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Event and Comment

Progress of the Dairy Industry.

PRAISING the Queensland dairy industry for the solid progress it had made in output and value at a farewell gathering in honour of the Minister for Agriculture and Stock, Hon. Frank W. Bulcock, the Premier, Hon. W. Forgan Smith, LL.D., went on to describe the marketing problems which would have to be solved before prosperity and peace could be restored in the world.

Queensland had led the way in regard to organisation in the farming industry, said the Premier. That required a good deal of enthusiasm and hard work, and above all an abiding and deep faith in the future of the State.

Dairying in Queensland had advanced by leaps and bounds. In 1938 there was record production of butter—140 million pounds as against the previous highest output of 133 million pounds in 1934. The value of butter production in 1938 was £8,200,000; in 1937 the factory output was 96,000,000 pounds of a value of £5,600,000. Queensland had moved into first place among the butter exporting States; exports last year were 88,100 tons as against 78,021 the previous year. Queensland contributed £4,534,924 to the total of Australia's exports. Cheese had advanced similarly.

These increases in butter production, value, and export, had meant that in this part of the economic life of the State great progress had

been made. Furthermore, the quality of Queensland butter had improved enormously, which indicated that the right methods were being adopted.

There were still, however, serious problems to be faced. It was an extraordinary thing that in the world to-day the problem of production had been solved, but the problem of an equitable and just distribution had not been solved. In the days when he was studying the theory of economics, there was a belief in some quarters that population would overtake the needs of mankind—that world production would be unable to feed the population. Its supporters did not realise what science applied to agriculture would do.

"No limit can be placed to the capacity to produce," said the Premier. "Methods can be adapted to meet changing needs, but you have also with this capacity to produce the problem of selling at a reasonable price the things you grow."

Co-operation had improved their conditions enormously. No one in Queensland would have the temerity to advocate a repeal of the measures that enabled that co-operation. The future lay with all working to achieve the maximum of co-operation in the work of civilisation itself.

The Great War had left a terrible legacy of death, maiming, and intolerable debt. The aftermath was the growth of economic nationalism; every nation was trying to buy, and every nation was trying to sell. Many currency expedients had been resorted to, and standards of value had been altered. There had been an international agreement whereby gold at £4 5s. per fine ounce was the standard of value, but most countries had now departed from the gold standard. New standards had to be adopted, and throughout the world there was now no co-operation in trade and no international understanding to promote the flow of trade. The problem of exchange as between various countries had complicated all forms of commercial transactions, and stifled the possibility of trade in a normal way between countries.

As an example, the Premier mentioned that when he was in England, butter from Holland was quoted at 11d. per lb. f.o.b. Dutch ports, whereas the price for home consumption in Holland was 2s. 6d. The Danes exported butter, and themselves ate margarine. Beet sugar in certain European countries was exported and sold at 1d. a pound, whereas it cost 8d. in the countries of origin. The desire of these exporting countries was to establish sterling credits in London, not necessarily to buy British goods in return, but in order to buy in the various markets of the world the materials they could not do without.

"The result is that the standard of living of all those people is much lower than it should be. Consequently, producers of every kind of necessary commodity have their markets very seriously limited. If a standard of value could be established in the various countries of the world on a similar basis, trade could be carried on more freely than at present, and many of your problems would be swept away."

Mr. Forgan Smith denied that this prospect was Utopian, and said it was not nearly so difficult a problem as the realignment of geographical boundaries between countries. It was a problem that must be solved if civilisation was not to decline and decay. Trade must be resumed on a

normal basis before world peace could be restored, for the prevailing conditions were breeding fear and international jealousy, and fear was at the bottom of all forms of evil.

"There is no overproduction when hundreds of thousands of people have insufficient food, clothing, and shelter. The remedy must be applied somehow, some time, and the sooner we get on with the business the better. The best way to start is to clear the ground so that we can get a bird's-eye view of the job before us."

Service to the State.

ACKNOWLEDGING the compliment paid him by the Queensland Butter and Cheese Boards at a farewell gathering on the eve of his departure on his mission abroad, the Minister for Agriculture and Stock said that the conditions in the countries that he would visit were comparable with those in Queensland, and the work being undertaken must necessarily have some bearing on our own prosperity and advancement.

While the dairy industry was buoyant and the various organisations were doing everything to promote a healthy spirit and prosperity, they must ask to what degree they were coping with the fundamental problems. These were of three kinds. There were the problems such as stock hygiene that the farmer himself may overcome. The second class of problems was more difficult, requiring the co-operation of factory managements, producers, and the Department. The third kind was almost entirely beyond the ken of the producer as far as remedial measures were concerned—that of economic loss arising from disease and parasites peculiar to animal husbandry, and preventible economic loss on the manufacturing side of the industry.

The dairy research laboratory of his Department, Mr. Bulcock continued, was the first in Australia, and even now there was only one other. It had made a material contribution to the welfare of the industry. He intended to have a look at the work of dairy research laboratories in other parts of the world dealing with problems of both manufacture and production. The whole science of dairy research was comparatively new, and he would particularly like in the United States to see what could be incorporated in our own practices.

Feeding was a most important thing in relation to the general economy of dairying, and it could not be said that the last word in feeding had been achieved. Experts were working out balanced rations and testing the nutritive value of crops and pastures, but the dependence on grass pasturage was not sufficiently realised. There was, however, a growing consciousness of the importance of grass; to-day much of the work of the agricultural branch and some of the work of the dairying branch of his Department was concerned with the laying down of pasturage and the introduction of new varieties.

"I am going to see in what directions our State may be better served," said the Minister. He hoped to visit Ohio, where a complete rejuvenation of the cheese industry was effected four or five years ago, their problems being precisely the same as ours.

He added that he was fortunate in two things: in having a man like Mr. Harry Heers at the head of the dairy industry, and in the excellent type of young men being recruited to the Department imbued with the ideal of service to the industry, and, consequently, service to the State.

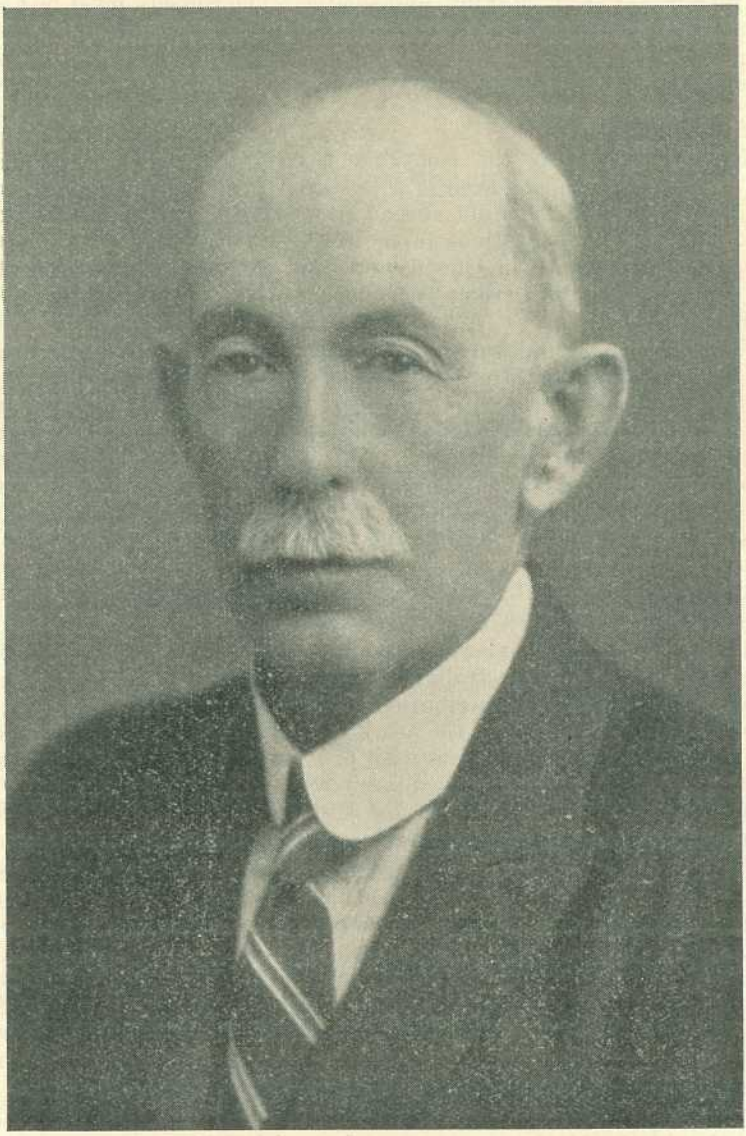


Plate 109.
HON. DAVID A. GLEDSON.
Acting Minister of Agriculture and Stock.

HON. DAVID A. GLEDSON.

ACTING MINISTER FOR AGRICULTURE AND STOCK.

DURING the absence of the Hon. Frank W. Bulcock on a mission of investigation into various rural problems abroad the Hon. David A. Gledson will have charge of his Department as Acting Minister for Agriculture and Stock.

As the representative of Ipswich—the important commercial centre of the rich agricultural province of West Moreton—Mr. Gledson has been associated for many years with rural industry and has assisted greatly in its progress. Representing, too, a great mining and industrial constituency he has made a close study of the economics of distribution and consumption as well as of production, and also of other important factors which influence stability, and balance in industry generally.

Mr. Gledson entered The State Parliament in 1915 as the successful contender for the Ipswich seat against the Hon. James Blair (afterwards Sir James Blair, K.C.M.G., Chief Justice and Deputy Governor of Queensland), then Minister for Public Instruction. Except for one break of three years—1929 to 1932—Mr. Gledson has represented Ipswich ever since. During most of that time he was chairman of party committees appointed to consider the details of projected legislation. From 1925 to 1926 he was Assistant Minister in Charge of State Enterprises, which included State cattle stations, State butcheries, canneries, and cold stores.

When the Department of Labour and Industry was established in 1926 Mr. Gledson was appointed to the new portfolio and continued as Minister of that Department until 1929, when the Government of which he was a member met defeat at the polls. Since 1932 he has been Temporary Chairman of Committees in the Legislative Assembly.

Mr. Gledson is one of the stalwarts of the Australian Labour Movement, and for a great number of years has been prominent in its councils.

Field Notes on some Rain Forests and Rain Forest Trees of Tropical Queensland.

W. D. FRANCIS, Botanist.

[Some time ago the writer visited forestry survey camps on the Atherton Tableland, Mount Spec, and the Eungella Range, and the present paper is largely the result of these three visits. The field characters of the trees as given by the writer should be of value to foresters, timber-men, and others who have any contact with the trees of the "big scrub," as the rain forests are frequently somewhat incorrectly designated.]

THE rain forests of tropical Queensland do not differ essentially in appearance from the more luxuriant rain forests in subtropical regions further south. In the northern forests, however, large-leaved species of shrubs and trees are a little more in evidence. There is also a greater variety of palms, both arborescent and climbing, in the northern rain forests. The climbing palms are chiefly represented by the lawyer palms (*Calamus* spp.).

