor should study carefully the prize schedule months before he proposes to exhibit, and should aim at having his animals entered in classes for which they are most suited. A class for boar over nine months and under twelve months is more readily won, other things being equal, with a boar nearer twelve months than nine months old. The prize for sows with litter not more than ten weeks old is more frequently won with a really good sow with a litter ten weeks old, than with a sow equally as good, but with a litter only ten days old; in fact, the very young litter has little chance in keen competition, besides they are much more subject to injury in transit and in penning at the show. Size for age also is important. In a class for sow twelve months old, the sow should be well grown and be fairly forward in her gestation period; a sow not in pig does not—and should not—stand the same chance of winning, and certainly does not "show up" to the same advantage. The commercial qualities are even more important than those associated with appearance.

Freedom from Faults Desirable.

Animals with manifest faults should never be exhibited. A boar with one only testicle showing, a sow with several blind or dummy teats should not be considered for a moment. A pig with a long, unmanageable tongue which protrudes several inches from the mouth should not be shown, nor should pigs mismarked or definitely faulty in conformation.

It should be remembered that improvement in livestock generally—whether pigs, horses, cattle, sheep, or other animals—depends very largely on thoughtful selection of breeding stock, coupled with efficient feeding and careful management. The successful breeder recognises at once hereditary characteristics in his animals and, consequently, is able to take full advantage of the good points and blend them in such a way that the resultant progeny should be even better than the parents. Practically all the characteristics of economic importance in farm animals are hereditary to some degree. In pigs, for example, colour, easy feeding qualities, early maturity, prolificacy, milk production, and the length and conformation which characterise the modern long, lean, light-shouldered bacon type are all more or less hereditary.

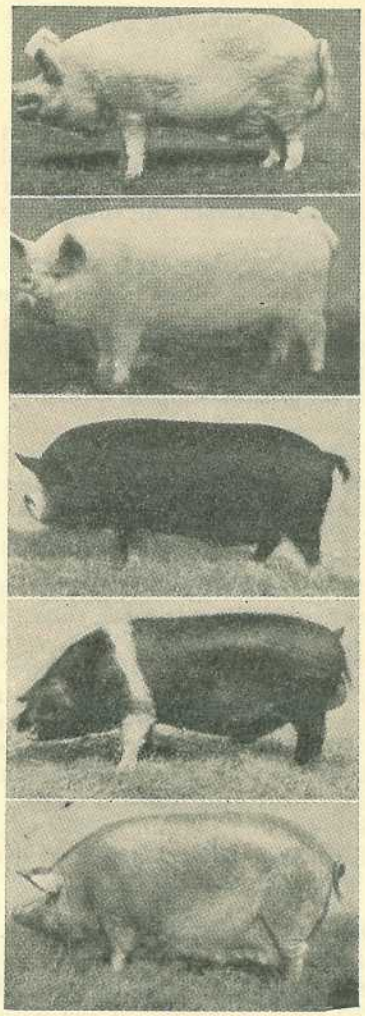


Plate 96.

Typical representatives of breeds of pigs popular at Australian live stock shows. These animals are all in top show condition, and have been properly prepared in readiness for placing before the judge.

Condition.

Breeding stock should be shown in good breeding condition only; any tendency to excessive fatness should be strictly avoided. If breeding stock over twelve months old are any good as breeders and are shown in profitable condition, they will not be overfat. Similarly, animals in low condition are undesirable. Even a sow with a large litter should be in good condition, otherwise she will not show to advantage.

Commercial stock should be exhibited in prime fleshy condition only, for there is no demand for very fat meat, and the judge is definitely at fault who recognises and awards prizes to overfat animals. Excessively fat animals are not likely to prove profitable breeders.

Preparation and Handling.

Animals with a vicious temperament should be excluded from the show ring and should not be kept on the farm. Even ordinary good-tempered pigs must be prepared and always be handled with great care.

The tusks of all boar pigs over six months of age should be cut or sawn off long before the animal is to be penned for show; in fact, the tusks should be removed whether the animal is to be exhibited or not, for boars are notoriously unreliable, and even the quietest of them will at times turn suddenly and show fight. On several occasions in recent years owners or attendants have been ripped in the leg by tusks of boars which were ordinarily very quiet and docile when on the home farm. The most useful instrument of all for the removal of boar tusks is a pair of blacksmith's bolt cutters. Advice on this matter may be obtained from the Department of Agriculture and Stock.

Great care also should be taken in entering the boar pen and in handling the suckers when the sow and litter are together, especially at show time when the animals are being continuously roused up by visitors. This is most important and instructions should be strictly carried out.

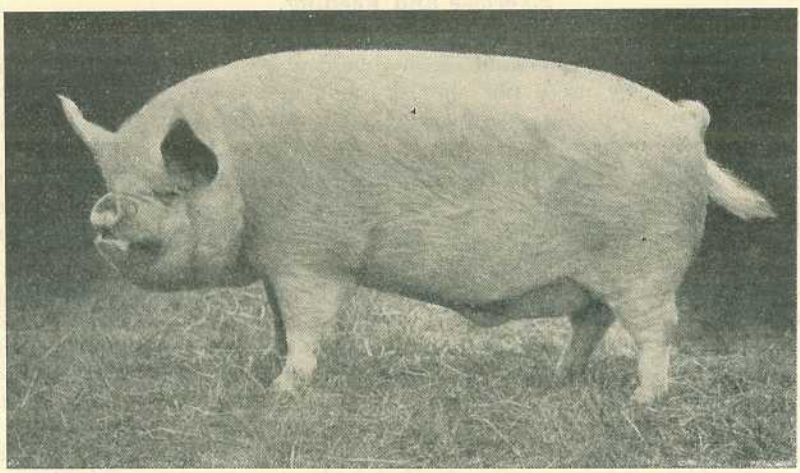


Plate 97.

A champion Middle White, shown in wonderful condition, possibly too fat for use in a warm climate. Note fine silky hair, nice brush on tail, and contented appearance of this animal.

Oiling and Preparing Skin.

It is unwise to smear the skin and hair with a heavy coat of sticky oil. It is equally unwise to permit the exhibition of pigs without first thoroughly washing and cleansing the skin and hair. Regular washing with warm water and soft soap should be the rule for several weeks before the date of showing. The exhibitor who pens pigs bespattered with mud and in a dirty condition only exposes himself to criticism. Careful washing and grooming, brushing over with a brush or cloth, or spraying—using colourless oil—is advised, and especially immediately before parading. Regular oiling will assist in keeping the animals free of parasites, and in mellowing the skin and hair with obvious advantages. It will be noted also that the animal itself appreciates this extra attention.

In the exhibition of stud pigs, clipping of the hair is always objectionable. It is not really necessary, and any attempt to clip with a view to removing natural mismarkings is an offence.

The animals should be carefully trained to parade properly and to stand at ease before the judge. The anxious, excitable animal—especially if in charge of an excitable attendant—usually fares badly, while the well-trained animal in the hands of a patient, observant exhibitor is more likely to succeed.

Judging Rings.

It is, of course, essential to parade all mature animals before the judge, for it is quite impossible to judge mature stock satisfactorily while they are penned in small enclosures. Judging rings or lanes are desirable where they can be arranged for, provided that the animals are well-trained, and that exhibitors are prepared to devote time to the job. In fact, pig judges should specially urge show societies to give this matter the attention it needs; otherwise it will probably be forgotten.

Exercise and Feeding.

Regular exercise is essential to the successful exhibition of pigs, plus plenty of green food and clean drinking water. Purgative medicines should not be used, nor should foods of a very laxative nature. The amount of food used should be strictly limited during the period the animal is on show.

It is wise to accustom the animal for some weeks beforehand to the same food it will get at the show; otherwise change of diet might upset the digestive organs and cause illness, loss of appetite, and "bloom."

If the animal refuses to eat and appears to be fretting and losing condition, a slice or two of apple or carrot, a piece of pumpkin, or some such tasty morsel—especially if sprinkled with salt—will often bring the animal back to its food. In fact, a very light sprinkling of salt over the food occasionally, followed by clean drinking water, will be found useful for show pigs. Clean dry straw, and plenty of it, is advisable for bedding down, and will make the animal feel more at ease. Sawdust, shavings, corn husks, or leaves are not advised if it is possible to substitute straw. The pens must be kept clean, and soiled bedding and dung must be removed regularly every two or three hours.

General Instructions.

It is unnecessary for the exhibitor to appear before the judge in "pig pen togs"; he should be just as spic and span as the animal. A combination of both, added to a pleasant, courteous manner, and a smile even under difficult circumstances, does much to create confidence. The exhibitor should watch the animal during judging; he should not watch the judge except to receive advice or instructions. When the judge has finished with an animal, its owner should not worry other exhibitors who are just as keenly interested in their own exhibits as he is in his. The judge has a difficult task and appreciates the co-operation of exhibitors in placing the animals before him as required. Exhibitors should not try to influence the judge, but should be ready at any time to answer questions the steward might ask. When judging is completed, the exhibitor should await a favourable opportunity for having a chat to the judge about the exhibits. Shows are educational, and are for the purpose of providing comparisons. Exhibitors are, of course, entitled to their own opinions just as much as the judge. The judge should plan his movements so as to enable him to spend sufficient time discussing awards with exhibitors.

Agricultural societies are always glad to have suggestions from exhibitors. Every exhibitor is, or should be, a show society member, and should, therefore, have some influence on the success or otherwise of the show. Member exhibitors have the privilege of sending in nomination of sectional judges for consideration by the show society concerned.

It is well to remember, too, that it is only fair to other exhibitors of pure bred animals that the stud pigs of all breeders concerned should be registered in the appropriate herd book, or be eligible for registration. The Australian Stud Pig Breeders' Society provides for registration of all breeds here.

It is wise also to have printed pedigree forms for stud pigs, and it is important to have the pedigrees prepared beforehand in readiness, so that when an animal is sold, the pedigree may be handed over with the cash receipt. Delay in the issuing and forwarding of pedigrees, and the preparation of pedigrees which are lacking in detail cause trouble, confusion, and unnecessary inconvenience to the buyer. All stud sales should be on a cash basis, and delivery should be subject to this consideration.

Judicious advertising should not be neglected. The Stud Pig Breeders' Society will advise any breeder interested as to the prices he or she should ask for pedigree male or female animals, on the costs of advertising and on similar matters. The Department of Agriculture also advises on these points.

Despatching, Crating, Loading.

Full particulars about the size of crates, material to be used, method of construction, and other relevant information may be obtained at any time from the Department of Agriculture and Stock, free of cost. Crates should be returned promptly, if required, and in as good a condition as when received. Freight on returned empty crates should be paid after proper consignment notes have been made out and signed. The full name and address of sender and of the person to whom consigned should be affixed in a conspicuous position on the crate.

It is wise to remember that pigs in crates *will not be accepted* for transport by shipping companies as cargo on passenger or tourist steamers or on first-class overseas liners, nor will they accept for some places—such as Darwin, New Guinea, and Fiji—unless space, feeding, and attention has previously been arranged for. Shipment in such cases would be by cargo steamers, or as otherwise arranged.

Prior advice regarding despatch of the stock, prompt despatch of pedigree and prize records of parents and the general business-like attitude of the breeder towards the clerical part of the job is most important, and should not be neglected.

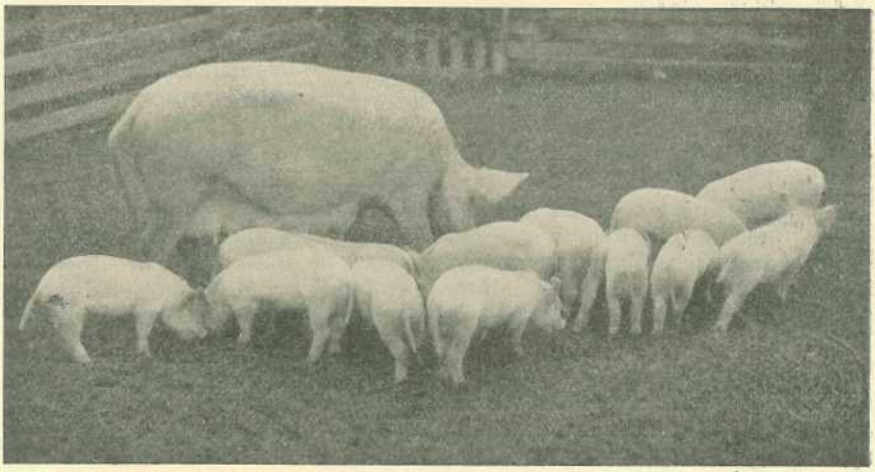


Plate 98.

An entrant in sow and litter (Large White) competition in which at some shows the points are allotted 60 to litter and 40 to sow. The sow has given of her best to her babies, and in consequence is not carrying the condition she otherwise would have for show purposes. The litter is well developed, and indicates prolificacy and thriftiness.

Rail Transport of Stud Pigs.

Where stud pigs (or other pigs) are being transported by rail to shows or other destinations, prior arrangements should be made for necessary space in the rail wagons used for that purpose. Pigs forwarded loose would be transported in wagons for which the symbols used are "L," "MGP," and "FP," and in which one or both decks may be used as provided.

Crated pigs are conveyed in other convenient type wagons, but will not be accepted for carriage on express passenger or mail trains.

Pigs in crates are charged first-class rates, the freight being determined by machine weight. Where two or more pigs are forwarded in one crate and the weight exceeds two hundred weight, the rate will be increased to that of a ½L van.

Note should be made of the 20 per cent. rebate allowed on the transport of pigs for breeding purposes, and of which particulars may be obtained from station masters. Where long distances are to be

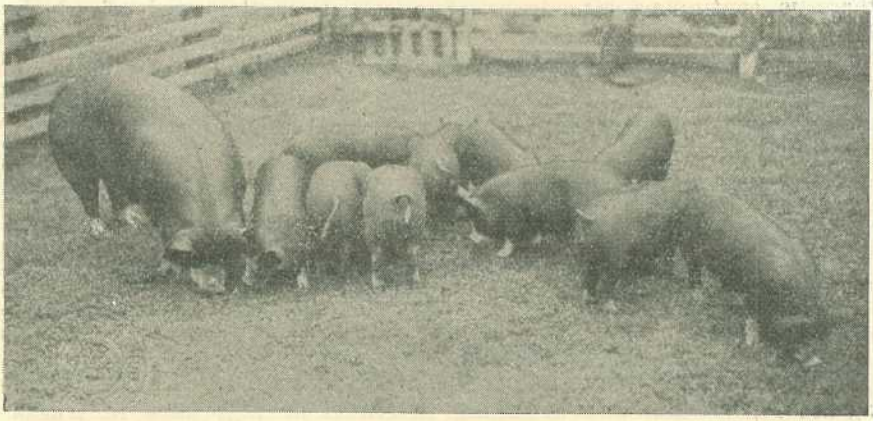


Plate 99.

Another entrant in the sow and litter (Berkshire) competition. In this case the points would be more evenly distributed because the sow is in nice show condition and the litter could not be better. Well marked, well developed, and very attractive.

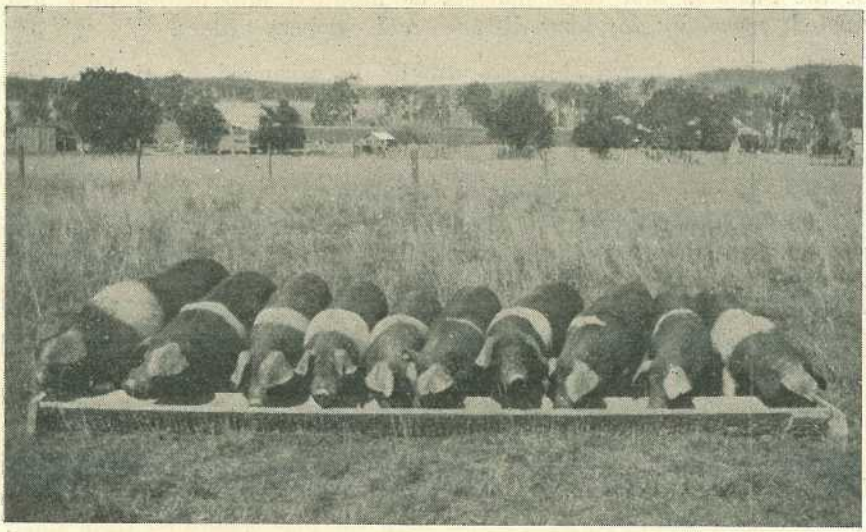


Plate 100.

The Wessex Saddleback grows rapidly, and is of a contented disposition. These young pigs are in course of preparation for stud purposes, and would be in excellent condition for exhibition in "under four months" class.

travelled, it will be necessary for the consignor to make prior arrangements for feeding and attention to the animals at a station at which there is continuous attendance of a station master, and of which information may be obtained on application to the railway people. Where feed is supplied by consignor and is attached to the crate, it may be arranged for one of the railway men to feed the animals en route, but this arrangement is purly a personal one and is not provided for in the regulations.

Water is not supplied *en route* unless attended to by consignor or his agent.

In case of long distance transport, it is sometimes possible to arrange for fast transit by express goods trains.

Trucking, Feeding, Insurance.

Arrangements may usually be made through stock and station agents for feeding and attending to crated or pigs loose in trucks *en route*. The cost of this service should be borne by the purchaser, who also should pay rail freight at the destination, unless the receiver's station is a "gate" where there is no official regularly on duty. In all such cases, freight must be prepaid, and any rebate allowable should be claimed when adjusting freight.

Insurance companies will not usually accept live pigs as "stock," and unless arranged for specially they will not quote for any other than a transit, "farm to farm" cover. It is essential in the interest of the business that these matters be inquired into before stock are quoted, especially for long distance and overseas orders.

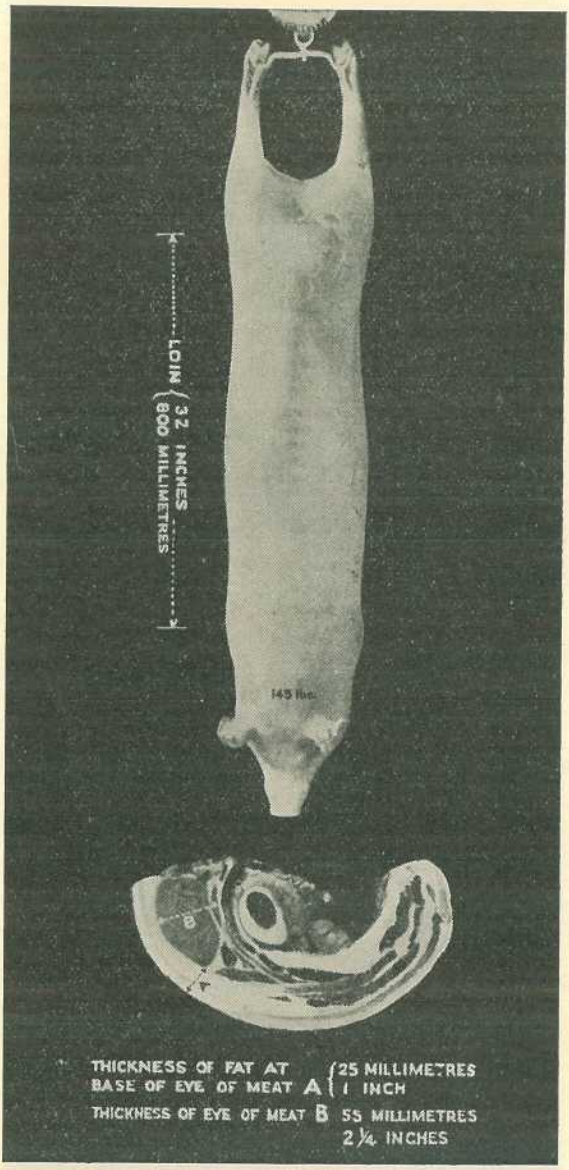
Feeding on board ship can usually be arranged for through the ship's carpenter. In all such cases, the people concerned look quite reasonably for a gratuity for rendering such a service.