From cursory examinations it appears that the trees on the northern highlands such as the Atherton Tableland and the Eungella Range are noticeably higher than the trees in the northern lowland rain forests. F. Kajewski has made a similar observation (White, C. T., 1933). The altitude of the Atherton Tableland varies from 2,000 to 4,000 feet, and that of the Eungella Range from 2,000 to 3,000 feet. The Mount Spec rain forests also are at an altitude of 2,000 to 3,000 feet.

As in the luxuriant rain forests of subtropical Australia, the species constitution of the northern rain forests is very complex. Only in exceptional cases are there evident dominant species. When there are evident dominant species, there are often extreme or remarkable climatic or soil conditions. For instance on dry hillsides or on moist, water-logged flats dominant species are most frequently observed; but in cases where the soil and climate are suited to a large variety of species instances of dominant species are not common so far as the writer has observed. Thus it seems evident that adverse conditions of either soil or climate lead to limitation of species. On the other hand, optimum conditions of soil and climate strongly favour the maintenance of numerous species, with a consequent complex species constitution.

The principal plant families well represented in northern rain forests by numbers and variety of species are the Myrtaceæ, Lauraceæ, Elæocarpaceæ, Rutaceæ, and Proteaceæ, and the chief economic woods of the northern forests are drawn from these families. Cabinet woods rank high in the scale of rain-forest products. The silky oak woods are included in the Proteaceæ and North Queensland walnut bean is supplied by *Endiandra Palmerstonii* of the Lauraceæ. *Flindersia Brayleyana* of the Rutaceæ yields the Queensland maple of commerce.

In North Queensland, the kauri pines (*Agathis Palmerstonii* and *Agathis microstachya*) are also important economic trees which produce a very serviceable softwood. They are magnificent trees, with imposing column-like stems and dark-green foliage crowns. In recent years, many of these trees have been removed in logging operations. The specimens seen during the course of the writer's visits were chiefly on the steep, forest-clad slopes of the Barron Gorge, on the mountain sides above the Cairns water-supply intake, and on the margins of Lake Barrine.

One of the commonest trees in the lowland rain forests is the milky pine (*Alstonia scholaris*). This tree is characterised by a strongly fluted, channelled, or angular stem and a pale bark which exudes a copious, milky sap when cut. The acacia cedar (*Albizzia Toona*) is also found in lowland rain forests, and often in foothill forests as well. It is often seen, too, as a spreading, dark-foliaged, bushy tree in open eucalyptus forests. It furnishes a good cabinet wood. The black bean (*Castanospermum australe*) is also frequently found in lowland and foothill rain forests. The largest trees of this species seen by the writer were located on the foothills of Mount Spec. This species, as is well known, produces a cabinet wood of exceptional appearance. *Cryptocarya Mackinnoniana* is a very common species of the rain forests of the Eungella Range, Mount Spec, and the Atherton Tableland. It is not one of the largest trees of the forests.

Lawyer palms are common in the rain forests of tropical Queensland. The common species in the Eungella Range and Mount Spec forests is *Calamus australis*.

Some of the most luxuriant rain forests of tropical Queensland are located on tablelands and mountain ranges. Very favourable soil conditions may be responsible for this distribution of very dense rain forest on highlands. The soils of the Atherton Tableland rain forests are derived to a great extent from basaltic rocks. The rain forests of the Eungella Range and Mount Spec are located principally upon soils which owe their mineral origin to the disintegration of granite or granodiorite. Granitic rocks also underlie the soils of the rain forests of the Bellenden-Ker Range.

One of the principal factors, or perhaps the principal factor, in the distribution of rain forests is a high rainfall. This fact is well exemplified in the distribution of luxuriant rain forests in tropical Queensland. There are two areas of North Queensland which are characterised by the presence of comparatively large tracts of luxuriant rain forest. The more southern of these areas is located between Carmilla on the south and Proserpine on the north. Within this area is the Eungella Range. The average annual rainfall varies from 50 inches at Carmilla to 66 at Mackay and 65 inches on the Eungella Range. The more northern area is located roughly from a point a little south of Ingham right up to Cairns. Some of the annual average registrations in this area are—Ingham, 79 inches; Cardwell, 82 inches; Innisfail, 142 inches; and Cairns, 89 inches.

THE RAIN FORESTS OF THE ATHERTON TABLELAND.

The rain forests of the Atherton Tableland are probably richer in species than those of the Eungella Range and Mount Spec. The basaltic soil of much of the Atherton rain forests is rich in mineral plant foods, and this is most likely connected with the diversity of species. Varieties of *Tarrietia argyrodendron* are often plentiful in the Atherton Tableland forests. These varieties are always buttressed, and their bark is often somewhat lined or wrinkled longitudinally. The wood always shows conspicuous and large rays, though not so large as those of many of the silky oaks. Varieties of *Tarrietia argyrodendron* are often very common in lowland and foothill rain forests in the vicinity of Cairns.

A considerable development of timber-tree species of the family Proteaceæ is found. The following species of this family were found

by the writer in the vicinity of the forestry station at Gadgarra:—*Cardwellia sublimis, Carnarvonia araliæfolia, Lomatia fraxinifolia, Helicia diversifolia,* and *Darlingia spectatissima.* The red penda (*Xanthostemon pubescens*) and blood-in-the-bark (*Ceratopetalum succirubrum*) are common trees at Gadgarra.

One of the most common species in Atherton Tableland rain forests is the silky oak (*Cardwellia sublimis*).

Owing to the difficulty of collecting them, the writer did not bring back specimens of lawyer vines (*Calamus* sp.) from the Atherton forests. The species there are the largest seen by him.

A comparatively small tree, *Villaresia Smythii,* is found in the Atherton Tableland forests, and is easily recognised by its light-coloured corky bark, often crooked stem, and conspicuous wood rays.

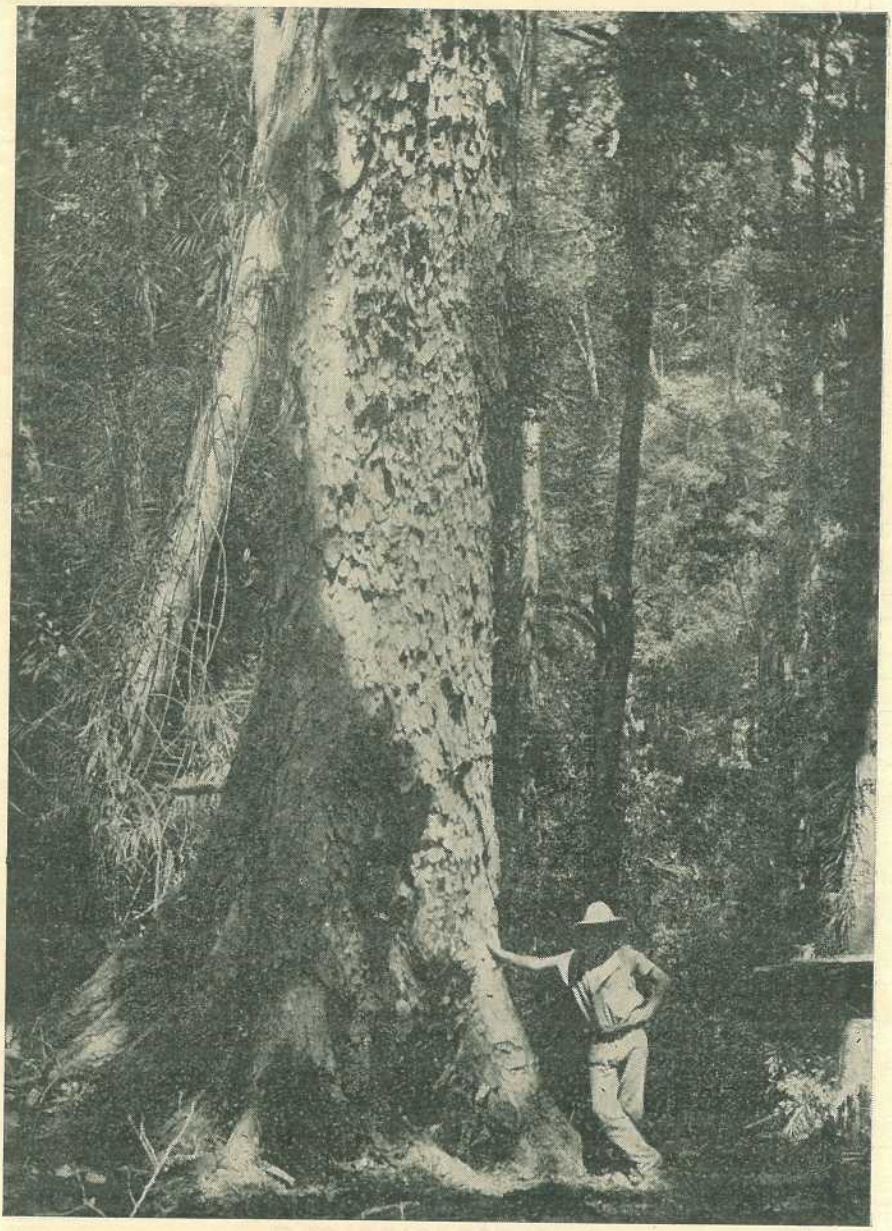
The cadaga (*Eucalyptus Torelliana*) is a somewhat exceptional member of the eucalypts, as it grows in parts of the rain forest on the ranges. It does, however, seem to prefer locations towards the margins of the forests. The cadaga has often some hard persistent bark at the base of the stem, but for most of its length the stem is covered by a smooth pale or green-coloured bark. It is a large tree. Some good examples of it can be seen from the train as it ascends the Barron Gorge on the way from Cairns to Kuranda.

THE MOUNT SPEC RAIN FORESTS.

In the parts of the Mount Spec rain forests seen by the writer much of the undergrowth consisted of young trees of *Cardwellia sublimis* and *Kermadecia Bleasdalii.* These are silky oaks, and belong to the family Proteaceæ. The young trees of these species, measuring from 1 foot up to 8 feet in height, are rather impressive with the beauty of their foliage. The leaves are pinnate and of several leaflets; their appearance and arrangement possess a pleasing and symmetrical effect. On the other hand, the stems and branches of these two species, as well as of some other Proteaceæ, are often crooked or otherwise asymmetrical.