Financial Assistance.

Those interested in the importation of stud stock from overseas should place themselves in communication with State Departments of Agriculture, where full particulars can be obtained relating to schemes of financial assistance to importers of pedigreed animals. The conditions are subject to variation from time to time, hence cannot be included in detail in these notes.

Trucking of Pigs and Calves.

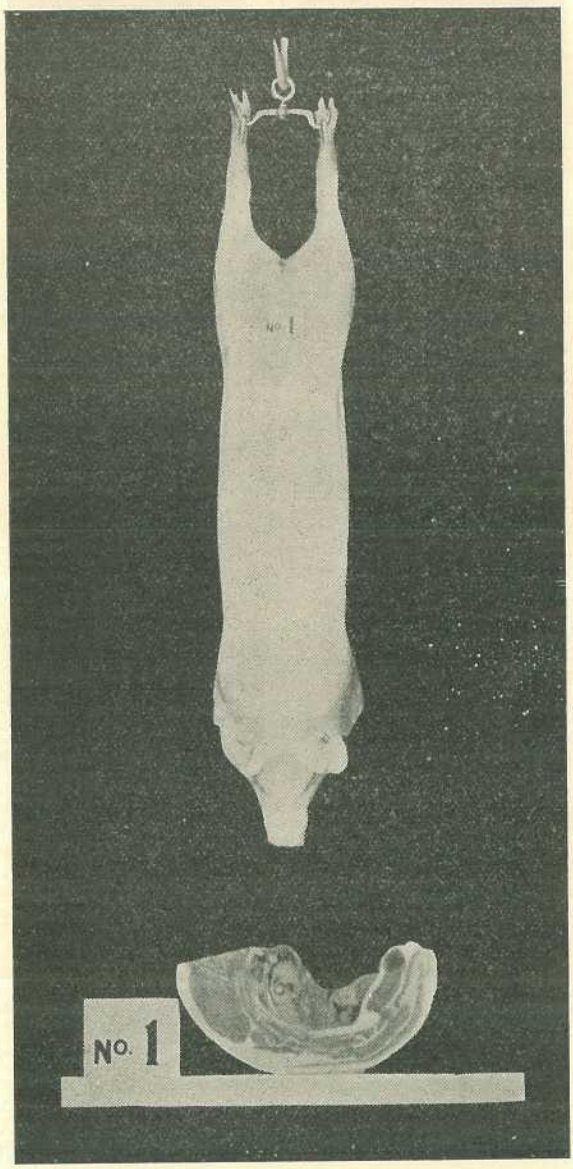
The Queensland Railway Department for some months past has been fitting a number of the smaller type sheep and pig trucks with a partition on each floor, in order to keep the pigs separated from small calves loaded at the same time by farmers and buyers. All concerned are notified that waggons of this type must be ordered when mixed consignments are to be loaded. This service of the Railway Department will be appreciated by all sections of the trade, for apart from the prevention of cruelty aspect, both pigs and calves will arrive at their destination in very much better condition.



[*Photo. by courtesy of A. H. Simons and Jos. B. Swain, from the Empire Pork Review.*

Plate 101.

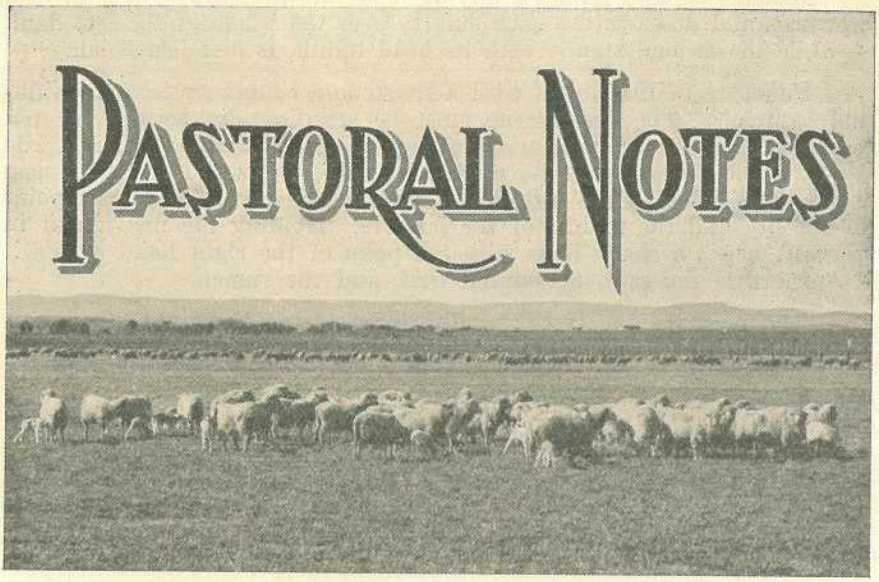
The Ideal Export Baconer Carcase.—Note length, evenness, clean, attractive appearance, and freedom from coarseness of this ideal export baconer. The cut portion indicates that the overseas market prefers pigs in prime, fleshy condition, for there is no profitable market for overfat pigs. Dressed weight (in this case) 145 lb., under Queensland conditions would indicate a live weight of 199 lb., a weight too heavy for Australian requirements but suited to a good class overseas trade.



[*Photo. by courtesy of A. H. Simons and Jos. B. Swain, from the Empire Pork Review.*

Plate 102.

THE IDEAL PORKER CARCASE.—Note clean, attractive appearance, freedom from fault, length, fleshiness, and evenness of carcase. The cut portion suggests a very lean carcase with fat and lean nicely streaked. Dressed weight 70 lb., which, under Queensland conditions, would indicate live weight at approximately 100 lb., a very useful weight in the frozen pork trade and also for Australian requirements.



Acute Bloating of Cattle.

W. DIXON, Inspector of Stock.

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

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

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

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

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

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

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

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

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

PALATABILITY OF FEEDS.

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

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

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

WOUNDS IN HORSES—SIMPLE TREATMENT.

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

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

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

ROTATIONAL GRAZING.

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

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

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

—C. W. Winders.

BLIGHT IN CATTLE.

Blight in cattle may again become prevalent in the coastal areas of the State during the wet season.

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

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

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

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

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

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

DERMATITIS.

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

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

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

—W. Dixon.

STOCK WATERING FACILITIES.

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

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

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

—*Jas. Carew.*

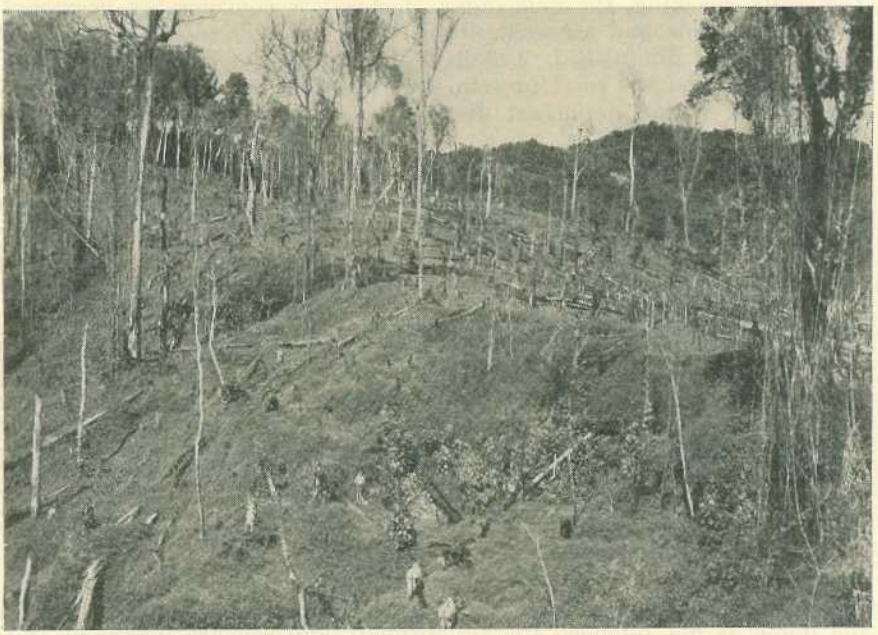


Plate 103. [*Photo.: Lands Department.*

A Dairy Farm in the Making.—Newly cleared and grassed rain forest country at Granadilla, North Queensland.

Effect of Disease on Composition and Yield of Milk.

THE effect of disease on milk from cows is variable. Usually there is an alteration in composition, accompanied by a decrease in yield. Generally speaking, the milk-sugar (lactose) is considerably decreased and the chloride and ash content increased. Fat is more likely to be increased than diminished. Casein is likely to be lowered and albumen increased, whilst the total protein may remain constant. A consideration of one or two important diseases will illustrate the changes that may occur.

Mastitis is one of the commonest diseases in this country, and analyses show that the casein, fat, and lactose are markedly reduced and the chlorides increased in milk from cows suffering from this malady. Casein and fat are the all-important substances in the manufacture of cheese, and a deficiency of these constituents in milk means a lowered cheese yield at the factory. The importance of this disease in relation to cheese making is, therefore, very evident, and only serves to emphasise the need for greater care and vigilance on the part of all concerned in the dairying industry.

Foot and mouth disease is not known in Australia, but analyses of milk in countries where it occurs show that drastic changes are wrought in the composition and yield of milk. One of the most noticeable effects of the onset of this disease is a very marked reduction in the volume of the milk secreted—often to one-quarter of its original quantity. The changes in composition depend very much on whether the udder is inflamed or not. If the udder is inflamed, then the changes in composition are very similar to those that occur in cases of mastitis. When the udder is not inflamed the fat, protein, and ash are increased and the lactose diminished. The fat may rise to as high as 10 to 15 per cent., the protein to 5 per cent. (normally 3), and the lactose diminishes to 3 or 4 per cent. (normally 5).

It is rather curious and interesting to find that the composition of milk when a cow dries off is very similar to that from a cow with foot and mouth disease, without inflammation of the udder. Drying a cow off usually involves a considerable reduction in her feed, together with less frequent milking, and it is suggested that there is a similarity between these conditions and those that occur in severe disease. In cases of disease there is a marked decrease in the food intake, and the milkings are apt to become less frequent. The abnormality of milk and the decrease in yield brought about by these two diseases alone indicate the economic importance of disease in regard to the dairying industry. Anything that the individual farmer may do towards improving the health of his herd will not only be of benefit to himself, but to the industry at large.

—O. St. J. Kent.

DAIRY PASTURES.

Efficient production is the only form of economic production, and this, perhaps, applies more to dairying than to any other primary industry.

Efficiency is achieved by ensuring that cows receive the right food in the right quantities. The cheapest means of filling the first requirement is by herd testing and culling, since by this method only high-producing cows are maintained on the farm.

Nowadays, the value of dairy land is judged, not by the number of cows it will carry, but by the butter-fat production per acre. Once this idea is fixed in mind, it becomes obvious that the higher the cow yields the more economic a producing unit she becomes. Low producers mean reduced output and reduced efficiency in the working of the farm.

As the dairy cow is required to produce large quantities of milk which is rich in protein, it follows that it must be given foods which are likewise rich in protein. There is little difference between the food values of the various popular cultivated grasses, which in the early stages of growth are equal in protein content to many valued concentrates. The young shoots are very rich in this respect, and this accounts for rapid recovery of cattle grazing on pastures after rain following spells of dry weather, or after a burn.

Here, then, is a natural food for the dairy cow readily available. It is economic, too, because with a little care it can be produced in large quantities, and it requires no labour in feeding. The dairy pastures then deserve special attention to maintain them at an efficient standard. There are several ways of maintaining and improving pastures, namely:—

(1) The growing of grasses which have a high feeding value.
(2) Top-dressing pasture land.
(3) Rotational grazing, or, in other words, feeding the grass while in its young stage of growth.
(4) Renovation of pastures.

In selecting grasses, attention must be given to their adaptability to local conditions, period of growth and production, nutritive value, palatability, and suitability for grazing and hay making. The length

of the grazing season is increased and the returns improved by the use of top-dressing. Its practicability depends on the increased returns in terms of cash.

Rotational grazing does not involve so great an outlay and is more a matter of pasture improvement by ensuring the economical use of herbage. The subdivision of holdings to provide rotational grazing appears to offer a ready means of immediate benefit through pasture management. And now is the time to act. It will be too late to achieve any advantage if it is left to make a start when the season turns dry.

—C. W. Winders.

POINTS IN DAIRY PRACTICE.

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

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

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

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

There are various ways in which these plant foods can be returned to the pastures. The obvious method is to distribute the phosphatic fertilizer over the pastures; a less obvious but efficient method is to

administer at least 2 oz. of bone meal to each cow daily. This weight only makes good the calcium and phosphorus removed in the milk and is distributed over the pastures in the droppings.

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

—*L. A. Burgess.*

SOME FACTORS IN PROFITABLE DAIRYING.

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

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

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

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

THE IMPORTANCE OF THE SEPARATOR FLOAT.

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

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

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

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

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

—*S. E. Pegg.*

Sheep on Coastal Farms.

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

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

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

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

—Jas. Carew.

AN AVENUE OF PROFIT FOR THE SHEEP MAN.

It is admitted by those in a position to know that one of the more important retarding factors in the fat lamb industry is the meagre supply of crossbred ewes. This applies not only in Queensland, but all over Australia.

Excellent crossbred ewe lambs, bred the right way, are regularly slaughtered as fat lambs. This is wrong in principle, although easily understood. Farmers generally are not in a position to refuse the remunerative figure offered. The opportunity exists, therefore, for the man further out, especially on some of that excellent country reclaimed from pear infestation, to join long-woolled rams with the robust type of merino, with the object of retaining the ewes of the drop for sale to fat lamb raisers nearer in and on the dearer country. The wethers of the drop should be disposed of as fat lambs.

The profits to a grazier adopting this policy are undoubted.

—*J. L. Hodge.*

HEREDITY IN SHEEP.

None of the domestic animals respond quicker to careful breeding than the sheep.

It may be taken, with some exceptions, admittedly, that like begets like—hence the importance of what is called prepotency in the sire. This power is especially important in the merino, when it is estimated that fully 80 per cent. of the animal's qualities are in the fleece.

To the careful student of breeding, prepotency in the sire is chiefly indicated in the head. This must be entirely masculine, with a bold eye, strong horn, well sprung, and with the head and neck well let into the shoulders. No matter how well a ram is covered, if the head is wrong disappointment usually follows his use in the stud.

The quality, conformation, and constitution of the ewes, too, is of great importance, and it is in the successful "nicking" of the sexes that the truly great studmaster shows that inherent gift which is born with him.

—*J. L. Hodge.*

RIGHT TYPE OF EWE FOR FAT LAMB RAISING.

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

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

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

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

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

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

—*J. L. Hodge.*

CARE OF THE FAT LAMB EWE FLOCK.

Some farmers have the prospective mothers of the fat lamb drop too fat for the purpose. This is wrong in two ways. Firstly, with too much condition a light lambing is likely; and, secondly, feeding the ewes at mating time on grown crops is wasteful and unnecessary.

The ewes should be in strong store condition. It is advantageous to "flush" the ewes on green feed a fortnight before mating. No feed is too good for the flock when the lambs are dropped.

Beware of jetting with an arsenical preparation before joining. This results very often in a poor lambing. If jetting is necessary, the job should be done six or seven weeks before the rams are joined.

Crutching the ewes a month before lambing is advisable.

Careful watch should be maintained for internal parasites, and systematic drenching undertaken so as to free the ewes of the pest long before the lambing season.

Avoid unnecessary yarding with the in-lamb ewes.

Provide a lick suitable to compensate for known deficiencies in the pastures.

—*J. L. Hodge.*

A SIMPLE SQUEEGEE.

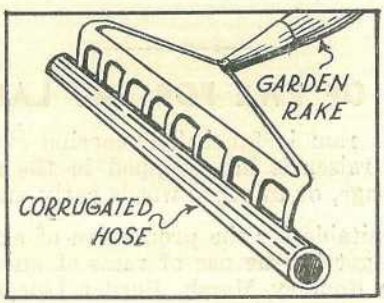


Plate 104.

A substantial squeegee for scraping a dairy floor after scrubbing may be made from a length of garden hose, which is impaled upon the teeth of a garden rake. Such a scraper will prove especially effective if hose having a corrugated surface is used. When worn off on one side, the hose may be turned.

Importance of Body Length in Pigs.

L. A. DOWNEY, H. D. A., Instructor in Pig Raising.

NOW that carcase appraisal has provided a definite measure of carcase quality in pigs, there is indisputable evidence of a general lack of body length in Australian pigs.

For a long time the leaders in the pig industry have stressed the necessity to select for body length, and breeders have attempted to secure this desirable feature in their pigs; in fact, most breeders thought their pigs had sufficient body length. However, since numbers of pigs have been measured under the carcase appraisal system during the past few years, it has been found that Australian pigs generally are too short.

Body length is not only an important characteristic from the point of view of the secondary side of the industry, but the producer also wants long pigs because they are usually more productive—long-bodied sows are usually better milkers, and that extra inch in the middle helps the weight when pigs are being sold.

Investigators have shown that pigs with bodies long in proportion to their weight also have the desirable light covering of back fat.

Body length in proportion to weight can be increased by growing the pigs slowly, but this practice is usually uneconomical, and as body length is an hereditary characteristic and is associated with the number of ribs in the pig, it is important that breeding stock should be selected for length of body either judged by appearance or by records of pigs of similar breeding whose carcases have been appraised.

The number of ribs in pigs varies from thirteen pairs to seventeen pairs, with most pigs having fourteen pairs or fifteen pairs. Such knowledge enables the breeder to have a wide field for selection of stock.

There has been a tendency to select stock with good hams and good heads. These are valuable features in the pig, but not nearly so

important as body length, and in securing good heads and hams body length is usually lost. Breeders and judges of pigs might, therefore, with advantage place a lot more importance on selection for body length, even if something is lost in ham and head quality.

The ideal pig for the grower or the trade is a pig well balanced in all features, but body length has been lost, and it must be retrieved quickly if the industry is to flourish and find a ready market in the United Kingdom for the increasing imports from Australia. It therefore appears very difficult to place too much importance on body length of pigs, particularly when it is remembered that a light covering of back fat and light shoulders are usually associated with good body length.

In a recent pig carcase competition conducted by the Australian Meat Board, in which 114 pigs from most of the States of the Commonwealth were judged by carcase appraisal in London, 92 of the pigs were too fat, and only two pigs reached the required standard for body length. The average total marks gained by all the pigs in the competition were 67·83 per cent., but the average marks gained for body length were only 55·31 per cent. These values are not the opinion of any individual, but are facts, based on measurements, and therefore deserve the serious consideration of the Australian pig industry.

Pig-raisers in Queensland can secure the appraisal of their pigs through various carcase competitions, or by arrangement with the firms slaughtering their pigs. Full information on these services can be obtained from the Department of Agriculture and Stock.