Some of the common trees in the Mount Spec rain forest are—*Villaresia Smythii, Eugenia hemilampra,* the so-called soft ghittoe (*Xanthophyllum Macintyrii*), *Cryptocarya Mackinnoniana, Balanops australiana.* The family Elæocarpaceæ is well represented. The following species were noted:—*Elæocarpus sericopetalus, E. largiflorens,* and a species very like *E. obovatus, Sloanea Macbrydei.* The family Lauraceæ is also very well represented. Representatives of this family included *Litsea ferruginea,* var. *lanceolata, Beilschmiedia obtusifolia, Endiandra dichrophylla, E. glauca, Cryptocarya angulata, C. corrugata, C. cinnamomifolia.* A deeply corrugated or wrinkled surface of the sapwood was well shown in *Cryptocarya angulata* and *C. corrugata.*

An acacia (*Acacia aulacocarpa*) is common in the rain forest on some of the drier ridges of Mount Spec. This acacia shows a considerable degree of adaptation to rain-forest conditions, but it has scarcely attained as much of the characteristics of typical rain-forest trees as *Acacia Bakeri,* which is common in some of the rain forests of Southern Queensland and Northern New South Wales.



[*Photo.: W. D. Francis.*

Plate 110.

A LARGE RED CEDAR TREE (*Cedrela Toona* var. *australis*) ON THE EUNGELLA RANGE.—In 1922 there were large numbers of these trees on the Eungella Range. *Freycinetia excelsa*, a climbing Pandanaceous plant, is shown on the right and left sides of the picture.

THE RAIN FORESTS OF THE EUNGELLA RANGE.

A large proportion of the undergrowth in parts of the rain forests of the Eungella Range is composed of *Drimys dipetala* and *Sloanea Langii*. The Eungella gums, *Eugenia hemilampra* and *Eugenia* sp., are important trees. Their timber was used by the settlers as a substitute for hardwood. The red Eungella gum is *Eugenia hemilampra*. It is doubtful whether the white Eungella gum is specifically different in a botanical sense from red Eungella gum. In October, 1922, there were a large number of red cedar trees, *Cedrela Toona* var, *australis* in the rain forest. Suitable access for timber hauling was not available up to that time, and the area was almost in its natural state. One of the common trees is a species which is known in Southern Queensland as black jack, *Tarrietia actinophylla*. This is very closely allied to the Booyong or Queensland hickory (*Tarrietia argyrodendron*). The black jack and the booyang resemble each other in appearance. The black jack like the booyong, is always buttressed, and often has a slightly furrowed bark and at times a scaly bark. The stems of both species above the buttresses are mostly fairly cylindrical, and they possess a long length of stem free of branches. A few trees of the booyong were observed in western portions of the Eungella Range.

A large and common species in the area is *Elæocarpus foveolatus*. When looked at from the ground beneath the trees the foliage is brown in appearance. This species was very frequent at an altitude of about 3,000 feet on the track leading to Mount Dalrymple. The trees mostly have a light-grey fairly smooth bark and a buttressed stem.

Another tree which was fairly common was found to be a new species. It was named *Cryptocarya corrugata* by White and Francis. It has a very corrugated sapwood surface, and on that account was called the washing-board tree.

The bangalow palm (*Archontophœnix Cunninghamiana*) was common along the track leading to Mount Dalrymple at about 3,000 feet. In parts of the forest these palms were a predominant constituent. The northern bangalow palm (*Archontophœnix Alexandræ*) appeared to be comparatively rare in the upper parts of the range, although it was seen in the gorges of the foothills.

On the roadside leading up to the Eungella Range, *Trema amboinensis* was plentiful up to an altitude of about 1,200 feet. This species is a tree attaining a height of about 50 feet and a stem diameter of about 15 inches. The wood is fairly soft to cut and the heartwood is pinkish in colour.

The common epiphytic fig. is *Ficus destruens*. This species also occurs in the rain forests of Mount Spec.

RAIN-FOREST TREES.

Family PODOCARPACEÆ.

Podocarpus amarus Blume. Black pine. Stem straight and cylindrical, without buttresses; 76 feet high, 2 feet 2 inches stem diameter. Bark very dark brown, somewhat scaly. When the bark is cut it is reddish brown and measures ⅜ inch thick. The fruit is bright red, nearly globose or slightly oval, and measures ¾-1 inch diameter. The leaves are placed alternately on the branchlets. Mount Spec and Atherton Tableland.

[*Photo.: W. D. Francis.*

Plate 111.

Trema amboinensis.—Sometimes called Pencil Cedar. It is allied to the Peach-leaved Poison Bush. Tree on the road up the Eungella Range. The tree on left also belongs to this species.

Family ARAUCARIACEÆ.

Agathis Palmerstonii F. M. Bailey and **Agathis microstachya** J. F. Bailey and C. T. White. The North Queensland kauri pines. It seems doubtful now whether these two species are quite distinct. The North Queensland kauri pines are very characteristic trees, and once seen they are not likely to be confused in North Queensland with other Australian trees. They attain 160 feet in height and 8 or even 9 feet in stem diameter. The stem is unbuttressed and rounded. The bark is generally brown in colour and is shed in roundish scales, a variable number of which remain *in situ* for some time. These scales, where they are present in numbers, give the bark a scaly appearance. The North Queensland species in the field almost exactly resemble the South Queensland species which is illustrated in "Australian Rain-forest Trees," p. 46.

Family BALANOPSIDACEÆ.

Balanops australiana F. v. M. Attaining 70 feet in height and 2 feet 6 inches stem diameter. A tree with a bulky stem without buttresses. Bark grey, often with prominent corky pustules ¼-½ inch across. Often the bark shows transverse ring-like markings, which extend right round the stem. When cut the bark is biscuit brown towards the outside and pinkish or reddish brown towards the sap-wood. The bark measured ¼-⅜ inch thick on tree 60 feet high and 16 inches stem diameter, and 1 inch thick on a tree 70 feet high and 2 feet 6 inches stem diameter. Sapwood creamy white. Mature wood nearly white or cleam coloured when first cut, very finely grained, the pores (vessels in cross section) and rays only visible with good lens magnifying eight diameters or more. The leaves are placed alternately on the branchlets. Eungella Range, Mount Spec, Murray Upper (west of Cardwell), Rockingham Bay, Bellenden-Ker Range, and Palm Island.

Family PROTEACEÆ.

Helicia diversifolia C. T. White. White oak. Attaining 60 feet in height and 1 foot stem diameter. Stem somewhat flared out at base, but not prominently buttressed. Bark brown, with numerous small lenticels about size of pin's head. When cut the bark is greenish yellow towards outside, brownish towards middle, and pale towards sapwood. Sapwood white. Heartwood nearly white or flesh-coloured, with prominent rays. Leaves are placed alternately on the branchlets. The leaves are undivided (mostly on large trees), toothed or divided (often on young trees or coppice shoots) and mostly have a fine coating of brown hairs on the underside. Atherton Tableland.

Kermadecia Bleasdalii. Benth. and Hook. A silky oak. Few of the trees seen exceeded 40 feet in height and 7 inches in stem diameter. Stem often somewhat irregular, with a strong tendency to asymmetry and occasional crookedness. The stem is without prominent buttresses. Bark brown to grey, somewhat rough, with small pustules. When the bark is cut it is light brown or pinkish in colour and measures ⅛ inch thick on a tree 40 feet high and 7 inches stem diameter. Sapwood pale. Heartwood pinkish brown, with very prominent rays. The leaves are placed alternately on the branchlets, and consist of several leaflets (pinnate). The leaflets have prominent teeth on their margins. Dallachy, who collected the specimens from which the species was named, described the species as "a small but beautiful tree." While on Mount

Spec the writer was struck by the beauty of its foliage. The young trees of 1-8 feet in height are very common in the rain-forest undergrowth on Mount Spec. Young trees of *Cardwellia sublimis* are also common there. The foliage of young trees of *Cardwellia sublimis* (also of Proteaceæ) is also strikingly beautiful. The stem and branch asymmetry of *Kermadecia Bleasdalii* is also evident in several other members the Proteaceæ such as *Stenocarpus sinuatus* and in a less degree in *Cardwellia sublimus*. Rockingham Bay (Dallachy), Eungella Range (W.D.F.) and Mount Spec (W.D.F.).

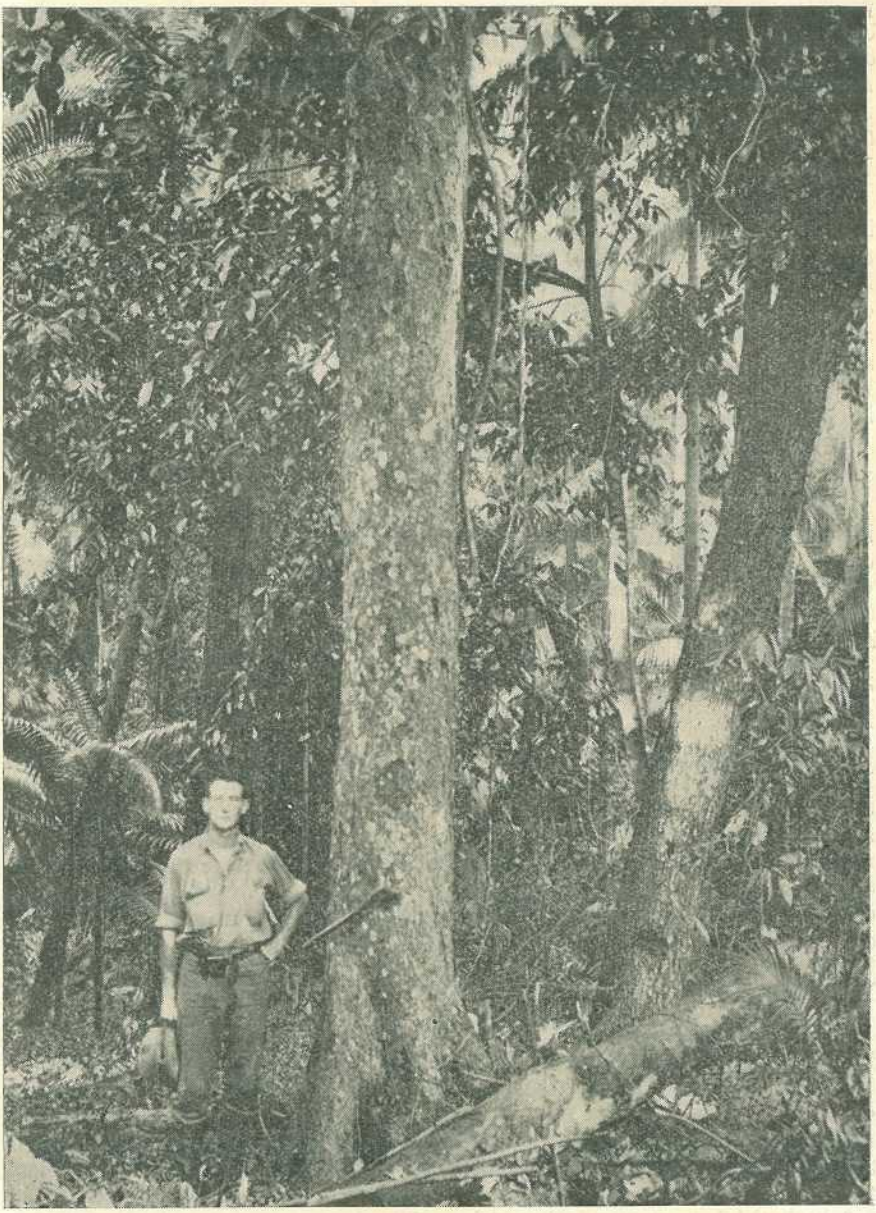
Carnarvonia araliæfolia. F. v. M. Red oak. Attaining about 100 feet in height and 2 feet in stem diameter. Stem scarcely buttressed. The few trees seen were generally straight and fairly cylindrical in the stem. Bark dark brown, rough with numerous pustules. When the bark is cut it is biscuit brown and measures ½ inch thick on tree of above size. Sapwood white; heartwood reddish brown. The leaves are placed alternately on the branches. The leaves are compound and consist of 3-5 leaflets arranged at the end of the leaf. Sometimes one or more of the leaflets are again divided or lobed. Atherton Tableland.