Those pig breeders who fear that the pig which suits the meat trade will not suit the farmer may take solace in the knowledge that in Denmark, where pig improvement has been based on the results of careful testing for many years, there has been marked increase in body length, decrease in back fat, increase in streak thickness, decrease in food consumption per lb. of pork, and increase in rate of growth. These statements are based on the analysis of complete records on many thousands of Danish pigs of the Large White and Landrace breeds, and therefore indicate that similar improvement might be anticipated with other breeds of pigs, provided similar methods are adopted.

Pig recording is costly work, and involves the use of testing stations, but some useful work can be done at very little cost by growers recording the prolificacy of their sows, the rate of growth of their pigs, and the carcase quality of their porkers and baconers.

WHEN SELLING PIGS.

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

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

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

In every instance the greatest care should be taken to avoid bruising and damaging the pigs in transit, especially when loading and unloading. Pigs carted to country sidings for trucking or sale should not be fed immediately before despatch, as such feeding is conducive to heavier shrinkage and to digestive disorders in transit.

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

—E. J. Shelton.

PESTS OF THE PIGGERY.

At this season of the year pigs are frequently tormented by house flies, mosquitoes, and lice. This irritation can be allayed to a large extent by giving the pigs a daily dressing (only a very small quantity at each application) of oil to which a small quantity of disinfectant has been added.

The pig has a tough skin and often carries a coarse coat of hair, but despite that his health may suffer through parasitic infestation. Where the skin is lacerated or badly sunburnt and cracked, blowflies and house flies swarm around, becoming a source of risk to the animal's general health. Wounds resultant from castration and other operations are favourable places for attack by blowflies. Where there is considerable inflammation, painting the affected areas with a dilute solution of iodine will be helpful. Carbolised glycerine—or boro-glycerine—is an excellent dressing once the wounds have been thoroughly cleansed by washing and/or syringing out. Any treatment for reduction of irritation and inflammation and assistance in healing will be beneficial.

Prevention of attack is often difficult, but something might be attempted along these lines by eradicating breeding grounds like manure heaps where flies breed freely. Swampy areas encourage mosquitoes and sandflies, and neglected sties and pens and rubbish lying about harbour fleas and lice. A general clean-up along the lines of a spring cleaning is worth while.

—E. J. Shelton.

CARELESS BRANDING CONDEMNED.

Most pig raisers are now conscious of the necessity for branding pigs offered for sale. Where practicable, the body tattoo method of branding is now in fairly general use. However, there are cases where it is desired to identify live pigs on arrival at bacon factories or saleyards, and for this purpose body tattooing is not suitable; in the absence of a more satisfactory method of branding, the firebrand is used.

The firebranding system is open to abuse in the hands of a careless man, and pigs which have been injured through faulty branding are sometimes noticed at bacon factories and saleyards. Their carcases are so blemished as to lower their value to the trade. The most common mistakes in firebranding are the use of too large a brand, and its application for too long a period—thus causing a deep burn in the skin of the pig which becomes an ugly sore.

Pigs with blemishes caused through faulty branding are not required by the trade. It is frequently observed that exporting buyers at the Cannon Hill saleyards refuse to bid for badly-branded pigs. This, of course, reduces competition, and the blemished pigs are sold at a comparatively low price.

Where pigs must be firebranded, a small brand should be used; the pigs should be clean and dry, and the brand used very hot and applied lightly and quickly on the shoulder or neck.

—E. J. Shelton.

THE PADDOCK SYSTEM OF PIG-RAISING.

Farmers who have not already adopted the practice are advised to give careful consideration to the advantages of running pigs on the grazing system as compared with the intensive penning system which, until a few years ago, was the recognised practice of most pig-keepers.

There is little doubt that the old custom of confining pigs to small pens resulted from the desire to produce very fat carcases. Present-day buyers demand leaner pork and bacon; so it is necessary to alter pig-raising practice accordingly, especially in respect of breeding, feeding, and penning. Provided pigs are bred to the correct type—that is, pigs intended for light porkers bred from quick-maturing stock, and pigs intended for baconers bred from later-maturing stock—they may be kept under grazing conditions from birth until fit for slaughter with very good results. Pigs kept in paddocks throughout their lives have a tendency to grow rather than fatten, and it is the lean, growing pig, and not the fat pig, which is required for meat.

When grazed, pigs find a lot of their food in the form of pasture or forage crops specially grown in the pig paddocks, and these foods usually require less labour and are cheaper than other pig foods. The pigs not only do their own harvesting but also return a good amount of manurial matter to the soil, thus maintaining or improving soil fertility.

With the run of a good paddock containing some pasture or green crop, there is very little chance of pigs suffering from mineral or vitamin deficiency. This is a decided advantage over the intensive penning system, in which ill-health often results from a lack of knowledge or care in attempting to supply a complete diet. Penned pigs often suffer from dietetic disorders, and when turned out on pasture recover rapidly.

Under the intensive system, it is necessary to have buildings, floors, and drains well constructed in order to maintain a safe standard of hygiene. This also means extra labour and water for cleansing pens.

There is little, if any, difference in the costs of establishing a good paddock piggery and a good intensive piggery. One of the most important features of a paddock piggery is that the work of tending the pigs is much more congenial, for the only cleaning-up of the piggery consists of cultivating or resting the pig paddock and moving the sheds and troughs, which should be built on skids to allow of easy transport.

Probably the most practical method of controlling worm infestation in pigs is to run them in paddocks which can be cropped, fed off, and ploughed in rotation. This system and the use of moveable equipment is a very satisfactory method of pig-raising under Queensland conditions.

—*L. A. Downey.*

CORN COB CHARCOAL FOR PIGS.

A good use for the corn cobs (cores) that accumulate on most farms, and around piggeries, is to make charcoal of them. The cores are of little value as a food for pigs because of their coarse, dry fibre content, and even if the whole cob (grain and core) were ground, it is doubtful whether it would be worth the trouble.

After the pigs have chewed all the corn from the cob, the waste cores and husks may be raked together into a pile and burned. When the heap is a mass of red-hot coals water may be poured over the pile. The partially charred cores, when cold, may be gathered for the pigs. Bones should also be gathered and burned, and added to the charcoal made from the cores. This cleaning-up serves a double purpose—it gets rid of matter that would otherwise accumulate and become a nuisance, and provides charcoal and mineral matter for the pigs.

AGRICULTURAL REFORMS IN ENGLAND.

Speaking of the need for greater agricultural reforms, this is how one Englishman who is farming in a large way has put it in a note in the *Farmer and Stock Breeder*: Any proposed reforms themselves "must assure that we keep in cultivation every single acre of land that can be made to produce a crop, and for stock-raising we must create conditions that will ensure that every stretch of pastoral land carries its live stock quota. But before we can pretend to begin practical reforms we are again face to face with the population problem. In my view this question of population dominates the whole issue. It is folly to lament the acres lost to the plough when we have not to-day the labour necessary to farm efficiently the present acreage."

He, of course, was speaking during the recent crisis, when the maintenance of food supplies in the event of war was uppermost in the minds of many in England.

Here is another English farmer's viewpoint taken from the same source:—"To increase the acreage to be farmed would, under present conditions, only make matters worse. We must first create new conditions which will retain on the land an increasing proportion of the young men and women who are bred to country life but year by year drift to the towns to find a decent living. Like boxers, they never 'come back.' It is obvious that the conditions of country life must be sufficiently attractive to retain people permanently on the land. With all essentials guaranteed, we can safely trust to the land to hold its own against the town, for land work is healthier, more vital, and less monotonous than work in a factory. One obviously essential guarantee is a sufficient return to the farmer on the produce of his farm."

Name and Address.	Name of Hatchery.	Breeds Kept.
G. Adler, Tinana	Nevertire ..	White Leghorns, Australorps, Rhode Island Reds, and Langshans
F. J. Akers, Eight Mile Plains	Elmsdale ..	White Leghorns and Australorps
J. Cameron, Oxley Central ..	Cameron's ..	Australorps and White Leghorns
M. H. Campbell, Albany Creek, Aspley	Mahaca Poultry Farm and Hatchery	White Leghorns and Australorps
J. L. Carrick & Son, Manly road, Tingalpa	Craigard ..	White Leghorns
N. Cooper, Zillmere road, Zillmere	Graceville ..	White Leghorns
R. B. Corbett, Woombye ..	Labrena ..	White Leghorns and Australorps
T. G. Crawford, Stratford ..	Rho-Isled ..	Rhode Island Reds
Rev. E. Eckert, Head street, Laidley	Laidley ..	Australorps, White Leghorns, and Langshans
Elks & Sudlow, Beerwah ..	Woodlands ..	Australorps and White Leghorns
W. H. Gibson, Manly road, Tingalpa	Gibson's ..	White Leghorns and Australorps
Gisler Bros., Wynnum	Gisler Bros. ..	White Leghorns
J. W. Grice, Loch Lomond ..	Quarrington ..	White Leghorns
C. & C. E. Gustafson, Tannymorel	Bellevue ..	Australorps and White Leghorns
J. McCulloch, Whites road, Manly	Hindes Stud Poultry Farm	White Leghorns, Australorps, and Brown Leghorns
A. Malvine, junr., The Gap, Ashgrove	Alva ..	White Leghorns and Australorps
H. L. Marshall, Kenmore ..	Stonehenge ..	White Leghorns and Australorps
W. J. Martin, Pullenvale ..	Pennington ..	Australorps, White Leghorns, and Langshans
J. A. Miller, Racecourse road, Charters Towers	Hillview ..	White Leghorns
F. S. Morrison, Kenmore ..	Dunglass ..	Australorps, Brown Leghorns, and White Leghorns
Mrs. H. I. Mottram, Ibis avenue, Deagon	Kenwood Electric Hatcheries	White Leghorns
J. W. Moule, Kureen	Kureen ..	White Leghorns and Australorps
E. K. Pennefather, Oxley Central	..	Australorps and White Leghorns
G. Pitt, Box 132, Bundaberg ..	Pitt's Poultry Breeding Farm	White Leghorns, Australorps, Langshans, Rhode Island Reds, and Brown Leghorns

Name and Address.	Name of Hatchery.	Breeds Kept.
C. L. Schlencker, Handford road, Zillmere	Windyridge ..	White Leghorns
T. Smith, Isis Junction	Fairview ..	White Leghorns and Langshans
T. A. Springall, Progress street, Tingalpa	Springfield ..	White Leghorns
W. J. B. Tonkin, Parkhurst, North Rockhampton	Tonkin's Poultry Farm	White Leghorns and Australorps
T. Westerman, Handford road, Zillmere	Zillmere ..	Australorps and White Leghorns
P. A. Wright, Laidley ..	Chillowdeane ..	Brown Leghorns, White Leghorns and Australorps
R. H. Young, Box 18, P.O., Babinda	Reg. Young's ..	White Leghorns, Brown Leghorns and Australorps

NEW REGISTRATIONS.

Following is a list of those who have applied for the registration of their hatcheries up to the 25th January, 1939:—

Name and Address.	Name of Hatchery.	Breeds Kept.
Dixon Bros., Wondecla ..	Dixon Bros. ..	White Leghorns
G. Grice, Loch Lomond ..	Kiama ..	White Leghorns
P. Haseman, Stanley terrace, Taringa	Black and White	Australorps and White Leghorns
H. W. & C. E. E. Olsen, Marmor	Squaredeal Poultry Farm	White Leghorns, Australorps, Black Leghorns, Brown Leghorns, and Anconas
S. V. Norup, Beaudesert road, Cooper's Plains	Norup's ..	White Leghorns and Australorps
A. C. Pearce, Marlborough ..	Marlborough Stud Poultry Farm	Australorps, Rhode Island Reds, Light Sussex, White Wyandottes, Langshans, Khaki Campbell and Indian Runner Ducks, and Bronzewing Turkeys
W. A. Watson, Box 365, P.O., Cairns	Hillview ..	White Leghorns
Dr. W. Crosse, Musgrave road, Sunnybank	Brundholme ..	White Leghorns, Australorps, and Rhode Island Reds
D. J. Murphy, Ferndale, Marmor	Ferndale ..	White Leghorns, Brown Leghorns, Australorps, Silver Campines, and Light Sussex

REDUCE FEEDING COSTS.

J. J. McLACHLAN, Poultry Inspector.

EVERY effort should be made to reduce production costs to a minimum. On many farms this is being done, but on many more feeding costs are excessive.

The actual costs of foodstuffs is governed by supply and demand; therefore no material saving can be made at this point. Any change in the present ration fed is of doubtful value, because such a change may result in lowering the egg yield. Again, it is doubtful whether any substitute for the existing rations would be economical.

This only leaves the actual practice or management of feeding open to question. Summed up, the cost of production is governed to a great

extent by the food consumed and the wastage. Any reduction in food consumption is followed by a reduction in egg production, therefore feeding costs cannot be reduced by feeding less food.

Food wastage is an appreciable factor in feeding costs. This applies, irrespective of the actual cost of foodstuffs, and is applicable to dry mash, wet mash, and grain feeding. By far the greatest wastage is occurring in the dry-mash system of feeding. This fact has been pointed out to many farmers who have immediately remedied the fault; nevertheless a great amount of wastage is still taking place.

Faultily constructed hoppers are the cause of nearly all the wastage that occurs with the dry-mash system. There are many different designs of dry mash hoppers, and a plan of a suitable hopper can be obtained free on application to the Department of Agriculture and Stock, William street, Brisbane. This hopper embodies other essential features, in addition to minimising wastage. The most important thing about any feed hopper is the feeding trough, which should permit ample space for the birds to eat, at the same time preventing any of the mash being wasted.

The hopper referred to embraces these features within certain limits. It also permits the mash to fall freely. It must be understood, however, that some mashes will run or feed more freely than others. Therefore, no one hopper will prevent different grades of mash overfilling the trough and allowing the mash to be readily scratched out. The hopper recommended has a lath along the front of the trough, and in the event of the mash running too freely and permitting wastage this lath can be shifted to reduce the space. This hopper is easily and cheaply constructed.

Quite recently one poultry farmer installed several of this class of hopper, and he stated that although production was maintained at the same level, the hoppers brought about a saving in food costs of approximately £4 per week. Some time ago another farmer installed similar hoppers and reduced feeding costs from 5 bags to 3 bags of laying mash each week. These two illustrations should be sufficient to demonstrate that wastage can be prevented. In the latter instance quoted, the farmer was confident that no wastage existed on his farm.

To ascertain if wastage is taking place, a rough estimate may be obtained by looking up the purchases of foodstuffs for the previous month or a longer period. As the birds consume approximately equal quantities of mash and grain, the quantities (by weight) purchased should be approximately the same. In the event of the quantity of ingredients for a mash exceeding the quantity of grain purchased, it indicates that the excess quantity is being wasted.

A more accurate method is to count the number of birds in one shed, then empty the hopper, refill it and record the weight of mash supplied; the period which the mash lasts will indicate the true position, as each bird will consume on an average 2 oz. of mash daily. For example, 100 birds supplied with 100 lb. of mash will consume it in eight days; if it only lasted six days each bird would be wasting 4 oz. weekly; if it lasted seven days there would be a wastage of 2 oz. per bird weekly. Such a small wastage as outlined, of 2 oz. per bird weekly, does not appear to be of great importance, but with a flock of 1,000

birds this would amount to 6,500 lb. in a year and would cost about £35, based on present feeding costs.

Existing high costs of all poultry foodstuffs make it essential for every poultry farmer to eliminate wastage. By putting into practice the advice offered, wastage will be minimised and the margin of profit increased.

POULTRY MANAGEMENT.

The maintenance of the flocks in a condition of good health largely depends on two factors:—(1) stock of sound constitutional vigour, and (2) sanitary surroundings.

Only healthy laying and breeding stock possessing an abundance of constitutional vigour should be kept. The removal of birds from the flock at the first sign of debility or sickness is a necessary precaution against loss.

Since the welfare of the healthy members of the flock is of far greater importance than that of a few sick birds, it is important to look after the healthy birds first. Sick birds should be culled out of the flock. The poultry house can then be cleaned and disinfected. All feeding and drinking utensils should be thoroughly washed.

If treatment of sick birds is advisable they should be kept confined while under treatment. Birds suffering from a contagious disease should be quarantined until all danger of contaminating the rest of the flock is over. In many cases of disease it is better to kill the affected birds at once, and burn or bury them deeply. In no case should diseased birds be sold.

Sanitation is a very important factor in keeping down disease in poultry flocks. The land used for poultry should be kept free from contamination by regular cultivation and the growing of grass, or some other kind of crop. Some poultry-men lime their soil annually. It is, of course, necessary to keep poultry houses clean and well littered with clean, dry straw. Houses to be kept free from dampness need good ventilation, but draughts should be avoided. Overcrowding tends to weaken the vitality of the stock, and careful poultrymen allow three or four square feet of floor space to each bird. Poultry houses should be disinfected thoroughly at frequent intervals. If disinfectants are used, the fowls should not be marketed until the odour of the disinfectant has completely gone. If poultry are to be marketed shortly after disinfecting the premises, the house may be best disinfected with a 4 per cent. solution of formaldehyde. Disinfection will be most effective if the floors, walls, and roosts are first cleaned thoroughly.

The culling of laying flocks has been practised for a number of years in practically all parts of the country, and, as a result, the laying qualities of the flocks have greatly improved. Culling has also led to a better distribution of the marketing of surplus hens. While the practice of culling the laying stock is designed to eliminate the poor layers, sometimes there is a tendency to market hens in unthrifty condition or in poor health, a practice which cannot be too emphatically condemned. Only the slip-shod farmer will market hens in poor flesh, and it obviously pays to select stock carefully before marketing.

—P. Rumball.

AUTUMN HATCHING.

The term autumn hatching is usually applied to incubation practised during February, March, and April.

Many poultry raisers may be considering the advisability of autumn hatching during the coming year because of the shortage in the number of chickens raised during the past hatching season. Before adopting this practice, consideration should be given to the financial returns that may be expected from autumn-hatched stock.

Most of our commercial breeds reach maturity within six months; consequently, chickens hatched during the autumn come into production during August, September, or October. Egg prices at this period of the year are usually around about 1s. per dozen gross, for first-quality eggs. Pullets, however, do not produce a first-grade egg with respect to size, and there is a tendency for autumn-hatched chickens to lay eggs of a smaller size than if the birds were hatched during the winter and spring of the year. Consequently, the demand for autumn-hatched stock during the glut period will not equal that for stock hatched in the usual season. In addition, during that period of the year when eggs vary in value from 1s. to 1s. 9d. per dozen, autumn-hatched stock will be growing and not producing.

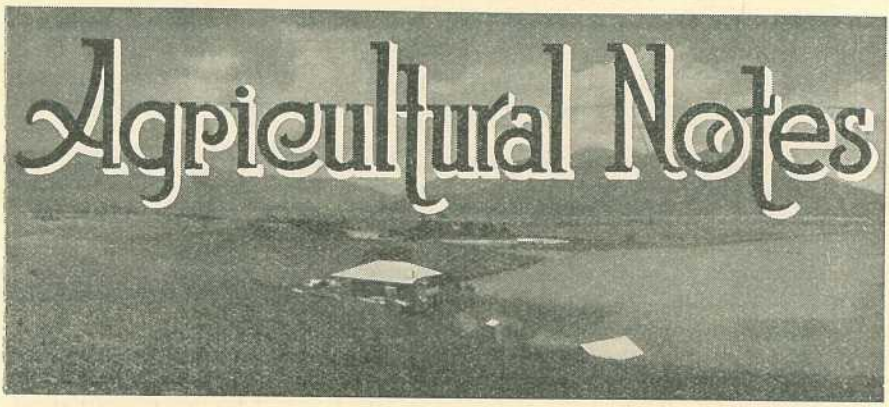
It may be claimed that the autumn-hatched stock will produce eggs in plenty during late summer when egg values are fairly high, the birds moulting late. This cannot be depended upon, for many moult at the usual period.