Buckinghamia celsissima F. v. M. A silky oak. Attaining 90 feet in height and 2 feet in stem diameter. Base of stem flanged into thick obscure buttresses. Stem in the single large tree seen somewhat irregular. Bark dark brown, rough and hard, in parts scaly, and in other parts with scattered rough pustules. When the bark is cut it is very dark red and measures ⅝ inch thick on a tree of above dimensions. Sapwood almost white. Heartwood very hard and tough, almost pink in colour. The leaves are placed alternately on the branchlets. Mountains near Rockingham Bay (Dallachy), Mount Spec, Atherton Tableland, and Mount Molloy. Planted as an ornamental tree in Brisbane streets.

Darlingia spectatissima F. v. M. Attaining 100 feet in height and 18 inches stem diameter. Buttresses at base of stem small or absent. Stem often irregular and crooked (see remarks under *Kermadecia Bleasdalii*). Bark dark brown with scattered fine pustules each of which measures up to $\frac{1}{12}$ inch across. Bark when cut brown, measuring ¼ inch thick on a tree of above size. Sapwood pale. Heartwood pinkish on outside, red-brown inwards, the rays being very prominent. The leaves are placed alternately on the branchlets. The leaves are often very large and deeply cut into large segments. Yarrabah, Johnstone River, Rockingham Bay, Atherton Tableland, and Mount Spec.

Cardwellia sublimis F. v. M. Silky oak. Bull oak. Attaining 100 feet in height and 5 feet in stem diameter. Stem without buttresses. Mostly this is a bulky or large stemmed species. Sometimes the stems are irregular in shape. Bark mostly grey, dark grey, or brown, with many scattered pustules. In the very large trees the bark is inclined to be longitudinally cracked or is even noticeably fissured. When cut the bark is biscuit brown, and is often darker towards the outer surface, ⅝-¾ inch thick on tree of above size. The leaves are placed alternately on the stem. Generally the leaves are very large and are divided into several or numerous segments or leaflets. Very common on the Atherton Tableland and at Mount Spec.

Lomatia fraxinifolia F. v. M. A silky oak. The one tree seen was about 60 feet high and 1 foot stem diameter. The stem was rather crooked and not prominently buttressed. Bark brown, with small pustules arranged in longitudinal lines. When cut the bark was ochre



[*Photo.: W. D. Francis.*

Plate 112.

NATIVE NUTMEG (*Myristica insipida*).—A tree in rain forest at Netherdale, at foot of Eungella Range.

brown and measured ¼-⅜ inch thick on tree of above dimensions. Heartwood pinkish in colour. Leaves placed alternately on the branchlets. Each leaf is composed of several leaflets. The leaflets generally have toothed edges. Atherton Tableland and Mount Bellenden-Ker.

Family OLACACEÆ.

Apodytes brachystylis F. v. M. The trees seen on Mount Spec only attained a height of 30 feet and a stem diameter of about 8 inches. Stems not buttressed. Often coppice shoots and many branches arise from base of stem. Bark dark brown or nearly black. When the bark is cut it is pinkish brown and measures ⅜ inch thick on a tree of above size. Wood light brown in colour. The trees were in full flower on Mount Spec in November. The flowers are white. Johnstone River, Mount Spec, Atherton Tableland, Herberton Range, and Rockingham Bay.

Family HIMANTANDRACEÆ.

Galbulimima baccata F. M. Bailey (*Himantandra baccata* L. Diels). In "Australian Rain-forest Trees" the writer used *Himantandra baccata* as the name for this species. However, while at the Royal Botanic Gardens, Kew, in 1930, he had a discussion with Dr. T. A. Sprague on the subject. Dr. Sprague stated that according to the rules of nomenclature F. M. Bailey's name, *Galbulimima baccata*, should stand. Trees of this species attain 100 feet in height and 3 feet in stem diameter. The stem at the base tends to flange out into obscure or thick buttresses. The bark is yellowish brown and marked by occasional small pustules; in places there are slight curved or concentric depressions left by scales of shed bark. When cut the bark is brown in colour with a green outer layer. The odour of the cut bark is decidedly resinous. The bark measures ⅜ inch thick on a tree of 18 inches stem diameter. The wood is pale or white. The leaves are placed alternately on the branchlets. The underside of the leaves and young green parts are partly covered by minute copper- or silver-coloured, wheel- or star-shaped scales similar in appearance and structure to the scales of Tarrietia. Apparently rare; Eumundi in South Queensland to the Atherton Tableland.

Family MYRISTICACEÆ.

Myristica insipida R.Br. Attaining 90 feet in height and 2 feet stem diameter. Stem fairly regular and slightly or not at all buttressed. Bark brown, sometimes scaly or with roundish shallow depressions left by fallen scales. When cut, brown towards outside, red inwards, exuding often much red sap. The bark measures ⅜-½ inch thick on tree of above size. The red-coloured sap often exudes from the vessels of the sapwood when it is cut. Wood pale. From Carmilla between Mackay and St. Lawrence to the Daintree River.

Family MONIMIACEÆ.

Daphnandra aromatica F. M. Bailey. The one tree seen attained 80 feet in height and 1 foot in stem diameter. Stem scarcely buttressed. Bark grey, with fairly large pustules measuring up to ¼ inch across. When the bark is cut it is very light brown and turns dark or biscuit brown on exposure. The bark measures ⅜ inch thick on a tree of above size. Wood yellow. There is a very strong odour of sassafras in the bark and wood when cut. The leaves are arranged opposite to each

other on the branchlets. The margins of the leaves mostly have more or less distinct teeth. Johnstone River, Atherton Tableland, and Murray Upper.

Daphnandra Dielsii Perkins (?). The determination of this tree is doubtful as the material of it does not allow its separation satisfactorily from *Tetrasynandra laxiflora*. Attaining 60 feet in height and 9 inches in stem diameter. Bark grey with small pustules often arranged in longitudinal rows. Bark and wood very bright yellow. The leaves are arranged opposite to each other on the branchlets and have small teeth on their margins. Atherton Tableland.

Family LAURACEÆ.

Cryptocarya Mackinnoniana F. v. M. Attaining 90 feet high and 15 inches stem diameter, but the trees are often much smaller than this. Occasionally there are buttresses at the base of the stem. Bark fairly smooth, often brown in colour. When cut biscuit brown, ¼-⅜ inch thick on tree of above size. Wood light-coloured; transverse sections show concentric lines of soft tissue and some oblique lines of soft tissue joining the vessels. The leaves are arranged alternately on the branchlets. The leaves are often large and have generally very strongly raised veins on their undersides. Very common in the rain-forests of Mount Spec and parts of Atherton Tableland. Eungella Range, Mount Spec, Atherton Tableland to Cape York.

Cryptocarya cinnamomifolia Bentham. The trees seen on Mount Spec attained 60 feet in height and 10 inches stem diameter. Stem somewhat buttressed at base. Bark grey or greenish grey with fine but prominent longitudinal wrinkles or fissures. The bark when cut is reddish brown and measures ¼ inch thick on tree of above size. Sapwood surface yellowish, finely but prominently corrugated. The leaves are placed alternately on the branchlets. A feature of the leaves are the longitudinal nerves one on each side of the midrib, which join the midrib a little above the base of the leaf. The leaves are whitish on the underside. Herberton Range and Mount Spec. Recorded from Rockingham Bay by Bentham.

Cryptocarya corrugata White and Francis. A washing-board tree. Attaining 90 feet in height and 2 feet stem diameter. Stem not prominently buttressed. Bark brown sometimes longitudinally corrugated on the outside and sometimes showing roundish depressions left by fallen scales. Bark when cut reddish or at times biscuit brown, ½ inch thick on tree of above size. Sapwood surface often very strongly longitudinally corrugated. The leaves and fruit are illustrated by a plate in the Proceedings of the Royal Society of Queensland, Vol. 37, p. 165, 1926, where the species is described. The leaves are entire and are placed alternately on the branchlets. Eungella Range and Mount Spec.

Cryptocarya pleurosperma White and Francis. Attaining 90 feet high and 18 inches stem diameter. Stem without conspicuous buttresses. Bark grey with rows of small pustules. When the bark is cut it is biscuit brown in colour and measures ⅜ inch thick on tree of above size. Wood pale or almost white. The leaves are generally placed alternately

[*Photo.: W. D. Francis.*

Plate 113.

CORDUROY OR WASHING-BOARD TREE (*Cryptocarya corrugata*), EUNGELLA RANGE. —The tree is characterised by the corrugated or longitudinally furrowed surface of the sapwood. The palm-like leaves belong to the common Lawyer Vine of the area, *Calamus australis*.

on the branches; they have a conspicuous longitudinal nerve on each side of the midrib beginning from near the base of the leaf blade and ending towards the apex. The numerous strong ribs of the round, almost walnut-sized seed are characteristic. There is a figure of the leaves and fruit in White and Francis' paper in the Proceedings of the Royal Society of Queensland, Vol. 35, p. 78, 1924. Bellender-Ker Range, Atherton Tableland, and Johnston River.

Cryptocarya angulata C. T. White. Attaining 100 feet in height and 15 inches in stem diameter. Stem slightly buttressed at base, otherwise fairly symmetrical. Bark brown, not prominently scaly or fissured in the trees seen. When the bark is cut it is biscuit brown and measures $\frac{5}{8}$ inch thick on tree of above size. Sapwood surface deeply corrugated like the surface of a washing board. Wood somewhat yellow, turning brownish yellow on exposure. The tissue of the wood when viewed in cross section shows distinctly the disturbances associated with the sapwood surface corrugations. The leaves are placed alternately on the branchlets. Eungella Range, Mount Spec, and Atherton Tableland.

Beilschmiedia Bancroftii J. F. Bailey and C. T. White. (*Cryptocarya Bancroftii* F. M. Bailey). Yellow walnut. Canary ash. Attaining 100 feet in height and 3 feet stem diameter. Stem sometimes crooked or irregular, without conspicuous or large buttresses. Bark brown, somewhat rough with small excrescences or pustules. When cut the bark is brown; middle layer of bark is reddish brown, outermost layer becomes dark towards surface and the innermost layer is pale towards the sapwood. The bark measures $\frac{3}{8}$ inch thick on tree of above size. Wood yellow, often with darker streaks. The leaves are placed alternately on the branchlets. Atherton Tableland.

Endiandra dichrophylla F. v. M. Attaining 90 feet in height and 20 inches in stem diameter. Stem with thick obscure buttresses at the base. Bark grey or brown with numerous fine longitudinal wrinkles. When the bark is cut it is pale brown or biscuit brown with a greenish white or clear white cambium layer which exudes a clear, somewhat sticky sap. The bark measures $\frac{5}{8}$ inch thick on a tree of above size. Sapwood surface pale cream. Heartwood pale or nearly white. Leaves placed alternately on the branchlets. Russell River, Atherton Tableland, and Mount Spec.

Endiandra Palmerstonii White and Francis (*Cryptocarya Palmerstonii* F. M. Bailey). North Queensland walnut, walnut bean. Attaining 120 feet in height and 4-5 feet in stem diameter. Stem without buttresses or with comparatively small ones. Bark grey or at times brown, with fairly fine longitudinal wrinkles which are scarcely deep and wide enough to be called fissures. When the bark is cut it is reddish brown and measures $\frac{5}{8}$ inch thick on a tree with a stem diameter of 3 feet. Sapwood white or pale and abundant; heartwood dark brown. Leaves placed alternately on the branchlets. Atherton Tableland and Russell River.

Litsea ferruginea Benth. & Hook. var. *lanceolata* Meissn. Attaining 80 feet high and 14 inches stem diameter. Stem slightly buttressed.

Bark brown with a few pustules. When the bark is cut it is light creamy brown, and measures ¼ inch thick on a tree of above dimensions. Wood yellow or greenish yellow. Fruit red when ripe. The leaves are generally placed alternately on the branchlets. Fraser Island, Family Island, near Rockingham Bay (Dallachy), and Mount Spec.

Family SAXIFRAGACEÆ.

Polyosma alangiacea F. v. M. Attaining 60 feet in height and 7 inches stem diameter. Bark dark grey, longitudinally fissured. When the bark is cut it is pale creamy brown towards the outside and white inwards. Sapwood surface pale cream colour. Wood light brown in colour. The leaves are arranged opposite to each other on the branchlets. Ranges about Rockingham Bay (Dallachy), Mount Spec, and Atherton Tableland.

Polyosma rhytophloia White and Francis. A small tree attaining about 35 feet in height and 7 inches stem diameter. Stem generally straight or nearly cylindrical. Bark greenish grey in colour with lighter-coloured longitudinal wrinkles or fissures. When cut the bark is brown. Leaves are opposite on the stem and their margins are toothed. This species is described in the Proceedings of the Royal Society of Queensland, Vol. 37, p. 158, 1926, where there is a plate illustrating the leaves, flowers, and fruit. Kirrima and Murray Upper (West of Cardwell), Atherton Tableland, and Eungella Range.

Family PITTOSPORACEÆ.

Hymenosporum flavum F. v. M. Attaining 80 feet in height and 15 inches stem diameter. The surface roots are at times somewhat flattened and resemble small buttresses. Bark grey or brown, sprinkled with transversely elongated lenticels. When the bark is cut it is seen to be cream-coloured or white and measures ¼ inch thick on a tree of above dimensions. Surface of sapwood cream-coloured. The leaves are placed alternately on the branches. The tree is conspicuous on account of its large, trumpet-shaped, white or yellow very fragrant flowers. Hunter River, New South Wales, to Atherton, North Queensland.

Family CUNONIACEÆ.

Ceratopetalum succirubrum C. T. W. Blood-in-the-bark. Attaining 90 feet in height and 20 inches stem diameter. Stem buttressed at base, otherwise mostly straight and almost cylindrical. Bark grey or light grey, fairly smooth. When the bark is cut outer bark is sooty brown and the inner bark red or reddish brown; a red sap exudes from the cut bark. The bark measures ¼-⅜ inch thick on a tree of above size. The leaves are placed opposite one another on the branchlets. Each leaf consists of three, or occasionally two or one, leaflets; the leaflets generally have more or less toothed edges. Atherton Tableland and Mount Bartle Frere.

Family LEGUMINOSÆ, Sub-Family MIMOSOIDEÆ.

Acacia aulacocarpa F. v. M. Attaining 60 feet in height and 2 feet stem diameter. The base of the stem shows a tendency to form flanges which are like thick obscure buttresses. Bark brown, fissured.

[*Photo.: W. D. Francis.*

Plate 114.

SO-CALLED QUEENSLAND FRANCHIPANIER (*Hymenosporum flavum*), EUNGELLA RANGE.—This species is sometimes grown in gardens as a flowering tree. The climbing Pandanaceous plant (*Freycinetia excelsa*) is shown on the upper part of the stem and on the right and left of the picture.

When the bark is cut it is pinkish brown and measures ¼-⅜ inch thick on a tree of above size. Sapwood pale yellow. Leaves placed alternately on the stem. The phyllodes, which take the place of leaves, are unequal sided or have a tendency to be sickle-shaped. There are several parallel longitudinal nerves in the leaf-like phyllodes. This species is not commonly found as a constituent of a rain-forest. It is found chiefly on the dry ridges of the Mount Spec rain-forests. From observations at Mount Spec the writer is inclined to think that it has scarcely attained the typical rain-forest characteristics shown by *Acacia Bakeri* in Southern Queensland rain-forests. Instances of species of Acacia assuming the qualities of rain-forest tree types are rare in Australia, and, so far as known, are almost confined to *Acacia Bakeri* and *Acacia aulacocarpa*. This wattle is common in coastal localities of Northern and Southern Queensland.

Albizzia Toona F. M. Bailey. Mackay cedar, Acacia cedar. Attaining 90 feet high and 2 feet stem diameter. Stem not prominently buttressed. Bark grey or brown, scaly in parts, sometimes showing roundish or curled irregular depressions from which scales of bark have been detached. When cut the bark is pink. The leaves are mostly placed alternately on the branchlets. The leaves are doubly pinnate like those of Acacia, the leaflets being very small. The trees grow in the open Eucalyptus forests as well as in the rain-forests. When growing in the open they form spreading trees with dark dense heads of foliage. In the southern portion of its range the species does not appear to ascend to the higher altitudes, but is common in lowland forests. From about 50 miles south of Mackay to Endeavour River.

Family RUTACEÆ.

Evodia Bonwickii F. v. M. Attaining 100 feet in height and 2 feet stem diameter. Stem slightly buttressed. Bark brown with small pustules which are often arranged in indistinct, fine longitudinal cracks. When the bark is cut it is reddish brown and measures ¾-1 inch thick on a tree of above size. Wood almost white and soft. The leaves are large and fairly soft in texture. They are arranged opposite to each other on the branchlets. Each leaf consists of three leaflets placed at the ends of the leaf stalks. Mount Spec and Atherton Tableland.

Evodia Bonwickii F. v. M. Attaining 50 feet in height and 9 inches stem diameter. Stem not buttressed, often straight and fairly cylindrical. Bark grey, marked by fine longitudinal wrinkles and fine pustules. The bark when cut is light brown and measures ¼ inch thick on a tree of above size. Wood nearly white, soft, with wavy lines of soft tissue. Atherton Tableland, Rockingham Bay (Bentham) and Johnstone River.

Evodia vitiflora F. v. M. Attaining 90 feet in height and 18 inches stem diameter. Stem without prominent buttresses. The symmetry of the stem is at times somewhat broken by irregular undulations, bumps, or obscure protuberances. Bark grey with fine cracks or longitudinal fissures and sometimes with a tendency to scaliness. In younger or smaller trees the longitudinal fissures and scales are not much in evidence. When cut the bark is cream-coloured or very light brown with

sometimes a pinkish tint under the outer bark; the cambium layer is prominently white. The bark measures ⅜ inch thick on a tree of the above size. The leaves are situated opposite to each other on the branchlets; each leaf consists of three leaflets attached at the ends of the leaf stalks. Tweed River, Johnstone River, Dunk Island, Atherton Tableland, Mount Spec, and Rockingham Bay (Dallachy).

Acronychia acidula F. v. M. Attaining 90 feet in height and 18 inches stem diameter. Stem without prominent buttresses. Often or at times the stems have numerous slight protuberances or indistinct swellings on them. Bark grey with numerous transverse rings. When cut the bark is fragrant and reddish brown, becoming paler towards the sapwood. The bark measures ⅜-½ inch thick on a tree of above size. The wood is whitish or pale yellow in colour and soft in texture. The leaves are placed opposite to each other on the branchlets. Fruit white or pale cream with an acid and somewhat lemon-like flavour. This species is known as wild lemon on the Atherton Tableland, where it is accused of causing dietetic trouble in pigs. Atherton Tableland and Rockingham Bay.

Halfordia scleroxyla F. v. M. Ghittoe. Attaining 80 feet in height and 18 inches stem diameter. Stem not conspicuously buttressed. Bark grey or light grey, slightly scaly or almost smooth. When the bark is cut it is yellow or yellowish brown and is paler towards the sapwood. There are numerous very fine but conspicuous concentric layers of tissue in the bark which are well seen in cross section when the bark is cut across and examined with a lens. Sapwood surface flesh-coloured. Wood pale or yellowish brown, very hard and tough. This species in the northern rain forests is very closely allied to *Halfordia drupifera* of the Southern Queensland and Northern New South Wales rain forests. In fact, the two species are remarkably alike in the field. There is a picture of the southern species in Francis' "Australian Rain-forest Trees," p. 172. Mount Spec, Atherton Tableland, and Rockingham Bay.

Flindersia Brayleyana F. v. M. Queensland maple. Maple silkwood. Attaining 100 feet in height and 4 feet stem diameter. Stem often fairly cylindrical, not prominently buttressed. Bark grey or slightly brown with fairly distinct longitudinal fissures. In very large trees of 3 to 4 feet stem diameter the longitudinal fissures are not so marked owing to the tendency to scaliness. When the bark is cut it is red towards the outer surface and flesh-coloured towards the sapwood. The bark measures ⅜-½ inch thick on a tree of 20 inches stem diameter and 100 feet in height. Sapwood white. The leaves are often very large, especially on young trees; they are pinnate and consist of several leaflets. The leaflets at times are large in comparison with a simple ordinary leaf. The leaves are placed opposite to each other on the branchlets. Atherton Tableland and Mount Spec.

Flindersia Bourjotiana F. v. M. A silver ash. Attaining 120 feet in height and 2 feet 6 inch stem diameter. Stem not buttressed. Bark grey, with numerous small corky pustules. When the bark is cut it is pinkish brown, becoming yellow towards the sapwood. The bark measures ⅜ inch thick on tree of above size. Wood yellowish white. The leaves are placed opposite each other on the branchlets. Each leaf consists of several leaflets which have the appearance of a simple leaf. Atherton Tableland.