With the relatively good prices for table poultry—and it is reasonable to assume that good prices will be obtainable for table poultry during the winter of 1939—some justification may exist for the raising of birds that are for table purposes only. This, however, is dependent on the value of fodders. In experiments at the Animal Health Station, it has been ascertained that the following quantities of fodder are required to raise cockerels to the various stages of development:—

Age.	White Leghorns.		Australorps.		Light Sussex.	
	Bird's Weight In oz.	Food Consumption for Period in oz.	Bird's Weight in ox.	Food Consumption for Period in oz.	Bird's Weight in oz.	Food Consumption for Period in oz.
Day-old ..	1·3	..	1·36	..	1·23	..
3 weeks ..	5·31	9·80	5·84	9·9	6·59	10·17
6 weeks ..	12·92	32·8	15·86	34·61	17·03	30·34
8 weeks ..	21·4	54·74	27·5	63·61	27·2	62·74
12 weeks ..	34·7	116·92	49·1	140·39	47·3	144·84
16 weeks ..	47·8	180·01	72·4	226·49	70·4	245·84
18 weeks ..	51·1	215·86	85·0	277·88	83·6	288·94
21 weeks ..	..	..	98·7	358·83	96·8	403·54

The poultry raiser who contemplates hatching poultry for table purposes during autumn should carefully consider the prospects of profitable engagement in this business by calculating the costs from this table, having due regard for the market value of fodder.

—*P. Rumball.*



Rhodes Grass as a Hay Crop.

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

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

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

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

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

—C. W. Winders.

THE VALUE OF ANIMAL MANURE.

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

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

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

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

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

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

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

When land is to be manured the pit can be opened and the material removed.

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

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

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

Cow	52 lb.
Horse	40 lb.
Pig	50 lb.

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

PARA GRASS—USEFUL IN DAMP SITUATIONS.

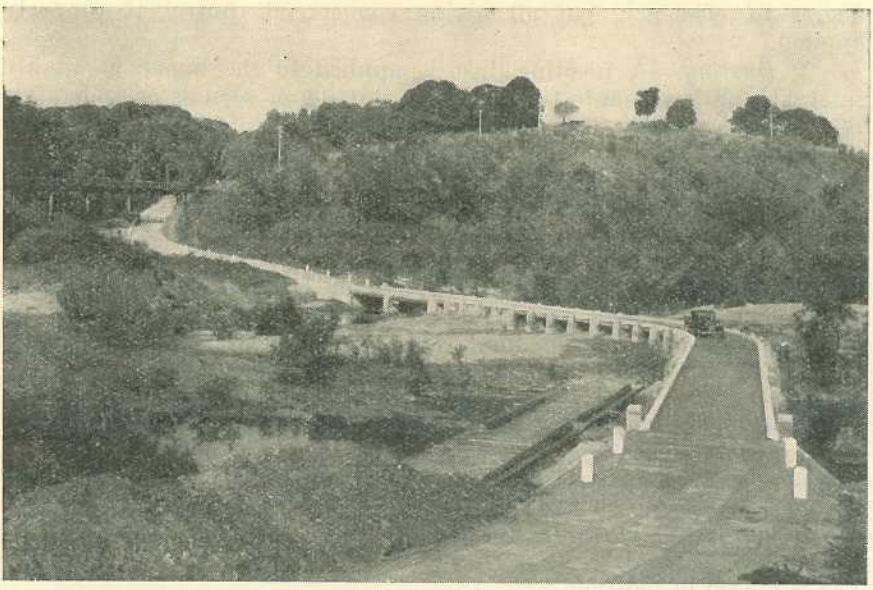
Para grass—known in Queensland also as *Panicum muticum* and giant couch—is grown to a large extent in many tropical and sub-tropical countries. The grass is a rapidly-growing perennial, spreading by means of thick runners which grow along the ground and root at the joints. Vertical shoots are produced at the joints and reach a height of up to 5 feet. The runners spread very quickly, and the area occupied by the grass rapidly increases in size as the mat of foliage is produced.

Stock are fond of both leaves and succulent stems, but the trampling of animals may injure the runners, and under some conditions it is advisable to cut the grass and feed it green rather than graze it heavily. The feeding value of Para grass is fairly good.

Para grass has proved very useful on our coastal country. In North Queensland, it has established a good reputation and is widely grown. It grows best on moist or even swampy land, and a paddock on a wet portion of any coastal farm might well be planted with Para grass to provide a change of diet from paspalum. Heavy frosts cut the grass back rather severely, but recovery in spring is rapid.

Seed of Para grass is usually of poor quality; hence the planting of roots or stem cuttings is the usual method of setting out the grass. These may be planted on ploughed land in furrows or started by mattocking in on the edges of waterholes or damp patches. Roots may be purchased in most of the coastal districts. A small number of cuttings will multiply rapidly in warm, showery weather.

—*C. W. Winders.*



[*Photo.: Lands Department.*

Plate 105.

ON THE ROAD TO THE ATHERTON TABLELAND.—The new bridge across the Barron River at Kuranda, North Queensland.

The Control of Banana Thrips Rust.

RECENT investigations have revealed that rust in bananas, caused by the banana thrips, can be effectively controlled in Southern Queensland at a cost compatible with the economics of the industry, provided that the price obtained for the fruit is maintained at a reasonable level.

Three measures may be recommended, differing in their cost and degree of efficiency, but all giving commercial control if properly applied.

1. *Dusting.*—A nicotine dust is applied to the bunch at weekly intervals for from ten to twelve weeks, starting as soon as possible after the bunch is thrown. The application is made lightly but evenly, from all angles, and with a fair pressure to ensure proper penetration between fingers throughout the bunch. Particular attention should be paid to top hands, especially in bunches which are inclined to be choked. The dusting must be thorough, though it is not necessary to "whitewash" the bunch.

2. *Cloaking and Dusting.*—A piece of hessian or other bagging material, large enough to completely envelop it, is wrapped round the bunch and secured at the top. The nicotine dust is applied at the bottom and the open side at fortnightly intervals during the life of the bunch.

3. *Bagging and Dusting.*—A bag made of good-quality sugar hessian and measuring at least 27 inches wide by 45 inches deep is placed over the bunch as soon as possible after it is thrown, and securely fastened at the top. The nicotine dust is applied through a small hole at the bottom of the bag at fortnightly intervals during the life of the bunch, or, alternatively, at weekly intervals for a month after the bag is placed in position.

In dusting cloaked or bagged bunches the covering is not removed, as it tends to retain the dust within the bunch and thus increase the effect of the nicotine.

In all cases, for the first two or three treatments the bunch stalk from the top hand back to the throat of the plant should be dusted. Also, it is advisable to remove the bracts as soon as they become detached and to snap off the flower end at the same time, especially in bagged bunches.

Growers are warned against removing the bags or cloaks a few days before cutting in order to darken the colour of the fruit. Sun-scalding will inevitably result. No objections have been raised in the past to the slightly paler colour of the fruit from bagged bunches.

The dust must be of good quality. It should be of the light, floating type, and not the heavy, settling type, and have a nicotine content not less than 2 per cent. Various types of dust guns are available. The more expensive ones are undoubtedly the most efficient, but cheaper makes have been found more suitable. In most cases it will be necessary to cut down the normal flow of dust. Dusting while the bunches are wet should be avoided as far as possible. No serious trouble should be experienced with a dust residue if careful attention is paid to these details.

Growers are advised that most of the insecticidal dusts available have been thoroughly tested, but none has fulfilled the general requirements as well as the nicotine dusts.

The time to apply control measures against rust varies with different plantations, and in different seasons, but generally the period ranges from December to April. A periodical examination of bunches of all ages during November and December will indicate quite clearly to growers when they should be tackling this problem.

Of the three measures outlined, bagging and dusting undoubtedly gives the best control of rust. Furthermore, this method obviates almost entirely the somewhat serious inconvenience caused to the operator by the floating clouds of dust, which are unavoidable when dusting alone is being done. Bags have numerous other beneficial effects. There is little difference between cloaking and dusting and dusting alone as a rust-control measure, but cloaking has many of the incidental advantages of bagging.

Bagging and dusting is the most expensive method, and dusting alone the cheapest, a careful estimate suggesting a probable annual cost of £12 and £4 per acre respectively. The cost of cloaking and dusting would lie between the other two, but obviously would depend largely on the price of the material used for the cloaks.

The keynote to success in rust control is thoroughness. Delay in treating the young bunch, by whatever method, is fatal, while slipshod dusting may reduce the efficiency of control to such a low level that the operation is a waste of time and money.

As an accessory factor in thrips control, it is important to have the plantation in first-class cultural condition. A healthy, vigorous plant will produce a bunch thrown well out, with hands well spaced on the bunch stalk, and with the individual fingers widely separated. Such bunches tend to develop rust much less severely and are much easier to treat than the choked and compressed bunches thrown by unthrifty plants.

The Significance of Bronze Orange Bug Outbreaks.

IN coastal areas, the bronze orange bug has recently been more numerous than for some years past. The crop will, of course, be reduced and the twig injury may give the trees a decided set back. Control is relatively simple if given adequate consideration by the grower.

The essential facts in bug behaviour and their significance in the control programme are as follows:—

(1) Outbreaks rarely occur suddenly; they are the sequel to a gradual increase in the bug population over a period of years; an increase which is quite apparent to any grower who personally works among his trees.

(2) Overwintering takes place on citrus trees in a young nymphal stage. Adults and the later-stage nymphs, which are so destructive in summer, are absent in late autumn and winter.

(3) No spray which can be safely applied to citrus trees gives a complete kill of the adults and later-stage nymphs, but a very effective spray is available to destroy the overwintering stage. This stage can be attacked most suitably late in March or early in April when spraying programmes for scale insect control are in full swing.

The appropriate bug spray contains 10 lb. resin, 3 lb. caustic soda, 1½ lb. fish oil per vat of 40 gallons. It can be prepared on the orchard without any great difficulty if the instructions, supplied on request to the Department of Agriculture and Stock, are followed. A soft soap compounded to the above formula is now on the market, however, and many growers will doubtless prefer to prepare the spray from this soap, which is merely dissolved in hot water and then diluted with the required amount of cold water to the proper strength. The resin-caustic soda-fish oil spray entails no more trouble in its preparation from the soft soap than an oil spray or a soap-soda wash, with both of which the grower is familiar. It is also a general purpose spray, toxic alike to the commoner scale insects in coastal districts and the overwintering nymphs of the bronze orange bug.

The bug control problem does not involve additional work for the orchardist. Normally a scalicide, sometimes an oil spray, sometimes a soap-soda wash, is applied to citrus trees on the coast in late March or early April. Resin-caustic soda-fish oil is quite an efficient scalicide, and at the same time deals with any existing bug problem. In these circumstances, the grower merely substitutes the resin-caustic soda-fish oil for the spray which he would normally use in his March-April spray programme.

In view of the importance of the bronze orange bug in coastal orchards at the present time, the resin-caustic soda-fish oil spray should be extensively used next autumn. Otherwise, current losses may be repeated or even accentuated in the 1939-40 season.

PREPARATION OF LAND FOR DECIDUOUS FRUIT TREES.

If a man about to plant an orchard were asked for how long he expected it to be a profitably investment, he would probably reply, "For the rest of my life." That being so—and an orchard can and should last a lifetime—it is obvious that too much care cannot be bestowed on the preparation of the land for the reception of the trees; but it is surprising to find that in some cases the land actually receives less preparation than it would for a quickly-planted row of cabbages.

Trees badly planted in ill-prepared ground cannot thrive, and to attempt to establish an orchard under such conditions is really a waste of time and money. There have been cases in which growers have planted the trees, and then tried to finish "the preparation" of the land afterwards. This cannot be done satisfactorily, and the grower would have been better off in the long run had he deferred his planting for a year.

There is nothing so unsatisfactory as working an unthrifty orchard. On the other hand, nothing in the working life of the orchardist gives more pleasure and satisfaction, or is so interesting, as caring for and harvesting the profit of trees that do well, and respond to good treatment.

In the preparation of the land subsoiling is desirable, although not absolutely necessary, provided the land can be, and is, ploughed to a sufficient depth. Should there, however, be a hard pan under the surface soil then subsoiling is necessary; for, if it is not done, the trees may suffer severly from "wet feet."

A disc plough is, generally, the most satisfactory implement to use; and, if it is not set to cut too wide a furrow, it can be made to plough 18 inches deep.

When preparing land for fruit trees, care should be taken to remove, as far as possible, all roots and stumps, even though they be below plough depth, in order to prevent, or at least to reduce to a minimum, the risk of attack by the root fungus *armillaria mellea* which, although primarily one of nature's scavengers and feeds on dead roots, yet it can —and so often does—leave the decaying roots and fasten on to the live roots of fruit trees with disastrous results. It is almost impossible to save the tree once the fungus has become firmly established.

—H. St. J. Pratt.

PROPPING BANANAS.

Loss of promising and superior fruit as the result of uprooting and breaking down caused during cyclonic weather in the Mons Marie variety shows the necessity for a system of propping that will reduce loss to an absolute minimum.

The method giving the best results is double propping, and it is carried out as follows:—Two stakes, 2 inches by 2 inches and approximately 12 feet long, are tied together about 1 foot from the end, and the tie wire left about 2 feet in length.

The two stakes are opened and the small fork or crotch formed by the union of the two stakes is placed at the correct height on the plant, and the length of wire is drawn round the stem and joined on the props.

When the two legs are firmly placed, and with the aid of the wire tie, it will be apparent that the plant will withstand a great amount of buffeting from the weather.

It is wise to place the props in position as soon as the plants have bunched, as it is noted that at this stage quite a large number are affected.

Another advantage of this method is that the bunch hangs between the two props, thus practically eliminating damage through rubbing.

For Cavendish bananas this method is just as practical, as the one-stake system causes an appreciable loss through rubbing, but for this variety the length may be reduced to 9 feet.

—*J. H. Mitchell.*

TRANSPLANTING TOMATOES.

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

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

—*A. M. Richardson.*

WASHING OF SOIL IN ORCHARDS.

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

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

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

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

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

—*H. St. J. Pratt.*

RESOILING RAIN-WASHED ORCHARD LAND.

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

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

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

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

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

—*A. M. Richardson.*

The Fruit Market.

JAS. H. GREGORY, Instructor in Fruit Packing.

PROSPECTS of a satisfactory market for early green vegetables are promising. Fruit prices for the month have been satisfactory. The Brisbane market has remained steady throughout for Stanthorpe fruits. Green classes of apples became increasingly hard to clear. Stanthorpe growers should make every effort to maintain the price of apples at payable levels by keeping immature fruit off the market, particularly Jonathan and Granny Smith varieties. There will be no competition with Stanthorpe Jonathans by Victorian growers this season, as the absence of rain has reduced the size, quality, and quantity of supplies. In many Victorian districts a heavy drop is being experienced. Queensland pineapples are being sent to Southern markets in green condition to the detriment of prices. The question can still be asked: "When will many of these so-called experienced growers realise that there is no continued profitable sale on any market for immature fruit?" The development of the trade in Queensland fruits on Southern markets is continually being retarded by this type of grower. Queensland has a monopoly of production which only requires sound development to be worth while. The development of a taste for papaws, pineapples, bananas, and mangoes is being handicapped all the time by this short-sighted policy.

Prices:—

Bananas.

Brisbane.—Cavendish: Sixes, 6s. 6d. to 12s. 6d.; sevens, 10s. to 14s. 6d.; eights, 11s. to 15s.; nines, 13s. to 16s.

Sydney.—Cavendish: Sixes, 16s. to 18s.; sevens, 17s. to 20s.; eights and nines, 20s. to 24s.

Melbourne.—Cavendish: Sixes, 14s. to 17s.; sevens, 16s. to 19s.; eights and nines, 18s. to 21s.

Brisbane.—Lady's Finger, 2d. to 11d. per dozen.

The heat wave during the second week of January caused a falling off in demand, retailers in many cases selling boiled fruit in an endeavour to avoid loss, so reducing the public demand.

Adelaide.—Supplies were light; prices, 20s. to 28s.

Pineapples.

Brisbane.—Smooths, cases locals, 3s. to 7s.; Northern, 6s. to 8s.; 2s. to 5s. dozen; Ripleys, 1s. 6d. to 4s. dozen.

Sydney.—Southern Queensland consignments containing much inferior fruit selling 3s. to 8s.; Northern fruit, 7s. to 15s. Some green lines hard of sale.

Melbourne.—Southern Queensland, 8s. to 12s.; Bowen, 10s. to 16s.

Action has been taken by the inspectors, some lines being condemned for immaturity.

Papaws.

Brisbane.—Locals, 2s. to 4s. bushel case; Yarwun, 5s. to 9s. tropical case.

Sydney.—7s. to 11s.

Melbourne.—12s. to 16s. tropical case.

Mangoes.

Brisbane.—Locals, 3s. to 7s.; Fancy Varieties, 8s. to 11s. per bushel.

Sydney.—12s. to 16s. per bushel.

Melbourne.—12s. to 15s. per bushel.

CITRUS FRUITS.

Lemons.

Brisbane.—Locals, 7s. to 12s. per bushel; Gayndah, 14s. to 16s. per bushel.

Melbourne.—17s. to 20s. per bushel.

Oranges.

Brisbane.—Imported, N.S.W., 12s. to 14s. per bushel.

DECIDUOUS FRUITS.

Apples.

Brisbane.—Gravenstein, 9s. to 12s.; well-coloured, 13s. to 14s.

Pears.

Brisbane.—Williams, 6s. to 10s.; Clapps, 3s. to 7s.

Plums.

Brisbane.—Burbank, 3s. to 6s.; Diamonds, 3s. to 5s.; N.S.W. Angelinas, 7s. to 10s.

Peaches.

Brisbane.—Elbertas and Wiggins, 5s. to 7s.; others 2s. 6d. to 6s.

Nectarines.

Brisbane.—3s. to 8s. half bushel.

OTHER FRUITS.

Passions.

Brisbane.—Choice, 5s. to 6s.; others, 2s. to 5s.

Tomatoes.

Brisbane.—Ripe, 3s. to 8s.; Green, 3s. to 5s.; Coloured, 5s. to 9s. half bushel.

Sydney.—Stanthorpe, 5s. to 8s. half bushel.

Grapes.

Brisbane.—White Varieties, Local 3d. to 4d. per lb.; Black, 3d. to 3½d. per lb; Cominya, 5s. 6d. to 7s. half bushel; Roma, 5s. to 7s.; Choice Muscats to 8s. per half bushel.

VEGETABLES.

Beans.

Brisbane.—10s. to 14s. bag; poor lines, 3s. to 4s.

Melbourne.—30s. to 50s. a 50-lb. bag.

Peas.

Brisbane.—8s. to 13s. bag.

Melbourne.—20s. to 30s. a 50-lb. bag.

Cabbages.

Brisbane.—8s. to 12s. bag; Specials higher.

Melbourne.—6s. to 12s. dozen for South Australian.

Beet.

Brisbane.—3d. to 10d. per bundle.

Melbourne.—3s. to 4s. 6d. dozen bundles.

Carrots.

Brisbane.—6d. to 1s. 3d. per bundle.

Melbourne.—3s. to 5s. 6d. dozen bundles.

Parsnips.

Melbourne.—2s. 6d. to 4s. 6d. dozen bundles.

Lettuce.

Brisbane.—2s. to 3s. 6d. dozen.

Melbourne.—6s. to 11s. per case.

Marrows.

Brisbane.—1s. to 4s. dozen.

Melbourne.—7s. to 12s. dozen.

Pumpkins.

Melbourne.—20s. to 22s. bag.

SCRAPER PROTECTOR.

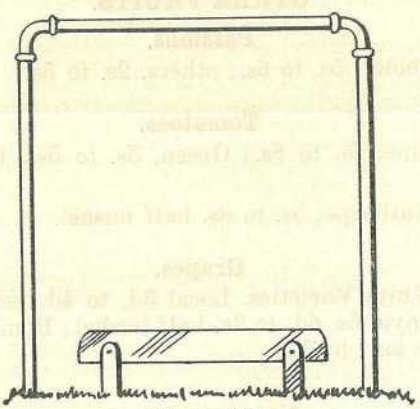


Plate 106.

There is no chance for anyone to stumble over this shoe scraper—a waist-high protector which may be grasped by the one using it to maintain a balance. It is made of three lengths of ½-inch gas pipe and two elbows. Two of the lengths are set upright in concrete at either end of the scraper. The third piece of pipe joined to the upper end of the uprights by elbows forms a crossbar at a height of about 40 inches.—*The New Zealand Farmer.*

PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock which have qualified for entry into the Advanced Register of the Herd Books of the Australian Illawarra Shorthorn Society, Jersey Cattle Society, Aryshire Cattle Society, production charts for which were compiled during the month of December, 1938 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
JUNIOR, 2 YEARS (STANDARD 230 LB.).				
Sunnyview Mabel 3rd	N. L. Siemon, Beaudesert	9,633·77	332·916	Burradale Byron
College Miss Rascal	N. L. Siemon, Beaudesert	7,411·49	313·479	Trevlac General
SENIOR, 2 YEARS (STANDARD 250 LB.).				
Rhodesview Nancy 19th	W. Gierke and Sons, Rhodesview, Helidon	9,128·51	349·603	Blacklands Prospector
Villa Maria Broady 17th	W. Hinrichsen, Clifton	6,375·75	320·295	Cedargrove Monarch
Rhodesview Fanny 25th	W. Gierke and Sons, Rhodesview, Helidon	8,124·03	316·407	Blacklands Prospector
Ashstead Pearlie	H. Seiler, Redbank, Creek, Gatton	7,683·18	263·581	Mountain Home Blossom's Royal
JUNIOR, 3 YEARS (STANDARD 270 LB.)				
Ashstead Rosette	H. Seiler, Redbank Creek, Gatton	7,713·34	286·727	Greyleigh Debenture
SENIOR. 3 YEARS (STANDARD 290 LB.)				
Navillus Violet 3rd	C. O'Sullivan, Navillus, Ascot, Greenmount	7,852·85	313·594	Park View Mars
JERSEY.				
JUNIOR, 2 YEARS (STANDARD 230 LB.).				
College Verbena	Queensland Agricultural High School and College, Lawes	5,453·39	281·224	Peggy 9th Duke of Belgonia
Balwyn Golden Love 2nd	H. G. McKnight, Balwyn, Gowrie Junction	4,804·4	281·157	Carnation Victoradio
SENIOR, 2 YEARS (STANDARD 250 LB.)				
Grange Vale Yvonne	T. Gillespie, Ravenshoe	5,502·5	286·345	Banyule Supremacy
Maiden Fern of Colmdale	G. Schroder, Warra	5,549·15	270·951	Grassmere Floss 20th Twylish
JUNIOR, 3 YEARS (STANDARD 270 LB.)				
Retford's Hope of Hamilton	J. Wilton, Junr., Raceview	5,339·3	344·478	Retford May's Victor
SENIOR, 3 YEAR TANDARD 290 LB.)				
Grange Vale Pansy	T. Gillespie, Ravenshoe	6,809·3	344·237	Eclipse of Brooklodge
AYRSHIRE.				
MATURE COW (STANDARD 350 LB.)				
Fairview Vesta	R. M. Anderson, Southbrook	10,856·14	528·614	Longlands Connie Willie 2nd
Myola Opal	R. M. Anderson, Southbrook	10,841·87	418·497	Fairview Bonnie Willie

General Notes

Staff Changes and Appointments.

Mr. G. K. L. Clark (Esk) has been appointed an inspector under the Diseases in Stock Acts, the Slaughtering Act, and the Dairy Produce Acts, Department of Agriculture and Stock.

The following transfers of officers of the Department of Agriculture and Stock have been approved:—

Mr. C. S. Clydesdale, Senior Instructor in Agriculture, from Mackay to Toowoomba;

Mr. N. E. Goodchild, Senior Instructor in Agriculture, from the Bureau of Tropical Agriculture, South Johnstone, to Mackay;

Mr. W. Dixon, Stock, Slaughtering, and Dairy Inspector, from Cloncurry to Southport;

Mr. M. Custance, Stock, Slaughtering, and Dairy Inspector, from Southport to Ipswich.

Mr. F. Caine, District Inspector of Stock, will be attached to Cloncurry.

Mr. D. A. Bacon, Inspector of Stock, Slaughterhouses, and Dairies, Mareeba, has been appointed also an inspector under the Brands Acts.

Mr. H. J. Bradshaw, Clerk of Petty Sessions, Nanango, has been appointed also an acting inspector of stock at Nanango.

Mr. C. L. Waller, Court House, Cairns, has been appointed chairman of the Babinda and Hambledon Local Sugar Cane Prices Boards, and also an agent of the Central Sugar Cane Prices Board for the purpose of making inquiries in regard to sales and leases of assigned lands.

Messrs. S. F. Robson (Canungra), P. Lentz (Binna Burra), L. W. Kollmar (Springbrook), and F. J. Taylor (North Tamborine) have been appointed honorary protectors under the Fauna Protection Act, and honorary rangers under the Native Plants Protection Act, respectively.

Messrs. E. J. Brewer and E. W. Graham (Sarina) and R. Long (Gympie) have been appointed honorary protectors under the Fauna Protection Act.

Mr. R. A. Tarrant, Instructor in Agriculture, Department of Agriculture and Stock, will be transferred from Brisbane to Bundaberg, and Mr. W. R. Straughan, Instructor in Agriculture, from Miriam Vale to Gympie.

Constables P. Costello (Rosedale), J. R. Hamilton (Proston), and D. G. Mouatt (Kajabbi) have been appointed also inspectors under the Slaughtering Act.

Mr. R. J. Brunton, Spring Creek, Killarney, has been appointed an honorary protector under the Fauna Protection Act and an honorary ranger under the Native Plants Protection Act.

Messrs. F. S. James and J. Brown (Rockhampton) have been appointed honorary protectors under "*The Fauna Protection Act of* 1937."

Mr. C. G. Warrian, of Glenvale Orchard, Southport, has been appointed an honorary protector under the Fauna Protection Act, and an honorary ranger under the Native Plants Protection Act.

Wild Life Preservation.

Two Orders in Council have been issued under "*The Fauna Protection Act of* 1937" declaring as sanctuaries for the protection of fauna an area embracing the summit of Mount Glorious and the head of Cedar Creek and its tributaries; and the Stanley River Catchment and Mr. J. K. McConnel's property at Mount Brisbane.

Honey Board Levy.

The Honey Board Levy Regulations issued in April, 1934, and extended in September, 1936, have been further extended for the period from 9th March, 1939, to 8th March, 1944. They empower the Honey Board to make a levy on growers of honey and beeswax at the rate of 1½ per cent. on all honey and beeswax sold to provide for the administrative expenses of the Honey Board.

Plywood and Veneer Boards.

Regulations have been issued under the Primary Producers' Organisation and Marketing Acts, empowering the Plywood and Veneer Board, and the Northern Plywood and Veneer Board, respectively, to make levies on pine plywood. Such levies to be used in establishing and maintaining a fund for the purpose of subsidising growers for plywood despatched to destinations beyond the Commonweatlh of Australia, or at the option of each Board, in establishing a joint fund contributed by both the Plywood and Veneer Board and the Northern Plywood and Veneer Board for the purpose of subsidising growers of any of the commodities, respectively, controlled by them for plywood despatched beyond the Commonwealth.

The levy, in each case, will be at the following rates:—

(*a*) On plywood three-sixteenths of an inch or less in thickness, at such rate not exceeding one halfpenny per hundred feet face measurement as the respective boards may from time to time determine;

(*b*) On plywood of a greater thickness than three-sixteenths of an inch, at the rate per hundred feet face measurement which bears the same proportion to the rate of levy for the time being determined by the respective boards under paragraph (*a*) above as the thickness of the plywood bears to three-sixteenths of an inch.

Banana Industry Protection Board.

The Regulations under the Banana Industry Protection Acts have been amended to provide that meetings of the Banana Industry Protection Board shall be held once in every three months instead of monthly as at present.

Mr. E. R. Ashburn, Instructor in Agriculture, Department of Agriculture and Stock, has been transferred from Bowen to Monto.

Constable W. O. J. Powell, Stonehenge, has been appointed also an inspector under the Brands Acts.

Veterinary Medicines.

Following on the passing of the Veterinary Medicines Act Amendment Act last Session, all Regulations hitherto in force under the Veterinary Medicines Act have been revoked, and new Regulations embodying the necessary alterations to give effect to the provisions of the amending Act have been issued in lieu thereof. These provide for the licensing of dealers in veterinary medicines, for the registration and analyses of veterinary medicines, and the procedure of business at meetings of the Veterinary Medicines Board.

Mr. F. B. Coleman and Mr. R. A. Taylor, of the Department of Agriculture and Stock, have been appointed Registrar of Veterinary Medicines and Deputy Registrar of Veterinary Medicines, respectively.

Egg Board Levy.

The Egg Board Levy Regulations issued in April, 1929, and extended in May, 1934, have been further extended for the period from 1st January, 1939, to 31st December, 1941. The Regulations empower the Egg Board to make a levy at the rate of ½d. per dozen eggs on all persons delivering eggs to the Board. The proceeds from the levy are used for administrative purposes.

Levy for Innisfail District Canegrowers' Executive.

Regulations have been issued under the Primary Producers' Organisation and Marketing Acts empowering the Innisfail District Cane Growers' Executive to make a levy of ½d. per ton on all cane harvested in its district for the 1938 sugar season, the proceeds therefrom to be used for administrative purposes of the Innisfail District Executive.

Dairy Products Stabilisation Board.

An Order in Council has been issued under "*The Dairy Products Stabilisation Acts, 1933 to 1936,*" constituting the fourth Dairy Products Stabilisation Board and appointing as the members thereof, for the period from 1st February, 1939, to 31st January, 1942, the undermentioned members of the Butter and Cheese Boards:—

Messrs. W. J. Sloan (Malanda), R. M. Hill (Bororen), J. McRobert (Maryborough), J. Purcell (Toowoomba), T. F. Plunkett (Beaudesert), and A. G. Muller (Fassifern Valley, Kalbar) (Butter Board); D. G. O'Shea (Southbrook), T. Dare (Narko), and R. C. Duncan (Pittsworth) (Cheese Board); and Mr. R. Wilson (Acting Director of Marketing).

Answers to Correspondents

BOTANY.

Replies selected from the outgoing mail of the Assistant Government Botanist, Mr. W. D. Francis.

Plants from Maryborough Named.

W.G.M.F. (Maryborough West)—

1. A 3-pronged spear grass, *Aristida* sp. It belongs to a large group of grasses widely spread in Queensland. They are often called "wire-grasses," and are generally regarded as having little or no value as fodder, except perhaps in their very young stages.
2. A sedge, *Cyperus gracilis*. The difference between sedges, grasses, and allied plants you will find given in *Botany for Queensland Farmers*. On the whole, sedges are not generally regarded as having the same fodder value as grasses.
3. Broad-leaf carpet grass, *Axonopus compressus*. This grass is very widely spread in Queensland and is sometimes called "Buffalo Couch." There has been a good deal of controversy about it in the Press of recent years. Though it has some value for second-class country, many dairymen are afraid it will encroach on better-class paspalum country, and seriously depreciate the carrying capacity of the land.
4. Small shivering grass or quaking grass, *Briza minor*, a native of Europe, now widely spread, either cultivated or naturalised, in most temperate countries.
5. Kangaroo grass, *Themeda australis*. Leaves only, and determination therefore doubtful. It may be *Cymbopogon refractus*, barb wire grass. Please send seed-heads to verify.
6. *Sporobolus diander*, a native grass for which we have not heard a common name.
7. Seed-heads required.
8. Large shivering grass or quaking grass, *Briza maxima*.
9. Buffalo grass, *Stenotaphrum secundatum*. No seed-heads; please send later on to verify.
10. Paspalum, *Paspalum dilatatum*. See No. 9.
11. Mullumbimby couch, *Cyperus brevifolia*, a sedge. See No. 2. For the determinations of the sedges in your collections, we are indebted to Mr. S. T. Blake, Walter and Eliza Hall Fellow in Economic Botany at the Queensland University, a botanist who is monographing the Australian sedges.
12. Crow's foot grass, *Eleusine indica*. A very common grass, widely spread over the warm-temperate and sub-tropical regions of the world. Like sorghum and some other fodders, it contains a prussic acid yielding glucoside. Apart from this, it seems to be quite a good fodder.
13. Common couch, *Cynodon dactylon*.
14. A star or windmill grass, *Chloris divaricata*. These grasses represent a group very common in Queensland pastures, making, on the whole, good bottom feed for stock. They are of particular value in sheep country.
15. Prairie grass, *Bromus unioloides*. A valuable grass during winter and spring months.
16. Rat's tail grass or Parramatta grass, *Sporobolus Berteroanus*. This grass has caused some concern in different places, particularly in over-stocked country, as it takes possession of bare patches, and is of very little value as a fodder.
17. A Love grass, *Eragrostis sororia*. The Love grasses represent a large group very common in the mixed native pasture. Although not particularly valuable themselves, they are of some importance in making up the mixture in the general native or wild pasture.

We will always be very pleased to name any specimens you care to send. The usual method is to number each specimen and retain a duplicate.

Blue Weed or Paterson's Curse.

W.H. (Pampas)—

The specimen is the blue weed or Paterson's curse, *Echium plantagineum*, a native of Southern Europe, now a common naturalised weed in Australia. It is much more abundant in the Southern States than in Queensland, and is a very bad pest of the wheatfields. In the wheatgrowing areas of South Australia it is known as "Salvation Jane." It has been established in Queensland for a number of years, but does not seem to have spread to any great extent. This year we have received more specimens than usual.

Guinea Grass.

W.G.B. (Toowong)—

The specimen is Guinea grass, *Panicum maximum*, a very valuable grass for tropical and sub-tropical countries. Several varieties have been introduced by the Department of Agriculture and Stock, and some of these seem rather better than the ordinary type. A particularly good one is that known as "green panic" (var. *trichoglume*).

The typical form of Guinea grass is a very palatable and valuable grass, particularly for periodical cutting and feeding-off. One of the reasons, probably, that it has not been grown more extensively in Queensland is because of the fact that fertile seed is hard to keep. Although the plants may spread naturally from seed, the keeping capacity is very short.

Whitewood.

J.B. (Jandowae)—

The specimen is the Whitewood, *Atalaya hemiglauca*, a tree with a wide distribution in Queensland, New South Wales, and parts of Northern Australia. It is quite a handsome tree in flower, and later on the flowers are followed by winged seed-capsules. In the southern parts of the State, it is generally regarded as an excellent fodder tree. In the inland north-west, the form that grows there is said to be the principal cause of "walkabout" in horses. In the southern parts of the State, and in New South Wales, it has, apparently, never caused trouble in any way.

Vetches.

N.F.W. (Severnlea)—

The two plants sent are vetches, which are leguminous plants allied to the broad bean. The larger-leaved plant is the common vetch, *Vicia sativa*. The smaller-leaved one is the hairy vetch, *Vicia hirsuta*. Both grow in the winter and spring.

Native Tamarind.

S.D. (Babinda)—

The specimen is the Native Tamarind, *Diploglottis diphyllostigia*, a tree confined to Northern Queensland. We have two other species of the genus in South Queensland, one with a yellow fleshy covering of the seeds and the other with a red covering, similar to the one you send, and both are sometimes used for making drinks. They are too acid to use straight out as fruits, but are not known to posses any poisonous or harmful properties whatsoever.

In spite of the extreme acidity of the fruits, we have known pigs to be very fond of them. The northern one you send is, if anything, more acid than the southern forms. It is in no way related to the true tamarind, commonly cultivated in North Queensland. It is, however, very closely allied to the lee-chee and longan, favourite Chinese fruits, sometimes cultivated here, but more often seen dried in Chinese shops.

Barklya, a Beautiful Native Tree.

R.A.C. (Miriam Vale)—

The specimen is *Barklya syringifolia*, a beautiful native tree. The only local name we have heard applied to is "golden shower," a name, however, belonging much more correctly to a different tree. The generic name Barklya is short enough for general use. It commemorates Sir Henry Barkly, an early Governor of Victoria.

Mayweed. Cape Cotton.

C.V.H.C. (Esk, Brisbane Valley)—

The specimens have been determined as follows:—

1. The plant with white, daisy-like flowers and a yellow centre is *Anthemis Cotula*, mayweed or dog fennel. It has been reputed poisonous to stock, but cattle very rarely eat it in any quantity. If poisonous at all, it is certainly only mildly so, and in ordinary circumstances cattle do not eat it in sufficient quantities to cause trouble.
2. *Gomphocarpus fruticosus*, Cape cotton or bladder cotton, a native of South Africa but now a naturalised weed in Queensland and New South Wales. Recent feeding tests at the Animal Health Station, Yeerongpilly, have proved the plant poisonous to stock. Generally, however, stock do not normally eat it in any quantity, except in a very dry time when attracted to it by extreme hunger. It is sometimes fostered in gardens on account of its peculiar appearance, but is potentially a very troublesome weed.

Saffron Thistle.

D.J. (Kilkivan)—

The specimen is the saffron thistle or false star thistle, *Carthamus lanatus*, a native of the Mediterranean region. It is now a great pest in parts of Australia, particularly in the Southern States. It has been established in Queensland for some years, but does not seem to be quite so aggressive here as elsewhere. It always, however, has the possibility of becoming a very bad weed, and on this account should be destroyed.

In spite of its very thorny nature, it has been spoken of at odd times, particularly in the Riverina (New South Wales), as being quite readily eaten by sheep before it gets to the hard, woody stage. A grazier in South Australia states that he had mown a large quantity of this weed, and, later on, stock took very readily to it. We think, however, that this is only making the best of a rather very poor plant.

Rye.

M.J.M. (Goomburra)—

The specimen is rye, *Secale cereale*, much cultivated as a grain crop on the Continent, particularly in Germany and northern France. In Great Britain it is grown to a very limited extent for grain, but very largely for a green feed and hay crop for stock. It is very rarely seen in Queensland. An odd plant or two, however, is occasionally seen, either as a stray or about vacant allotments.

If you want to try it, seed should be sown preferably during autumn, say in May. Much the same conditions apply to it as to wheat.

Sour Grass.

H.N.H. (Cooroy)—

The specimen is *Paspalum conjugatum*, commonly known in Queensland as sour grass or yellow grass. In the Philippine Islands it is commonly known as mission grass or hula grass. It is very widely spread over the tropical regions of the world, and has been established in North Queensland for a number of years. It has travelled south recently, and is now found in various places in Northern New South Wales and along the North Coast Line between Brisbane and Gympie.