Flindersia acuminata C. T. White. Putt's Pine or Paddy King's Beech. Attaining 80 feet in height and 20 inches stem diameter. Stem

not buttressed, often straight and fairly cylindrical. Bark brown or grey, smooth or slightly wrinkled and slightly scaly. When the bark is cut it is brown and measures ⅜-½ inch thick on tree of above size. The leaves, as in other Flindersias, are generally opposite to each other on the branchlets and each leaf consists of several leaflets. Atherton Tableland.

Family BURSERACEÆ.

Canarium Muelleri F. M. Bailey. Queensland Elemi tree. Attaining 90 feet in height and 2 feet in stem diameter above buttresses. Buttresses large and prominent. Bark brown with a fair number of small pustules and some roundish depressions left by fallen scales. When the bark is cut it is very pale brown or almost cream-coloured, and measures ⅜ inches thick on a tree of above dimensions. The bark when cut or bruised exudes a whitish or cream-coloured resin with a strong odour of turpentine. Sapwood whitish in colour. The leaves are placed alternately on the branchlets and are composed of several leaflets, generally five or seven. Johnstone River, Atherton Tableland, and Mount Spec.

Family MELIACEÆ.

Dysoxylum Pettigrewianum F. M. Bailey. Spurwood. Spur mahogany. A tree attaining over 100 feet in height and 2 feet in stem diameter. Stem mostly prominently buttressed. The common names of the tree originate from these buttresses, which are often popularly known as spurs. Bark dark brown, marked with numerous pustules ⅛-¼ inch in diameter, often with large irregular scattered flakes or partly detached sheets of old bark. When the bark is cut it is bright pink beneath outer surface and flesh coloured inwards. The bark measures ¼ inch thick on a tree 60 feet high. Sapwood white. The leaves are placed alternately on the branchlets and consist of several leaflets. The trees seen reminded the writer very much of *Dissiliaria baloghioides* in the manner in which the bark is shed in large flakes or sheets. See illustration on page 200 of "Australian Rain-forest Trees." Barron River, base of Bellender-Ker Range, and Atherton Tableland.

Dysoxylum oppositifolium F. v. M. The one tree seen at Mount Spec attained 60 feet in height and 16 inches stem diameter. The stem was not prominently buttressed. Bark greyish brown with fairly prominent pustules and large flakes of partly shed bark. When the bark is cut it is cream-coloured with a pinkish tint towards the outer bark. Sapwood white or nearly so. Heartwood inclined to be red. The fine concentric rings of soft tissue, or wood parenchyma, are prominent in the wood. The leaves are situated opposite to each other on the branchlets. Each leaf consists of several leaflets. Rockingham Bay, Johnstone River, foothills of Bellenden-Ker Range, Mount Spec, Atherton Tableland, and Endeavour River.

Synoum Muelleri C. DC. Northern scentless rosewood. Attaining 70 feet in height and 18 inches stem diameter. Stem with small and not prominent buttresses at the base. Stem sometimes rather irregular. Bark grey, scaly. When the bark is cut it is red or pink and measures ⅜-½ inch thick on a tree of above size. Sapwood nearly white. Heartwood dark red when first cut. The leaves are placed alternately on the branches; they are pinnate and consist of several leaflets. The species is extremely closely allied to the southern species, *Synoum glandulosum*. In fact the northern trees are so like the southern *Synoum glandulosum*

that the pictures of the southern tree on pages 192, 193 of "Australian Trees" are quite useful in identfying the northern species. Atherton Tableland and Rockingham Bay.

Family POLYGALACEÆ.

Xanthophyllum octandrum (F. v. M.) Domin (*Xanthophyllum Macintyrii* F v. M.). Sometimes called Soft Ghittoe on account of its resemblance to *Halfordia scleroxyla*. The trees on Mount Spec attain a height of 70 feet and a stem diameter of 2 feet. Sometimes the stems are forked or twinned at the base and two or more stems arise from the same base. Generally the trees are without conspicuous buttresses. Bark grey or sometimes brownish and often with a yellow tint. The trees are mostly conspicuous by their grey or yellow-grey longitudinally wrinkled bark. When the back is cut it is deep yellow-brown and measures ¾ inch thick on a tree of above size. Wood yellow-brown when first cut. The leaves are placed alternately on the branchlets. Daintree River, Kamerunga (near Cairns), Johnstone River, Innisfail, Mount Molloy district, Dunk Island, Eungella Range, Mount Spec, and Atherton Tableland.

Family EUPHORBIACEÆ.

Mallotus angustifolius Benth. Attaining 60 feet high and 1 foot stem diameter. Stems sometimes angular in cross section. Bark grey with an inclination to be finely scaly. When the bark is cut it is light brown and measures ¼-⅜ inch thick on tree of above size. The sapwood, which is pale when first cut, turns to a sooty colour after being exposed to the air for about 10 minutes. The leaves are placed alternately on the branchlets or are occasionally clustered or approximated together at one region of the branchlet. Mount Spurgeon, Mount Bartle Frere, Johnstone River, Atherton Tableland, and Eungella Range.

Family ANACARDIACEÆ.

Blepharocarya involucrigera F. v. M. Northern bolly gum, rose butternut. Attaining 120 feet in height and 2 feet 6 inches stem diameter. Stem generally buttressed, the buttresses often prominent. Stem above buttresses often straight and fairly cylindrical. Bark grey, sometimes rough with small pustules and sometimes longitudinally wrinkled. When the bark is cut it is pinkish brown and measures ½-⅝ inch thick on tree of above size. Sapwood white. The leaves are opposite each other on the branchlets and each leaf consists of several leaflets. Cairns region on the foothills of the mountains, Atherton Tableland, Endeavour River, and Coen River.

Family ICACINACEÆ.

Phlebocalymna lobospora F. v. M. Tree attaining 70 feet in height and 14 inches stem diameter. Bark grey, finely longitudinally wrinkled, the wrinkles not very long, and often with corky pustules in the wrinkles. When cut the bark is brown and ½ inch thick on tree of the dimensions given above. Sapwood white. Bark and sapwood after being cut turn brown on exposure. The wood is pinkish or reddish in colour and the rays are fairly prominent but are not so large as those of many Proteaceæ. Atherton Tableland, Mount Spurgeon, and Eungella Range.

Villaresia Smythii F. v. M. So far as the writer has noticed this species does not much exceed 80 feet in height and 1 foot stem

diameter. In the colour and appearance of the bark it is strikingly like *Villaresia Moorei*. See illustration on page 13 of "Australian Rain-forest Trees." The trees are sometimes crooked or irregular in shape. Their chief characteristics are the pale grey, longitudinally-fissured, corky bark and the pale, fairly soft wood with fairly prominent rays. The leaves are placed alternately to each other on the branchlets. Atherton Tableland and Mount Spec.

Family ELAEOCARPACEÆ.

Sloanea Macbrydei F. v. M. Attaining 90 feet in height and 2 feet in stem diameter. Stem with very prominent buttresses. Above the buttresses the stem is often fairly symmetrical. Bark brown with longitudinal rows of pustules like those in the allied *Sloanea Woollsii*. When the bark is cut it is pinkish or reddish brown and measures $\frac{5}{8}$ inch thick on a tree of above size. Sapwood surface pale yellow. Wood cream-coloured or light brown. The leaves are placed alternately on the branchlets. The margins of the leaves are generally toothed. Ranges near Rockingham Bay, Atherton Tableland, and Mount Spec.

Sloanea Langii F. v. M. Attaining 90 feet high and 20 inches stem diameter. Stem with very prominent thin buttresses with their edges curving outwards. The stems are fairly straight and cylindrical above the buttresses. Bark greyish, slightly longitudinaly wrinkled. When the bark is cut it is very light brown and measures $\frac{1}{8}$-$\frac{1}{4}$ inch thick on tree of above size. Wood pale or nearly white. The leaves are placed alternately on the branchlets and the margins are often toothed. Shrubby forms of this species constitute a large proportion of the under-growth of the rain-forest of Mount Spec. The species is also common in parts of the Atherton Tableland, such as at Gadgarra, where the above description was made.

Elæocarpus sericopetalus F. v. M. Attaining 90 feet in height and 20 inches in stem diameter. Stem somewhat buttressed. Bark dark brown with many closely packed pustules which are often arranged in longitudinal cracks. When the bark is cut the outer dead part is dark brown, the middle layer is pinkish brown, and the innermost layer is yellow. Sapwood yellowish. Heartwood light brown. The wood is fairly soft. The trees often have coppice shoots and the heartwood in the Mount Spec trees is sometimes decayed. The leaves are placed alternately to each other on the branchlets. The margins of the leaves are generally toothed. Like most of the other species of the *Elæocarpaceæ* the leaves often turn bright red or crimson in age. Byfield, Eungella Range, Mount Spec, and mountains about Rockingham Bay.

Elæocarpus ruminatus F. v. M. About 100 feet high and 2 feet stem diameter. Stem with buttresses. Stem often straight. Bark grey or brownish, slightly longitudinally wrinkled, with brown-coloured pustules in the wrinkles. When the bark is cut it is cream-coloured or light brown outwards and bright yellow inwards. Inner surface of bark and surface of sapwood bright yellow. The bark measures about $\frac{3}{8}$ inch in thickness on a tree of above size. Leaves placed alternately on the branchlets, leaf margins toothed. From Eungella Range to Rockingham Bay.

Elæocarpus foveolatus F. v. M. Attaining 90 feet in height and 2 feet 6 inches stem diameter. Stem mostly straight with buttresses at base. Bark light brown in colour, sprinkled with pustules which are often arranged in short longitudinal rows. When the bark is cut it is

[*Photo.: W. D. Francis.*

Plate 115.

Elæocarpus ruminatus, EUNGELLA RANGE.—Numerous Bangalow Palms (*Archontophœnix Cunninghamiana*) are shown in the picture.

pinkish brown outwards and yellow inwards. The bark measures ½ inch thick on a tree of above size. Inner surface of bark and surface of sapwood bright yellow. The leaves are arranged alternately on the branchlets and their margins are toothed. A peculiarity of the leaves is the hollow thickenings on the underside where the lateral nerves join the midrib. Looked at from the ground the foliage of the trees frequently has a brown appearance. Eungella Range to Daintree River. Very common on some of the higher parts of the Eungella Range such as the track leading to Mount Dalrymple.

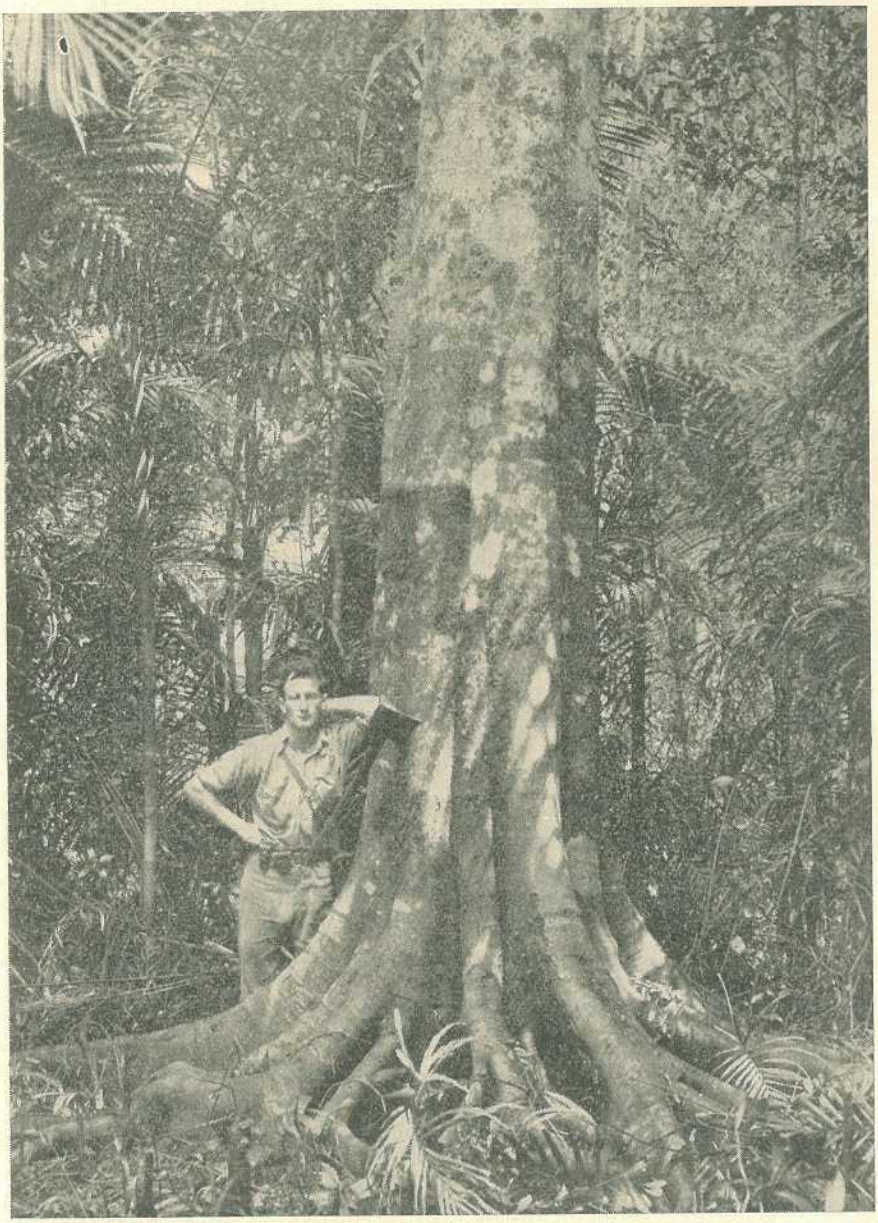
Elæocarpus largiflorens C. T. White. The Mount Spec trees attained 60 feet in height and 15 inches in stem diameter. Stem with small buttresses, otherwise fairly straight and slender. Bark brown with scattered pustules; the pustules often arranged in longitudinal lines or cracks. When the bark is cut it is dark pinkish brown on outside and bright yellow towards the sapwood. Sapwood surface whitish or greenish yellow. Sapwood nearly white. Heartwood light brown, sometimes decayed at centre. Leaves placed alternately on the branchlets. Margins of the leaves mostly toothed. At times the teeth on the leaf margins are small or inconspicuous. The sap oozing from the wood is said to be strongly irritating. Mount Spec, Atherton Tableland, and Johnstone River.

Elæocarpus sp. affinities *Elæocarpus obovatus* G. Don. The trees here described may not be specifically distinct from *Elæocarpus obovatus*. In fact at present the writer does not know how they can be separated from *Elæocarpus obovatus*. Attaining 100 feet in height and 2 feet 6 inches stem diameter. Stem buttressed at base just as shown in the illustration of *Elæocarpus obovatus* in "Australian Rain-forest Trees," p. 246. Bark grey or brown with a tendency to be longitudinally wrinkled. When the bark is cut it is pinkish brown and measures ⅝ inch thick on tree of above size. Sapwood surface greenish yellow. Mount Spec.

Family STERCULIACEÆ.

Sterculia laurifolia F. v. M. Sometimes called cabbage crowfoot. This common name is applied because the tree is remarkably like some of the Tarrietias in appearance, but the wood is much softer than the wood of the Tarrietias which are at times referred to as crowfoot elm. This is a buttressed tree with a grey or brown bark which has a tendency to longitudinal fissures. The leaves are simple and are not in threes or twos as in Tarrietia, and are placed alternately to each other on the branchlets. Atherton Tableland.

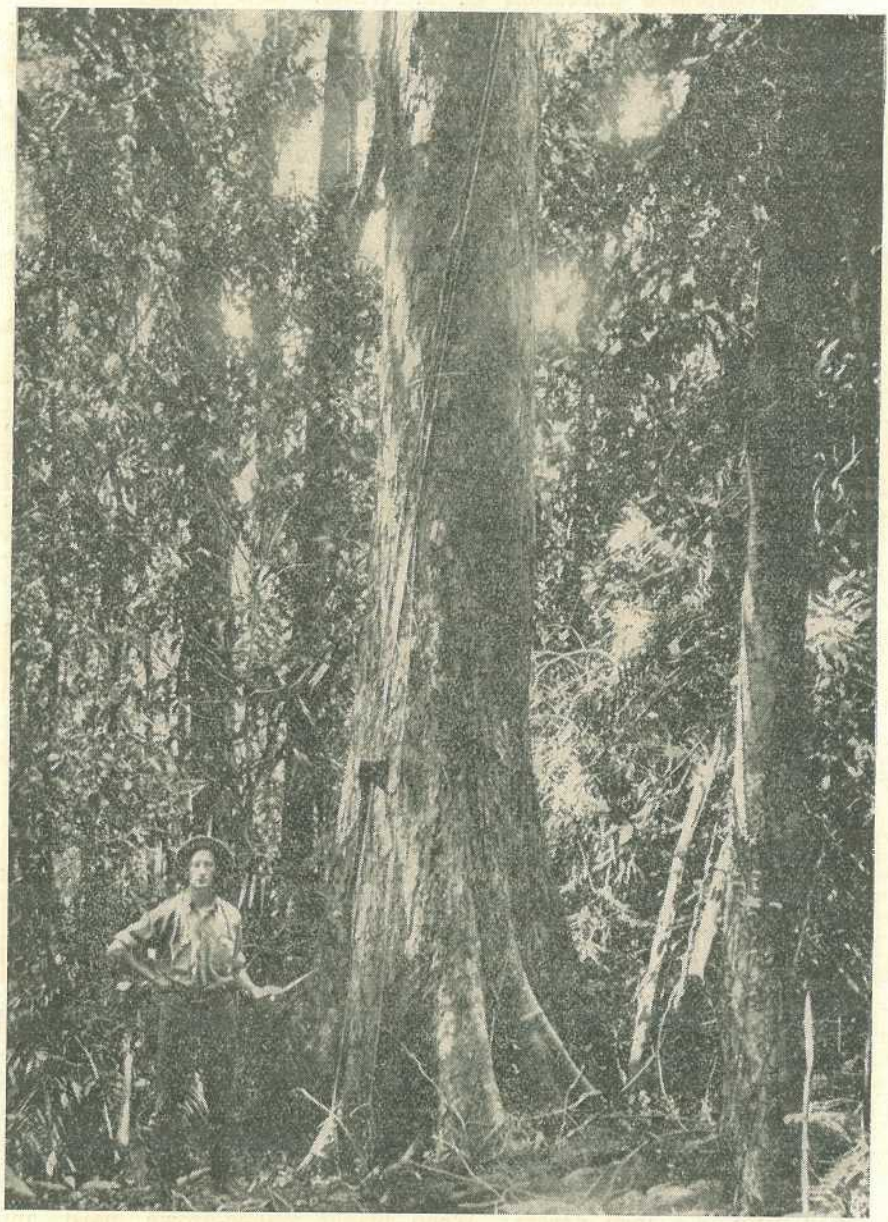
Tarrietia Argyrodendron Bentham. There are several varieties of this species in North Queensland. For brief descriptions of the varieties and pictures of the stem and herbarium specimens of the normal form the reader is referred to "Australian Rain-forest Trees," pp. 266-272. In general appearance the northern varieties, so far as is known, conform to the southern type as illustrated in the work quoted above. The trees are almost without exception buttressed. The bark varies from grey to brown, has a tendency to be longitudinally wrinkled or slightly fissured and at times in large trees there is a tendency to scaliness. The wood of all varieties always shows large conspicuous rays, although these as a rule are not so large as the rays of many *Proteaceæ* (silky oaks). The varieties of this species are extremely common in North Queensland lowland and mountain rain-forests.



[*Photo.: W. D. Francis*

Plate 116.

Elæocarpus foveolatus ON THE EUNGELLA RANGE.—This was a very common tree along the track from Eungella to Mount Dalrymple. The palms in the background are the Bangalow (*Archontophœnix Cunninghamiana*).



[*Photo.: W. D. Francis.*

Plate 117.

RED EUNGELLA GUM (*Eugenia hemilampra*), EUNGELLA RANGE.—The aerial roots of a fig tree are shown on the stem of the tree.

Family MYRTACEÆ.

Xanthostemon pubescens C. T. White. Red penda, Atherton penda. Attaining 120 feet in height and 4 feet 6 inches stem diameter. Stem tall and often straight, often very prominently buttressed. Bark grey or at times brown, somewhat scaly in large trees and sometimes with roundish depressions left by fallen scales. When cut the bark is brown or pinkish brown and measures about ⅜ inch thick on the sides of buttresses of tree of above size. Sapwood often very thin on large trees, flesh-coloured. Heartwood when fresh dark brown. Leaves mostly alternate but at times they are opposite each other on the branchlets. There is a drawing of the specimens by C. T. White in the Proceedings of the Royal Society of Queensland, Vol. 29, p. 58, 1917. Atherton Tableland.

Eugenia hemilampra F. v. M. Red Eungella gum. Attaining a height of 105 feet and a stem diameter of 3 feet 6 inches or even more. The stems are mostly straight and are somewhat buttressed at the base. Bark reddish brown, shed in flakes, inner bark somewhat fibrous. When the bark is cut it is reddish brown and measures ⅜ inch thick on a tree of above dimensions. The leaves are placed opposite to each other on the branchlets. It is very common on the Eungella Range and Mount Spec. This species and the allied or identical one known as White Eungella Gum are used for building purposes on the Eungella Range. The species ranges from the Clarence River in New South Wales to Cape York, Queensland.