Wherever this grass grows it seems to have a very poor reputation as a fodder. It has obtained a very strong hold on some dairy farms in the wetter parts of the Atherton Tableland, and is regarded in much the same way as carpet grass is on the Blackall Range and other places. In the Hawaiian Islands and elsewhere the grass seems to have the same poor reputation as a fodder. It is very common in New Guinea, particularly in coconut and rubber plantations, and we have seen working mules feeding on it extensively . On the whole, however, it apparently has very little value as a dairying grass.

Italian Millet.

D.T.A. (South Johnstone)—

The specimen is *Setaria italica*, Italian Millet. This grass is widely distributed over the warm and temperate regions of the world. It has a good reputation as a fodder grass, and is suitable for silage. It is both palatable and nutritious, and is a summer-growing annual.

Notes on Grasses.

Inquirer (Murgon)—

As a general rule we do not give diagrams and sketches of grasses, but the following notes on those you ask about may be of interest:—

Couch Grass.—The common Couch Grass is *Cynodon Dactylon*, a grass very widely spread over the warmer regions of the world. It has a wide distribution in Queensland. Outside of Australia it is perhaps best known as doub grass. It is a very nutritious and palatable grass, but does not provide a great bulk of forage.

Rhodes Grass.—This is *Chloris Gayana*, a native of South Africa, now cultivated in many countries. It is one of the most important grass introductions into Australia, particularly Queensland.

Pigeon Grass.—A name given to different species of *setaria*. The commonest in Queensland is probably *Setaria glauca*. This grass has a wide distribution over the warm temperate regions of the world. In Queensland it frequents rather wet pastures. It is also found as a weed of cultivation. It is quite a good fodder. The grains of some species of *setaria* or pigeon grass are eaten by the natives in different parts of the world.

Windmill Grass.—A name applied to various species of *chloris*. *Chloris* is a large group of grasses which contains Rhodes grass and a number of native species. Most of the native species are quite good fodder for stock, particularly for sheep, making a good bottom bite.

Rat's Tail Grass (*Sporobolus elongatus*).—This grass has a very wide distribution in Queensland, and is generally regarded as inferior as a fodder.

Summer Grass (*Digitaria marginata*).—This grass is widely spread throughout the tropics and subtropics of the world. It is a very common weed of cultivation in Queensland, and is found from the coast to the far interior. When a constituent of ordinary pasture it mostly grows on sandy land. It is generally regarded as quite good fodder for stock.

Paddock Love Grass (*Eragrostis leptostachya*).—This grass has a wide distribution in the State. The love grasses, though in themselves of only secondary value, are useful members of the mixed native pasture.

Stink Grass (*Eragrostis cilianensis*).—This grass is a native of Southern and Central Europe, but is now widely spread as a weed in most temperate and sub-tropical countries. It is very common in Queensland, and is mostly met with as a weed of cultivation. The leaves are provided with glands along the edges which give forth a peculiar although not altogether unpleasant odour. Generally it is not eaten by stock, although sometimes it is said that plough horses eat it greedily when working in fields in which it predominates.

Prairie Grass (*Bromus unioloides*).—A native of North America now cultivated or naturalised in most warm temperate countries. It is an important winter grass in Queensland.

Forest Blue Grass (*Bothriochloa intermedia*).—This grass has a very wide distribution in Queensland, and in some places is the most important constituent of the mixed native pasture.

Kikuyu Grass (*Pennisetum clandestinum*).—A native of Africa now cultivated extensively in many warm temperate and sub-tropical countries.

Bunch Spear Grass (*Heteropogon contortus*).—This grass has a wide distribution along the Queensland coast. In its young stages it is quite a palatable and nutritious grass; later it becomes harsh and lacking in nutritive value. The name bunch spear grass comes from the fact that the "seeds" become gathered together in bunches because of their long awns.

Paspalum (*Paspalum dilatatum*).—This is one of the most generally cultivated grasses along the whole of the coastal belt. It is a native of Southern Brazil and the Argentine, but is now widely cultivated in sub-tropical countries.

Bitter Blue Grass (*Bothriochloa decipiens*).—A very common grass with a wide distribution in Australia. It is particularly abundant in over-stocked pastures on the coast and north coast because of the more palatable species having been eaten out. Stock will eat it, of course, when forced on to it in the absence of other feed. In the Southern States, particularly in Victoria, it has been found that the grass becomes more palatable and the pasture better if during the autumn clover is sown down with about 1 cwt. of superphosphate per acre.

Rural Topics

Dairy Practice in Germany.

From a recent European tour a member of a party of New Zealand farmers brought home with him a fund of new information on dairy practice in Germany, where high dairy standards have been attained. There avery acre of grass land is used. Even the railway and canal embankments are cropped for grass hay, or grazed by tethered milkers. Ordinary dairy farm land is subdivided into small paddocks. The cattle, arranged in groups according to yield, are allowed to graze on the different plots in turn. The cows yielding the most milk have the first bite of the fresh grass, then the second best or less milk productive group follows the first lot until, finally, the young dry stock and horses are put on to eat out what is left. Then the plot is rested for about a month, and when the grass is long enough again the process is repeated. Every small paddock is managed in the same way, so that the process of rotational grazing is continuous.

By dividing the land available into a large number of plots (four, eight, or twelve, according to the size of the farm) it is possible to let the fresh-milking cows always have a newly-grown pasture and plenty of feed. By this method the German farmer is able to increase his grass crop by manuring the plots after they have been grazed down.

The German dairy farmer is always aiming to increase the quality as well as the quantity of milk produced. The primary aim is to obtain milk in its purest possible condition. Pure milk can only be obtained from clean animals. Animals are kept clean by washing, brushing, and appropriate general care.

Realising the importance of such care, the German cattle breeding societies provide for the proper training of dairy workers. Sons of farmers and dairy hands are trained in schools for milkers. The principles of animal nutrition and the general care of farm stock is included in the course of instruction. The fact that the price of milk is based on quality is a direct incentive for the continuance and efficiency of these schools.

Improvement in the breeding, feeding, and keeping conditions of farm animals is a primary task of German agriculture. The German bull breeding law and laws relating to compulsory milk control and the improvement in quality and quantity of home-grown fodder are all embodied in German agricultural policy.

Calf Feeding.—A device by which calves are fed their milk ration on German dairy farms is simplicity itself. Each calf is allotted its own bucket—a shallow pail with one segment extended like a lug and in which a handgrip is cut. A rubber teat is allowed to float in the milk. This the calf seizes in its mouth and sucks in very much the same way as straws are used in a milk bar. The calf gets its drink in a natural way without waste or sloppiness. Each, of course, is fed in a separate bail.

Teams of Trained Milkers.—On the larger German farms milking is done by a trained team who do nothing else throughout the year than to milk the cows, feed them, and keep things clean.

By paying farm hands wages according to the output per animal per day, milkers are encouraged to obtain as high a yield of milk as possible. It is taken for granted that the compulsory test for the whole herd of cows—a regulation which has now been in force in Germany for two years—has been properly carried out by the farmer. Testing of the whole herd—which is carried out with, perhaps, the greatest thoroughness in Denmark and Holland—has gradually spread in Germany, where, two years ago, the Government decided to compel all owners of cows to register and control the milk yield of their animals.

The purpose of this yield control becomes most evident by the fact that the total output of milk of a number of cows fed and kept in the same way increases so that the net profit of a farm also increases. At the same time the quality control raises the general standard of cattle breeding in Germany because it demonstrates to the farmer the necessity of better feeding and care of dairy stock.

Milk Testing.—The German milk law prescribes that at every milking the first jet of milk from each teat must be tested. This is done in a very simple way. The milker catches the stream of milk in the palm of his hand and scrutinises its appearance. The use of black basins for this work is of greater advantage and more practical. Clotted matter is more easily and accurately observed against the

dark surface of the black basin, serving to avert infection and to prevent "wet milking," which is prohibited. The use of the indicator paper helps the observer to recognise the symptoms of sickness in the udder before these are seen in the changed appearance of the milk. The presence of disease is shown by a sudden change in colour of the indicator paper, easily noticeable by even untrained persons, and enabling them to judge of the state of health of the udder. Sick animals and those suspected of being so much be separated from the cows in sound health, which, of course, are milked first.

In the Milking Bail.—In Germany milking is done mostly by hand. Cow-tail holders protect the milker against being brushed by the cow's tail and also the milk from being soiled by it. To reduce the germ contents, the first jets of milk containing these are milked from every udder into a special first-milk receptacle. In order to prevent the milker's hands from being soiled and infected by contact with the milking stool, and also to allow him comfortably and quickly to adapt himself to the movements of restless animals, the milker has the one-legged stool buckled round him. The receptacle for the milk is an open, oval-shaped milking bucket of tinned sheet plate, with thigh rests. This, however, is being gradually superseded by a covered bucket with an opening for receiving the milk flow. The use of this bucket has proved effective in protecting the milk against disease and germs. A handgrip is placed on the outside of the bucket near the bottom so as to avoid soiling hands when emptying the bucket.

How do you Milk your Cows?

During an investigation among milkers in the Old Country to discover the possibilities of applying the principles of industrial psychology to farming, it was found that nine important points of temperament were needed in a good milker. Here they are with their respective values:—

	Per cent.
Conscientiousness	15
Patience	12
Perseverance	7
Determination	7
Attentiveness	7
Steadiness while at work	7
Punctuality	6
Cheerfulness	4
Talkativeness	2
Love of the work	13
General intelligence	20
	100

Women milkers were found to be more patient but more talkative than men; also they were considered more cheerful than men, but not more so than boys.

The rate of milking cows by different milkers is also very interesting. At this investigation it was found that the mean rate of milking with three test milkers was 1.4, 1.2, and 1 lb. a minute for the morning milking, and 1.25, 1, and 0.9 lb. a minute, respectively, for the afternoon milking.

In practice, it was claimed that an experienced dairy hand will milk about seven 2-gallon cows an hour without much trouble, and a really good milker will do nine.

Variety in Livestock Feeding.

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

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

Valuable Pig Foods.

Skim milk and buttermilk—they should not be mixed with wash water—are of equal feeding value. These dairy products supply all the protein necessary to balance the carbohydrate content of the grain portion of the pig's ration. Together with lucerne, rape, barley, or other green feed—which may be either grazed or fed in the pig pen—they form an excellent ration.

High Lights of the Science Congress.

For the man on the land there were many highlights in the Science Congress at Canberra—many challenging addresses and many brilliant discussions. Sir John Russell, Director of the Rothamstead Agricultural Experiment Station, in England, who is so well known to many Queenslanders, helped the Congress in taking a keenly practical turn by a striking address on soil erosion.

The problem of soil erosion is viewed by both the scientist and the farmer so seriously that a close study of its causes and means of preventing it is now being made.

A survey of soil resources of the Empire, each Dominion making its own investigations, as a first step towards a comprehensive plan of organisation, adjustment, and development was advocated by Sir John Russell. He went on to say that "in the first place, there is the difficulty that prices in world markets vary radically, but there is the more serious danger that the production of one class of crop will lead to the permanent destruction of the soil. The production of wheat exclusively in large areas of Canada and the United States—also in Australia to some extent—has led directly to the destruction of many thousands of acres of good soil by erosion.

The economic importance of opossums and other native animals was emphasised by Professor Dakin, who said that only recently it had been discovered that the rapid killing-off of opossums was the cause of mistletoe getting out of control in Australian forests. The necessity of more adequate national reservations of native fauna and flora also was strongly stressed.

Another highlight of the congress was a discussion on the atmosphere as a source of raw material. The earth's atmosphere is now the subject of intense study by scientists, on whom rests the obligation of educating public opinion in the preservation of natural resources and the maintenance of the balance of nature. The stabilising forces of things within the earth and above the earth and which influence water and food supply requires intelligent study from every angle.

A Wool Substitute.

In his lecture to the Science Congress on modern developments in the industrial world, Professor Denham, of New Zealand, said that there is little doubt that before many years a synthetic fibre, possessing the crimp and elasticity of wool, will be on the market.

The March of Science.

In the course of its sittings for seven days the Congress revealed an immense amount of knowledge of the world about us which to most of us was unexpected and amazing.

We were told something about a new gas—xenon. This gas is very rare, yet in the future it may be exploited to an immeasurable degree by man.

We were let into the secret of what X-ray reveals about proteins. We were told how bromine is recovered from sea water to make the anti-knock motor spirits now sold at every motor service station. And we heard all about the new bearing metal which has the remarkable property of smoking when the lubricating oil gives out, thus supplying an automatic danger signal.

Men of science from many countries told fascinating stories of what the research laboratories of other nations are doing to adapt and direct the resources of nature to man's immediate needs. Sir John Russell, for instance, described how, at his experiment station, in England, the Australian farmer is being helped to replace chemical deficiencies in the soil, and so make twenty blades of grass grow where only one grew before.

To the layman many of these things were astonishing and some almost incredible.

Forest Scouts.

The appalling forest fires in Victoria have aroused the sympathy of all of us with those who have suffered. At one time or another we have all had to fight bush fires, and we know what it means. Here is an idea from Canada for forest fire prevention. Over there they have a volunteer youth movement, organised eight years ago, to help the regular forest rangers in fire prevention. Already an "army" of 10,000 "junior forest wardens" has been enrolled, and it is of great assistance in saving timber reserves from being burnt out. Incidentally, any carelessness in the use of fire anywhere during a dry spell should not be tolerated.

The Green Leaf—The Essential of Life.

Long before man inhabited the earth the atmosphere was foul with carbonic acid gases, so poisonous that a few inhalations of them would destroy life. Gigantic ferns, mosses, and reeds grew with extraordinary rapidity, and by absorbing these noxious gases consolidated them into leaves, stems, and branches, which in the course of long ages grew and decayed, and they changed into coal beds under the earth.

In this wonderful way two great results were accomplished—the atmosphere was purified and made fit for the breathing of man and animals, and vast stores of fuel were laid up for the use of future generations. What the green leaf did for the primeval world the green leaves of our woods and fields are continually doing for our atmosphere to-day.

Without them carbonic acid gases would accumulate to such an extent that animal life would be impossible.

There would not be any gay blossoms to delight our senses; for flowers are as pure breathers as man himself, and cannot exist in a foul atmosphere. Nor have we only the green leaves of our fields and woods to thank for this blessing; the air that we breathe has been purified for us, hundreds of miles away, by the palms of the Pacific, the pines of Europe, the fir trees of America, and the gum trees of Australia. Nothing is more wonderful in Nature than the balance which is kept up between the animals that contaminate the air and the plants that purify it—the refuse of one kingdom being the food of the other. If only 10 per cent. of carbonic acid gas accumulated in the atmosphere it would destroy every animal that breathes it. Out of a much smaller proportion than this the leaf builds up the mass of vegetation which covers the surface of the earth, whilst by the same act it restores to man and animal a healthy and pure atmosphere.

The green leaf, by retaining the constituents of sunlight, is the source of all life of the world. By its agency alone inert organic matter is changed into vegetation which is the starting point of all life.

Nowhere else in the world does this important process take place. The green leaf alone conserves and creates—everything else consumes or destroys. The quiet sunbeam, working by the most delicate and wonderful of chemical reactions in the leaf itself, has created for us our food and fuel.

The green leaf is the best conductor of electricity. To guard our homes from its destruction we erect lightning rods which drain the clouds or receive the discharge and bear it harmlessly to earth. But ages before Franklin pointed the first lightning rod to the storm, Nature had surrounded the dwellings of man with a protection far more effectual than this; for since the creation of organic life every pointed leaf and blade of grass has been silently disarming the clouds of their destructive weapon. A twig covered with leaves, sharpened by Nature's exquisite workmanship, is said to be three times as effectual as the metallic points of the best constructed rod. And when we reflect how many thousands of these vegetable points every large tree directs towards the sky, and consider what must be the efficacy of a single forest with its innumerable leaves, or a single meadow with its countless blades of grass, we see how abundant the protection from the storm is, and with what care Providence has guarded us from the destructive force.

In addition to these wonderful functions, the green leaf is also the source of all the streams and rivers in the world. It is by the agency of the leaf that water circulates as the life-blood of the globe. In the leafless world there would be no rains and no streams. Destroy the woods and you destroy the balance of Nature; you prevent the formation of clouds, you dry up the rivers, and you produce an arid desert; whereas, on the other hand, foster the growth of leaves and they will alter the nature of the climate, and change the wilderness into a fruitful field.

The green leaf is the type upon which the forms of all life are moulded. All the parts of a plant are but modifications of the leaf. The stem is a leaf rolled up tight; the blossom is a leaf transfigured for a higher purpose; the fruit is a leaf changed into a receptacle for the seed; and the seed itself is a leaf packed together in a case to protect it from unfavourable weather, and furnished with a sufficient amount of food for its unfolding and growth into a new plant in more favourable circumstances.

Take a pea or a bean, and if you strip off its envelope or skin, you find that it consists of a short joint and a pair of leaves; as it grows in the ground another joint with its pair of leaves is formed; and then another joint with its pair of leaves is formed, and so on. The whole stem consists of a mere repetition of these single elements—joints and leaves. And as all the vegetable kingdom is thus built up of leaves, so the animal kingdom is constructed on the same model.

All organisms, whether animal or vegetable, are similar in their elementary structure and form; and the most complicated results are obtained by the simplest conceivable means, and that without the slightest violation of the original plan of Nature. The palms of the human form are both constructed upon the model of the leaf. The whole earth is but a gigantic leaf in which the rivers and streams resemble the veins, and the mountains and plains the green parts.

Forestry is a fast declining art. The old ditchers and hedgers fully understood the importance of vegetation and trees. They only removed the surplus growth, allowing to remain all that was necessary for disease prevention. The sooner the hedger's and forester's art is revived in the agricultural community the sooner shall we have healthy soil, healthy stock, and healthy vegetation.

Green leaves are not the inert things many people believe them to be. Without them there would be no life. The crust of the earth was once a burnt cinder; and the reason why it has not continued so, why, unlike the moon which revolves around the earth, a great lifeless desert of solid lava, it has been peopled with all kinds of living things, is owing to the ministry of the green leaf.

—Dr. W. E. WESSELS (Vancouver, B.C.), in *The Jersey Bulletin*, and reprinted from *The New Zealand Farmer*.

Renewal of Federal Grant for Vocational Training of Unemployed Youths.

In view of the announcement that Queensland will secure £25,000 of the £200,000 grant made available in the Federal Government's 1938-39 Estimates for the training of unemployed youths, the Queensland Government has decided to continue the existing schemes of vocational training for youths between the ages of eighteen and twenty-five years. The classes at present being conducted comprise:—(1) Commercial training at Brisbane, Toowoomba, Rockhampton, and Townsville; (2) practical farming at the Queensland Agricultural High School and College, Gatton; (3) scientific mining and prospecting at Charters Towers.

In the farming course applicants are enrolled as short-course students of Gatton College. The course is of twelve months' duration, and provides a sound practical training in farm operations. Whilst in attendance at the course free board will be provided, and an allowance of 10s. per week will be granted. It is possible to draw on this allowance in advance to meet the cost of outfit required.

It is hoped to have 100 students in attendance under the scheme in the early future.

All unemployed or temporarily employed young men between the ages of eighteen and twenty-five years are eligible for selection, and early application is advised.

Further information regarding the agricultural or other courses may be obtained from any technical college or high school, or any Labour Agent's Office, or direct from the Board of Juvenile Employment, Old Railway Offices, George street, Brisbane.

Success in Pork Production.

A young farmer who is doing the pig-raising correspondence course instituted by the Department of Agriculture and Stock, writes:—

"To be successful in pork production the first thing is to get suitable sows who produce good litters *and rear them.*

"We have a sow soon to come in on her fourth litter: to date, this sow has had—

1st litter	.. ..	12, all reared.
2nd litter	.. ..	13, all reared.
3rd litter	.. ..	14, all reared.

She is a Tamworth-Berkshire cross and has not lost a pig."

"Pea-struck" Sheep.

When the Darling pea is in pod, its effects on animals are most noticeable. There is no medicinal treatment, but sheep noticed as affected should be removed immediately to a paddock in which the plant is not growing. Recovery is then certain and rapid, unless, of course, the animals are too far gone.

If practicable, the plants should be hoed out and destroyed. If very thick, a flame-thrower may be profitable to use.

One thing is certain, however—once sheep have acquired a taste for Darling pea they will always look for it; hence the necessity of grazing these particular sheep on country where the plant does not exist.

Treatment of Cream.

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

Navel Infection.

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

To Check a Bad Habit in Calves.

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

Science—The Silent Service.

There was a time when farmers were inclined to look sideways at the man of science, but to-day science has no longer any terrors for the layman. The Science Congress at Canberra last month was welcomed generally as an important contribution to the cultural life of the Commonwealth. No longer are science people regarded as a class apart. Science, after all, is only organised common sense, and does not in any way confine knowledge in watertight containers or within the limits of a ring fence. Solid contempt for the "mere theorist" has gone, and nowadays we see the man of scientific knowledge working in double harness with the practical primary producer. Science works in silence. The modesty of the scientist is the modesty of the eager learner; his zeal is the zeal of the adventurer—the searcher for truth.

Blood Meal for Dairy Stock.

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

When moisture is present, blood soon fouls, and an objectionable odour results from the fermentation. Stock dislike this intensely, and it may be difficult to get animals into the bail where such food has lain.

The Horse's Nosebag.

The nosebag for working horses is more or less a necessary evil. Usually, it gets scant attention and yet the owner of horses so fed often wonders why they go off their midday feed, and yet eat greedily at night. He is then inclined to make the midday feed too light and the night feed too heavy. The reason is plain. Food residues in the nosebag have soured, because of the presence of moisture and saliva.

The considerate horse owner will turn the nosebag inside out each day and expose it to sunlight. Further, he will always keep a spare nosebag to use when the other goes to the weekly wash in hot suds.

Best Time to Poison Green Timber.

The autumn is the best time to poison green timber with arsenic pentoxide or sodium arsenite. If the job is done when the sap flow in the tree is ceasing, suckering will be reduced to a minimum.

Weather Forecasting.

The Australian Radio Research Board—which has been working in Sydney and Canberra on the physics of the upper atmosphere—has made a discovery which may prove of profound importance in weather forecasting. The discovery, which was largely accidental, was described at the Science Congress by Dr. D. F. Martyn.

Records extending over a period of approximately two years, he said, had shown a marked and unexpected association of certain electrical changes in the atmosphere 160 miles above the earth—one hundred and sixty miles—with the movement of ordinary areas of low barometric pressure in the lower atmosphere across the observing stations at Sydney and Canberra. Hitherto it had been assumed that the variations known to occur at great heights in the extremely attenuated ionosphere had been without influence on atmospheric conditions within 10 miles of the ground. A delegate from the United States described the effects observed in Australia as being of first-class importance. He said that it was unquestionable that Dr. Martyn's disclosure would initiate research elsewhere in the world to confirm his results and to explain, if possible, the cause and the significance of the effect noticed.

North Queensland Chilled Beef Production.

Professor Seddon, of the Queensland University, told the Science Congress that development of the wet coastal areas of North Queensland must be regarded as a venture of national importance. He said that the aims of this development should be a better utilisation of the land, the production of high-quality chilled beef, and a regular supply of this important commodity. On observations to date, he added, there was no doubt that suitable pastures could be established and maintained, and that they would provide adequate nutrition for regular and continued growth and fattening of steers taken there.

These animals would be taken off as prime chillers at any time of the year, and could be delivered to the works with a minimum of handling and after a short railway journey, thus leading to few rejections for bruising.

Because of the fattening process being continuous, the cattle could be fattened at an earlier age than was generally possible in North Queensland. Observations do not support the belief, he said, that the usefulness of this country will be short-lived, and the cost of establishing the right grasses will be uneconomic.

The pastures in the Northern lands now under experimental grazing, Professor Seddon remarked, are considered to be too valuable to be used for any purpose other than for their true national worth, which is the production of top-grade chilled beef at a time when it is most needed for export. The success of the Tully River scheme opens up the possibility of bringing large numbers of store cattle from the inland grazing areas and fattening them on the coast, where convenient facilities for treatment and shipment can be provided.

Politeness on the Poultry Run.

It pays to be polite to poultry. If you will always knock on the fowl-house door before entering, so an American poultry research workers says, the fowls will appreciate your courtesy, spring to attention, and face the door in a dignified manner. If you don't knock, the birds are apt to become excited, flutter round the coop, and knock themselves about.

The Modern Sausage.

The old-fashioned sausage is going modern. A Chicago company has just patented a sausage casing made of vegetable parchment and equipped with a zip opener of the same material. After cooking you merely yank the zipper, and "plonk!" the sausage jumps right out of its skin—easier than peeling bananas, in fact.

THE TOAST IS "AGRICULTURE."

Let mining magnates sip their wine
And puff their huge Havanas,
Let foreign nabobs richly dine
Surrounded by sultanas.
Our merchant princes go their way
While bankers bow before them.
What shall it profit them, if they
Forget the land that bore them?

But he whose husbandry can make
Two blades where one was growing,
And from the stubborn earth can take
The harvest of his sowing,
Such is the man who shall command
Our humble emulation
Whose work has made this fertile land
The birthright of a nation.

Then drink a health to men of old
Who farmed this land before us
Through rain and drought, through heat and cold,
They well deserve this chorus,
Australia breeds men of parts
Its maids are lovely charmers,
But the toast we give with fervent hearts
Is—"Gentlemen, The Farmers."

—Adapted from verses by T. A. Robertson in *Veld* (South Africa) and reprinted from *The Farmer and Stockbreeder* (England).

Farm Notes

MARCH.

LAND on which it is intended to plant winter cereals should be in a forward stage of preparation. Sowings of lucerne may be made at the latter end of the month on land which is free from weed growth and has been previously well prepared.

The March-April planting season has much in its favour, not the least of which is that weeds will not make such vigorous growth during the succeeding few months, and, as a consequence, the young lucerne plants will have an excellent opportunity of becoming well established.

Seed wheat should be treated with copper carbonate for the control of bunt. For oats and barley seed the use of formalin or a reliable mercury dust is advisable.

Potato crops should be showing above ground, and should be well cultivated to keep the surface soil in good condition; also to destroy any weed growth.

In districts where the potato crop is subject to Irish blight it is advisable to spray the plants for the control of this disease. Bordeaux mixture of 4.4.40 strength should be applied at least three times at intervals of ten days to a fortnight, commencing when the plants are about six weeks old.

Maize crops which have fully ripened should be picked as soon as possible and the ears stored in well-ventilated corn cribs, or barns. Selected grain which is intended for future seed supplies should be well fumigated for thirty-six hours and subsequently aerated and stored in airtight containers. The germination of the maize is not normally affected by this treatment if dry and mature when treated.

The following crops for pig feed may be sown:—Mangel, sugar beet, turnips and swedes, rape, field cabbage, and carrots. Owing to the small nature of the seeds, the land should be worked up to a fine tilth before planting, and should contain ample moisture in the surface soil to ensure a good germination. Particular attention should be paid to all weed growth during the early stages of growth of the young plants.

As regular supplies of succulent fodder are essentials of success in dairying operations, consideration should be given to a definite cropping system throughout the autumn and winter, and to the preparation and manuring of the land well in advance of the periods allotted for the successive sowings of seed.

The early-planted cotton crops should be now ready for picking. This should not be done while there is any moisture on the bolls, either from showers or dew. Picked cotton showing any trace of dampness should be exposed to the sun for a few hours on tarpaulins, bags, or hessian sheets, before storage in bulk or bagging or baling for ginning. Sowings of prairie grass and *Phalaris tuberosa* (Toowoomba canary grass) may be made this month. Both are excellent winter grasses. Prairie grass does particularly well on scrub soil.

Dairymen who have maize crops which show no promise of returning satisfactory yields of grain would be well advised to convert these into silage to be used for winter feed. This, especially when fed in conjunction with lucerne or cowpea, is a valuable fodder. Where crops of Sudan grass, sorghum, white panicum, Japanese millet, and liberty millet have reached a suitable stage for converting into silage, it will be found that this method of conserving them has much to recommend it. If permanent storage facilities are not available on the farm the stack method offers a practical alternative. Stacking with a framework of poles, and well weighting the fodder, is necessary for best results. All stacks should be protected from rain by topping off with a good covering of bush hay built to a full eave and held in position by means of weighted wires.

Orchard Notes

MARCH.

THE COASTAL DISTRICTS.

IF the weather is favourable, all orchards, plantations, and vineyards should be cleaned up, and the ground brought into a good state of tilth so as to enable it to retain the necessary moisture for the proper development of trees or plants. As the wet season is frequently followed by dry autumn weather, this attention is important.

Banana plantations must be kept free from weeds, and suckering must be rigorously carried out. There is no greater cause of injury to a banana plantation than neglect to cultivate. Good strong suckers will give good bunches of good fruit. Weedy overcrowded suckers will only give small bunches of undersized fruit hard to sell, even at a low price.

Cooler weather may tend to improve the carrying qualities of the fruit, but care should still be taken to see that it is not allowed to become over-developed before it is packed, otherwise it may arrive at its destination in an over-ripe and consequently unsaleable condition. The greatest care should be taken in grading and packing fruit. Small or inferior fruit should never be packed with good large fruit.

There has been a marked increase in the banana thrips population in some districts in which this pest is well established. Growers who consider it necessary to deal with banana thrips are advised to apply to the Department for the latest information on how to deal with this pest.

The marketing of the main crop of pineapples, both for canning and the fresh fruit trade, will be completed in the course of the month, and as soon as the fruit is disposed of plantations, which are apt to become somewhat dirty during the gathering of the crop must be cleaned up. All weeds must be destroyed, and if blady grass has got hold anywhere it must be eradicated, even though a number of pineapple plants have to be sacrificed, for once a plantation becomes infested with this weed it takes possession and soon kills the crop. In addition to destroying all weed growth, the land should be surface worked and brought into a state of nice tilth.

In the Central and Northern districts, early varieties of the main crop of citrus fruits will ripen towards the end of the month. They will not be fully coloured, but they can be marketed as soon as they have developed sufficient sugar to be palatable; they should not be gathered whilst still sour and green.

As blue mould is likely to cause heavy loss in coastal citrus, especially in long-distance consignments, special precautions should be taken for minimising this loss.

It must be remembered that the blue mould fungus will only attack bruised or wounded fruit; hence it is necessary to be careful that no injuries are given by the clippers or finger nails during picking. Fruit should be cut and not pulled. Long stalks which may injure other fruit must be cut away.

The fruit must be carefully handled and accurately packed so as to avoid bruising. Any injured fruit should be discarded. In order to reduce the number of fungus spores present in the plantation, all waste fruit in the orchard or packing shed should be collected at frequent intervals and destroyed by fire or burying.

Fruit must be carefully graded for size and colour, and only one size of fruit of one quality should be packed in one case. The standard bushel case, the inside measurements of which are 18 by 11½ by 10½ inches, is the best for citrus. The fruit must be sweated for seven days before it is sent to the Southern markets, in order to determine what fruit has been attacked by fruit fly, and also to enable bruised or injured fruit liable to blue mould to be removed prior to despatch.

Growers are reminded that the control of the bronze orange bug is best achieved by spraying with the resin-caustic soda-fish oil mixture normally either late in March or early in April. Applied at this time of the year, the spray can give a mortality of 98 per cent. of the bronze bugs, which are then present solely in the very young stages. This spray is also very effective against several of the important scale insects infesting citrus.

Red scale is a pest to which citrus growers will shortly have to give attention, it being considered that control is best established from the middle of March to early in April. Fumigation with hydrocyanic acid gas is most effective against red scale, but success may also be achieved with white oils or with the resin-caustic soda-fish oil mixture evolved for the control of the bronze orange bug. Red scale, of course, is pre-eminently a pest of the hotter, drier citrus districts.

Strawberry planting may be continued during the month, and the advice given in last month's notes still holds good. Remember that no crop gives a better return for extra care and attention in the preparation of the land and for generous manuring than the strawberry.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

THE advice given in these notes for the last few months regarding the handling, grading, and packing of fruit should still be followed carefully. The later varieties of apples and other fruits are much better keepers than earlier-ripening sorts, and as they can be sent to comparatively distant markets, the necessity for very careful grading and packing is, if anything, greater than it is in the case of fruit sent to nearby markets for immediate consumption. Instruction in the most up-to-date methods of grading and packing fruit has been published by the Department, which advice and instruction should enable growers to market their produce in a much more attractive form.

The same care is necessary in the packing of grapes. Those who are not expert cannot do better than follow the methods of the most successful packers.

As soon as the crop of fruit has been disposed of, the orchard should be cleaned up, and the land worked. If this is done, many of the fruit-fly pupæ that are in the soil will be exposed to destruction in large numbers by birds, or by ants and other insects. If the ground is not worked and is covered with weed growth, there is little chance of the pupæ being destroyed.

Where citrus trees show signs of the want of water, they should be given an irrigation during the month, but if the fruit is well developed and approaching the ripening stage, it is not advisable to do more than keep the ground in a thorough state of tilth, unless the trees are suffering badly, as too much moisture is apt to produce a large, puffy fruit of poor quality and a bad shipper. A light watering is therefore all that is necessary in this case, especially if the orchard has been given the attention recommended in these notes from month to month.

PINEAPPLE DISTRIBUTION SCHEME.

Following on representations made by the growers of pineapples to the Minister for Agriculture and Stock (Mr. F. W. Bulcock), a scheme has been inaugurated, to operate during the months of February, March, and April, for the distribution of fresh pineapples direct from the grower to the consumer. The scheme is being administered by the Committee of Direction of Fruit Marketing, which is acting in collaboration with the Railway Department and the Woombye Fruitgrowers' Association. Pineapples are being offered at a uniform price delivered to any railway station in Queensland in cases of three different sizes, i.e., half-bushel, bushel, and bushel and a-half. These cases are quoted respectively at 3s. 9d., 5s. 6d., and 6s. 6d., freight paid. A half-bushel case will hold from six to ten pineapples, a bushel case from eleven to twenty, and a bushel and a-half case from twenty-one to thirty. Orders, accompanied by cash, are being received by all railway station masters in Queensland.

The scheme, which is to operate during the marketing of the summer crop of pineapples, provides an opportunity for householders, particularly those in the country, to obtain supplies of this luscious fruit at reasonable prices.

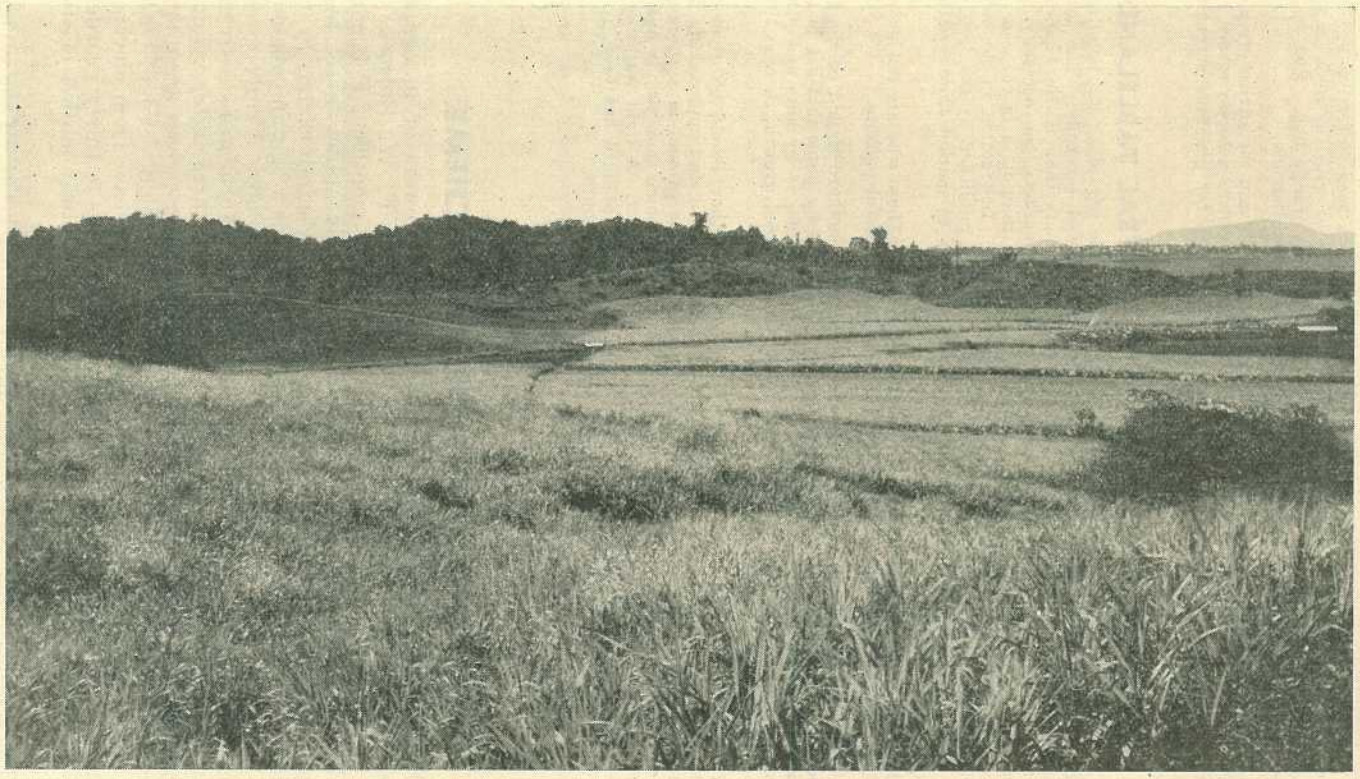
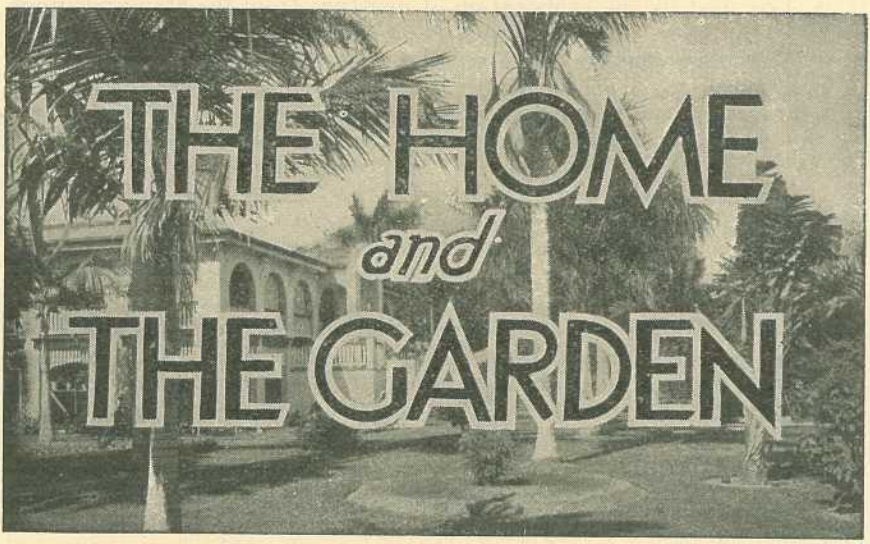


Plate 107.

FROM GOD'S GOOD EARTH HIS GIFT OF CANE.—The Fertile Fields of the South Johnstone District, North Queensland.



Our Babies.

Under this heading a series of short articles, by the Medical and Nursing Staffs of the Queensland Baby Clinics, dealing with the care and general welfare of babies has been planned in the hope of maintaining their health, increasing their happiness, and decreasing the number of avoidable deaths.

THE CODDLED CHILD.

A MOTHER arrived with a baby aged nine months at one of our Baby Clinics the other day seeking advice regarding a rash which had appeared on the child's body. It was noticed that in addition to the cotton and wool singlet, he was wearing a petticoat and dress. The mother stated that the child had suffered from "a cold in his chest" during the winter and she had been afraid to remove the extra clothing.

The rash was due to over-clothing. The tradition that illness is caused by a chill and that wrapping the child up is a means of preventing it, is deeply rooted in the minds of many. No one doubts the necessity of providing adequate covering for premature and delicate infants whose heat-regulating mechanism is not fully developed, but a robust, well-developed child is capable of adapting himself to changes of temperature if he is allowed to use his limbs and move his body freely, unhampered by clothing. Once able to run about, a healthy child, if not overclad, is able to adjust himself to changes of temperature without ill-effects or apparent discomfort. A child, whose older brother had suffered from asthma, was found to be developing symptoms of the disease. The doctor pointed out to the mother that he was being "coddled" and overclad. She was persuaded to expose the child's skin to the air with ultimately good results.

Function of the Skin.

The skin plays a vitally important part in heat regulation. It is a useful and not merely a ornamental covering of the body. While the

body loses heat by the evaporation of moisture from the skin and lungs, most of the heat is lost by conduction and radiation. Production of heat takes place mainly in the muscles. By a delicately adjusted piece of mechanism the body in health is maintained at a temperature best suited to the carrying on of its functions and activities. The part played by the skin in heat regulation is very important and its function, like the function of any other part of the body, should be exercised and encouraged to develop normally in order that it may contribute its share in building up the defences of the body against the invasion of disease. The function of the skin in developed and strengthened by exposing it to light, air, and sun. If the child is overclad or unsuitably clad the function of the skin becomes impaired and he becomes an easier prey to disease. Coughs and colds are infections and are caused by the inhaling of germs from persons suffering from them. If the skin has not been allowed to develop its power to withstand changes of temperature, chilling of the body occurs, and this lowers its resistance to disease. This is why the coddled child feels the changes in temperature and suffers in consequence.

The healthy, hardy child whose skin is active and prepared for changes in temperature, does not suffer from chilling and maintains a high state of resistance to infection by germs. A sudden attempt should not be made to harden the child who has been coddled. The hardening process must be carried out gradually. Watch the changes in temperature and begin by allowing the child to leave off a garment on a warmer day. It is surprising how quickly he becomes used to wearing fewer clothes and appreciates it. He will require fewer bed clothes also. Accustom him to having his body exposed to light, air, and sun, but avoid sunburning. If you proceed resolutely and courageously, the hardening process will continue, your fears will gradually vanish, and by the time it is completed you will be a less anxious and happier mother. At times during the process your confidence will be shaken and you will be tempted to blame the treatment for the first cold that he happens to contract, but with determination and perseverance you will achieve your object.

You may obtain information on all matters concerning child welfare by visiting the nearest Baby Clinic or by writing to the Sister in Charge, or by communicating direct with the Baby Clinic Training Centre, Alfred street, Valley, N.1, Brisbane.

IN THE FARM KITCHEN.

PEANUTS FOR THE TABLE.

The following recipes are particularly suitable for light "snacks" during the hottest days and nights:—

Sandwich Filling.

A delightful sandwich filling may be made as under:—

1 cup of milk or water
1 tablespoon of flour
½ tablespoon water
1 egg
1 teaspoon salt
1 tablespoon of sugar
1 tablespoon butter or other fat
¼ cup of vinegar
Red pepper
2 cups of roasted peanuts ground fine.

Heat the milk, and, while it is heating, mix the flour with the water and add eggs, salt, and sugar. To this mixture add the heated milk. Cook five minutes, stirring constantly. Then add butter, vinegar, and ground peanuts.

Peanut Salad with Bananas.

Slice bananas through the centre, spread out on lettuce leaves, and sprinkle liberally with chopped peanuts. Serve with mayonnaise or plain salad dressing.

Peanut Fondu.

1 cup of finely ground peanuts
1 cup dried Liberty bread crumbs
1 egg
1¾ cups milk
1½ teaspoons salt
Dash of paprika

Grind the peanuts fine. Mix all the ingredients except the white of egg. Beat egg white very stiff and fold in. Bake in a butter baking dish for thirty or forty minutes in a moderate oven.

Peanut Muffins.

¾ cup corn meal
1¼ cup rye flour
1 cup finely ground peanuts
1 egg
1 teaspoon salt
1¼ cup of milk
4 teaspoons baking powder

Add liquids to dry ingredients and mix well. Bake in well-greased muffin pans.

Parched Corn Meal Biscuits.

½ cup of yellow corn meal
1 teaspoon salt
1 cup peanut butter
1½ cup water

Put the meal in a shallow pan and heat in the oven until it is a delicate brown, stirring frequently. Mix the peanut butter, water, and salt, and heat. While this mixture is hot, stir in the meal, which also should be hot. Beat thoroughly. The dough should be of such consistency that it can be dropped from a spoon. Bake in small cakes in an ungreased pan. This mixture makes sixteen biscuits.

Peanut Loaf.

1 cup chopped peanuts
2 cups Liberty bread crumbs
2 tablespoons melted fat
1 egg
½ teaspoon salt
½ teaspoon pepper
½ to ¾ cup of milk

Mix, using enough milk to make a moist loaf. Put in buttered pan and bake an hour in a moderate oven, keeping covered the first half-hour. Baste once or twice with melted fat. Turn into a hot platter and sprinkle with chopped peanuts.

Peanut Brownies.

½ cup of corn syrup
2 tablespoons strained honey
1 square chocolate
¾ cup buckwheat flour
½ teaspoon baking powder
1 cup chopped peanuts
¼ teaspoon salt
1 teaspoon vanilla

Melt the chocolate and mix with the corn syrup and honey. To this add 1 teaspoon of vanilla and the dry ingredients—flour, baking powder, salt, and nuts. Mix well and pour by the spoonful on well-greased pan. Bake in a moderate oven.

Peanut Sausage.

1 cup mashed potatoes
1 cup ground roasted peanuts
1 egg, well beaten
1½ teaspoon salt
⅛ teaspoon pepper
Salt pork, bacon, or other fat

Mix the mashed potatoes and seasonings with the ground nuts. Add beaten egg. Form into little cakes or sausages, roll in flour, meal, or Liberty bread crumbs, and place in greased pan with a small piece of fat or salt pork on each sausage. Bake in fairly hot oven until brown.

Creamed Peanuts on Toast.

2 cups milk
1 cup finely ground roasted peanuts
1 teaspoon salt
1 teaspoon corn starch
1 teaspoon onion juice
½ cup chopped stuffed olives

Canned pimentos, chopped green peppers cooked until tender, or cooked celery are equally as good as stuffed olives.

Scald milk in the double boiler, reserving a tablespoon of cold milk to mix with the corn starch. Add with onion juice and other seasonings to the hot milk. Let come to a boil and finish cooking over the double boiler. Add the peanuts the last thing before serving. Serve on toast. Good for a luncheon dish.

Creamed Peanuts and Rice.

1 cup rice (uncooked)
2 cups chopped peanuts
½ teaspoon paprika
2 teaspoons salt

White Sauce—
3 tablespoons flour
3 tablespoons fat
3 cups milk (whole or skim)

Boil the rice and make a white sauce by mixing the flour in the melted fat and mixing with the milk. Stir over fire until it thickens. Mix rice peanuts and seasoning with the sauce, place in greased baking dish and bake for twenty minutes.

Peanut Brittle.

1 cup white corn syrup
1 tablespoon vinegar
¼ teaspoon salt
1 teaspoon vanilla
1 cup freshly roasted peanuts, halved

Cook the corn syrup, vinegar, and salt in a saucepan until a little dropped in cold water forms a soft ball. Put the peanuts and this syrup into an iron skillet and stir until the syrup becomes a golden brown. Remove from the fire and stir in vanilla. Have ready a shallow buttered pan, pour candy in and spread out in a thin sheet. Allow to cool, then remove from pan and crack into pieces.

Peanut Pop Corn Balls.

2 quarts freshly popped corn
2 cups freshly roasted peanuts
1 cup corn syrup
1 tablespoon vinegar
½ teaspoon salt
1 teaspoon vanilla

Boil the syrup, vinegar, and salt until the syrup hardens when dropped in cold water. Add vanilla. Pour, while hot, over the popcorn and peanuts, and mix well. When cool enough to handle, grease the hands and form into balls.

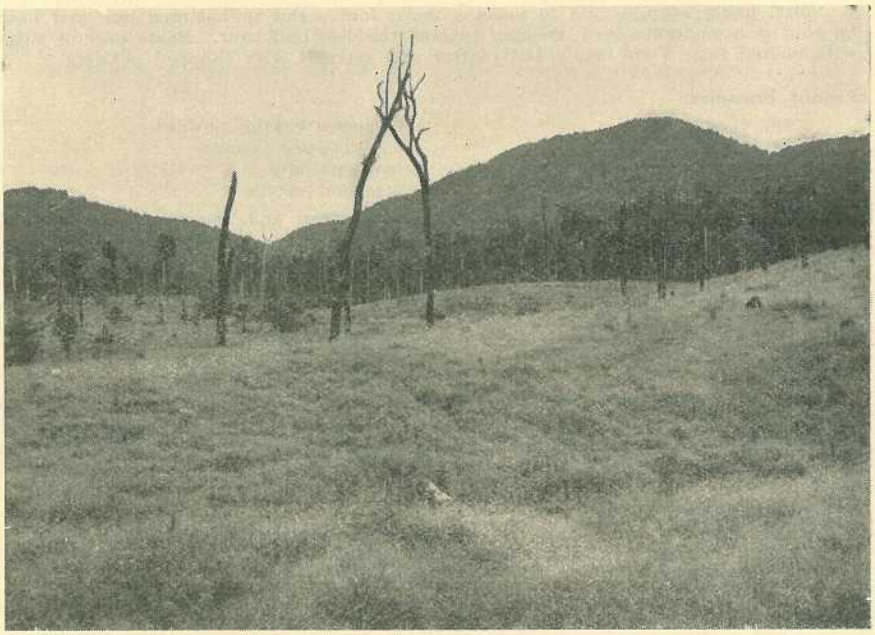


Plate 108.

A HEAVY COVERING OF RICH PASTURE.—Typical rain-forest country cleared and sown with introduced grasses on Utchee Creek, North Queensland.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF DECEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1938 AND 1937, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec.	No. of years' records.	Dec., 1938.	Dec., 1937.		Dec.	No. of years' records.	Dec., 1938.	Dec., 1937.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	7·30	37	1·20	6·07	Gatton College ..	3·76	39	..	3·37
Cairns	8·67	56	4·19	4·55	Gayndah	4·19	67	0·10	2·92
Cardwell	8·18	66	2·80	2·08	Gympie	5·43	68	1·91	4·23
Cooktown ..	6·57	62	3·87	2·64	Kilkivan	4·58	59	0·29	4·94
Herberton ..	5·73	52	0·96	4·72	Maryborough ..	5·08	67	0·34	3·23
Ingham	6·91	46	1·12	0·66	Nambour	6·76	42	0·54	5·16
Innisfail	11·70	57	3·08	1·87	Nanango	3·81	56	0·26	3·20
Mossman Mill ..	10·18	25	3·15	2·18	Rockhampton ..	4·79	67	1·01	3·24
Townsville ..	5·43	67	..	0·06	Woodford ..	5·53	51	0·08	3·45
Central Coast.					*Central Highlands.*				
Ayr	3·95	51	0·50	..	Clermont ..	3·79	67	1·45	0·80
Bowen	4·40	67	..	0·61	Gindie	2·78	39	..	1·56
Charters Towers ..	3·26	56	0·06	1·81	Springsure ..	3·24	69	0·29	2·47
Mackay P.O. ..	7·06	67	1·61	1·20	*Darling Downs.*				
Mackay Sugar Experiment Station	7·98	41	1·91	1·96	Dalby	3·34	68	0·23	1·37
Proserpine ..	7·62	35	0·57	0·74	Emu Vale ..	3·47	42	0·79	2·28
St. Lawrence ..	4·71	67	0·86	1·74	Hermitage ..	2·94	32	..	0·95
South Coast.					Jimbour	3·29	50	..	1·53
					Miles	3·15	53	0·06	2·17
Biggenden ..	4·66	39	1·45	2·31	Stanthorpe ..	3·60	65	1·48	3·10
Bundaberg ..	5·08	55	0·23	3·77	Toowoomba ..	4·45	66	0·30	4·10
Brisbane	4·89	86	0·41	4·53	Warwick	3·45	73	0·56	2·69
Caboolture ..	5·23	51	0·27	4·47	*Maranoa.*				
Childers	5·71	43	0·94	6·84					
Crohamhurst ..	7·18	45	0·24	6·00	Bungeworgorai ..	2·96	24	..	0·80
Esk	4·69	51	..	3·05	Roma	2·56	64	..	1·44

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—DECEMBER, 1938.

COMPILED FROM TELEGRAPHIC REPORTS.

Districts and Stations.	Mean Atmospheric Pressure at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·80	87	75	93	9	69	9, 23	387	11
Herberton	..	82	63	95	12, 13	54	8, 9	96	4
Rockhampton	29·90	91	71		12	65	7	101	5
Brisbane	29·94	86·4	69·3	101	11	60·5	5	41	2
				102·3					
Darling Downs.									
Dalby	29·92	94	64	107	25	52	14	23	2
Stanthorpe	..	86	57	98	19, 20, 21	42	14	148	2
Toowoomba	..	89	62	101	24, 25	48	2	30	2
Mid-Interior.									
Georgetown	29·81	101	73	107	25	65	8	64	3
Longreach	29·82	104	74	113	11, 12	67	20	..	..
Mitchell	29·87	99	68	108	10	49	3	..	..
Western.									
Burketown	29·79	99	78	106	14	71	7	73	1
Boulia	29·68	106	76	116	10	66	2, 3, 4, 5	..	..
Thargomindah ..	29·81	103	71	117	27	57	2	..	..

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	February, 1939.		March, 1939.		Feb., 1939.	Mar., 1939.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					MOONRISE.	
					p.m.	p.m.
1	5·25	6·46	5·45	6·24	3 45	2·28
2	5 26	6·46	5·46	6·23	4·42	3·21
3	5 27	6 45	5·47	6·22	5·36	4·13
4	5·27	6·45	5·47	6·21	6·27	4·57
5	5·28	6 44	5·48	6·20	7·12	5·45
6	5·29	6·43	5·49	6·19	7 55	6·27
7	5·29	6 43	5·49	6·18	8 35	7·10
8	5 30	6·42	5·50	6·17	9·16	7·55
9	5·31	6·41	5·50	6·16	10 1	8·36
10	5·32	6·40	5·51	6·15	10·43	9·21
11	5·32	6·39	5·51	6·13	11·27	10·7
12	5·33	6·38	5·52	6·12	a.m.	10·56
13	5·34	6·38	5·52	6·11	12·12	11·45
14	5 35	6·37	5·53	6·10	1 0	..
						a.m.
15	5·35	6·37	5·53	6·9	1·52	12·37
16	5·36	6 36	5·54	6·8	2·42	1·29
17	5·37	6·35	5·54	6·7	3·33	2·20
18	5·37	6·34	5·55	6·6	4·25	3·12
19	5·38	6·33	5·55	6·4	5·16	4·3
20	5·39	6·32	5·56	6·3	6 8	4·55
21	5·39	6 31	5·56	6·2	7·0	5·46
22	5·40	6·30	5·57	6·1	7·52	6·41
23	5·41	6·29	5·57	6·0	8·46	7·36
24	5·41	6·28	5·58	5·59	9·39	8·31
25	5·42	6·27	5·58	5·58	10·35	9·29
26	5·43	6·26	5·59	5·57	11·33	10·27
					p.m.	
27	5 44	6·25	5·59	5·56	12·32	11·26
						p.m.
28	5·45	6·24	6·0	5·55	1·30	12·20
29			6·0	5·54		1·15
30			6·1	5·53		2·4
31			6·1	5.52		2·51

Phases of the Moon, Occultations, &c.

4th Feb.	○	Full Moon	5 55 p.m.
11th „	☾	Last Quarter	2 12 p.m.
19th „	●	New Moon	6 28 p.m.
27th „	☽	First Quarter	1 26 p.m.

Perigee, 4th February, at 10.0 a.m.
Apogee, 17th February, at 12 noon.

On the 19th Mercury will be beyond the Sun from the Earth, but soon afterwards it will be seen emerging from the afterglow of the Sun, mounting higher until it reaches the furthest limit east of our great Magnet which holds it securely in its elliptical orbit.

Mercury rises at 4.45 a.m., 40 minutes before the Sun, and sets at 5.46 p.m., 1 hour before it, on the 1st; on the 15th it rises at 5.16 a.m., 19 minutes before the Sun, and sets at 6.30 p.m., 7 minutes before it.

Venus rises at 2.2 a.m., 3 hours 23 minutes before the Sun, and sets at 3.31 p.m., 3 hours 31 minutes before it, on the 1st; on the 15th it rises at 2.8 a.m., 3 hours 27 minutes before the Sun, and sets at 3.40 p.m., 2 hours 57 minutes before it.

Mars rises at 12.24 a.m. and sets at 1.53 p.m. on the 1st; on the 15th it rises at 12.2 a.m. and sets at 1.38 p.m.

Jupiter rises at 7.23 a.m. and sets at 8.12 p.m. on the 1st; on the 14th it rises at 6.26 a.m. and sets at 7.48 p.m.

Saturn rises at 10.8 a.m. and sets at 9.57 p.m. on the 1st; on the 14th it rises at 9.22 a.m. and sets at 9.10 p.m.

Following the Milky Way we see the most luminous constellations, from the Southern Cross and the Pointers in the south-east to the Pleiades in the north-west. First and second magnitude stars in Auriga, Perseus, and Aries are near the horizon in the north-west, while Leo with the bright star Regulus has arisen in the east. Castor and Pollux and Camm's Mirror with Procyon are now well above the horizon, north-eastward; westward from the foot of the Cross gleams Achernar, the end of the River. Sirius and Canopus, the two most brilliant of all stars, will be seen till the end of May. With some magnification some fine clusters of stars may be found, as for instance in Gemini and Cancer, the constellation eastward of it, and in Argo Navis, and a small telescope would reveal Binary stars.

6th Mar.	○	Full Moon	4 0 a.m.
13th „	☾	Last Quarter	7 37 a.m.
21st „	●	New Moon	11 49 p.m.
28th „	☽	First Quarter	10 16 p.m.

Perigee, 4th March, at 9.0 a.m.
Apogee, 17th March, at 1.0 a.m.

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

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

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