Eugenia sp. White Eungella gum. It seems very doubtful whether this species can be kept separate from the foregoing species, *Eugenia hemilampra*. *Eugenia hemilampra* in its turn may not be specifically separable from *Eugenia Smithii*. The White Eungella gum is very common on the Eungella Range.

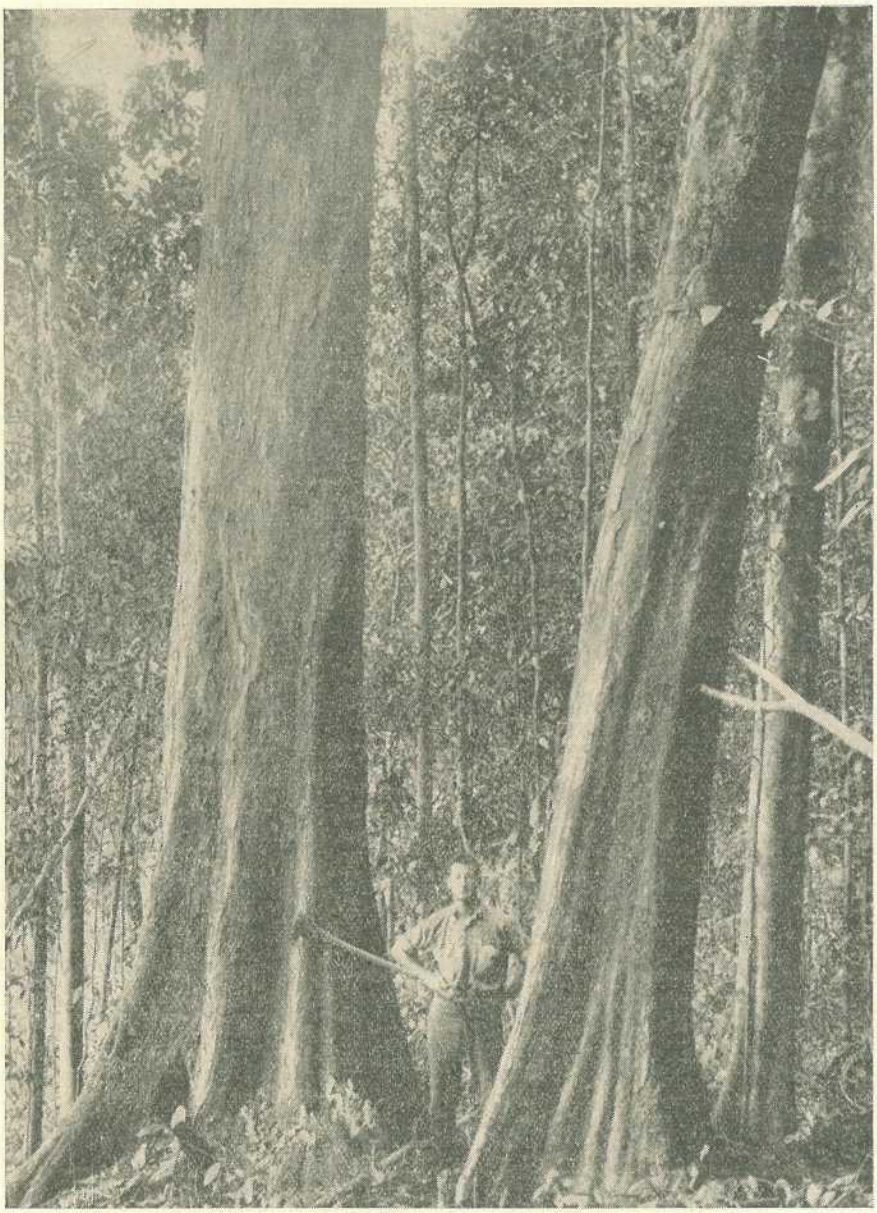
Family SAPOTACEÆ.

Lucuma galactoxyla F. v. M. Cairns pencil cedar, Daintree maple. A comparatively large tree. Stem with small buttresses at base. Bark brown with shallow longitudinal fissures spaced fairly widely (1-2 inch) apart. When cut the bark exudes a milky sap. Wood red, soft to cut. Daintree River, Freshwater Creek near Cairns, Johnstone River, and Rockingham Bay.

Sideroxylum euphlebium F. v. M. Attaining 60 feet in height and 14 inches stem diameter. Stem with buttresses. Bark dark brown with discernible or distinct longitudinal wrinkles or fissures. When the bark is cut it is yellow-brown and exudes a milky sap. The bark measures ⅜ inch thick on a tree of above size. The fruit is red when ripe and has a pleasant flavour. The fruit is globose or inclined to be egg-shaped, with a tendency to forming a point at the apex, 1-1½ inch long, ¾-1 inch across. Wood bright yellow-brown, hard, and apparently with long fibres. The leaves are placed alternately on the branchlets. Rockingham Bay (Dallachy), and Mount Spec.

Family SYMPLOCACEÆ.

Symplocos spicata Roxb. Attaining about 100 feet in height and 2 feet 6 inch stem diameter. Stem not prominently buttressed. Bark brown, finely scaly. When cut the bark is brown and measures 1¼ inch



[*Photo.: W. D. Francis.*

Plate 118.

WHITE EUNGELLA GUM (*Eugenia* sp.).—Two trees on the Eungella Range.

thick on a tree of above dimensions. The leaves are placed alternately on the stem and mostly have toothed margins. Eungella Range northwards.

Family APOCYNACEÆ.

Cerbera manghas Linn. Milky pine. Attaining 100 feet high and 2 feet 6 inches stem diameter. Stem not prominently buttressed. Bark grey, with large pustules measuring $\frac{3}{8}$-$\frac{3}{4}$ inch across, also with longitudinal cracks and a tendency to scaliness. When cut the bark is cream-coloured or yellow-brown, exudes much milky sap and measures $1\frac{1}{4}$ inch thick on a tree of above dimensions. The leaves are closely crowded towards the ends of the thick branchlets, which when broken exude large quantities of milky sap. The flowers are conspicuous, white or cream, and strongly fragrant. Atherton Tableland.

Family APOCYNACEÆ.

Alstonia scholaris R. Br. Milky pine, white cheesewood. Attaining 100 feet in height and 2 feet 6 inches stem diameter. The stems in large trees are commonly longitudinally grooved or furrowed, giving the stem the appearance of being deeply channelled. This furrowing or flanging of the stem imparts an angular or lobed contour to cross sections of the stem. Bark grey or light grey. In a closely examined tree the writer has described the bark as having horizontally elongated processes almost like transverse rings. When the bark is cut it is light or yellowish brown and exudes a large quantity of milky sap. The leaves are collected in groups or whorls of 4-7 at the ends of the branchlets and at intervals along the branchlets. A very common species in the rain-forests of the low lands from about 60 miles south of Mackay to Cape York. This species was not seen on the Eungella Range or Mount Spec, but there were some trees at Gadgarra on the Atherton Tableland.

Family VERBENACEÆ.

Gmelina fasciculiflora Benth. Attaining 100 feet in height and 18 inches stem diameter. Stem without prominent buttresses, often straight. Bark grey, somewhat scaly. When the bark is cut it is brownish yellow. The wood is white or pale cream-colour. The general aspect of the tree, the character of the bark and the appearance of the wood strongly resemble those of the Australian White Beech (*Gmelina Leichhardtii*), pictures and descriptions of which are given in Francis' "Australian Rain-forest Trees," 334-336. The leaves are large and placed opposite one another on the branchlets. The fruit are round with a blue rind. Atherton Tableland and Rockingham Bay.

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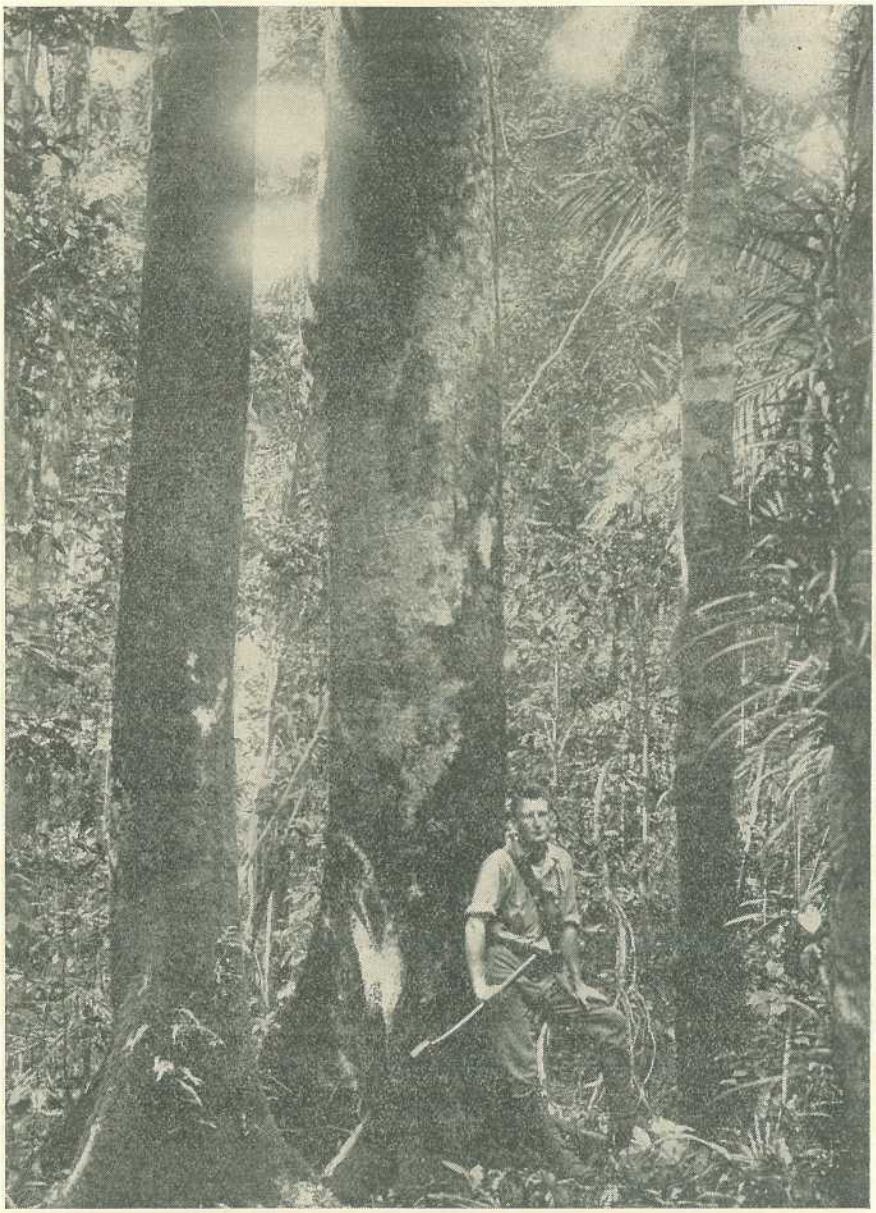
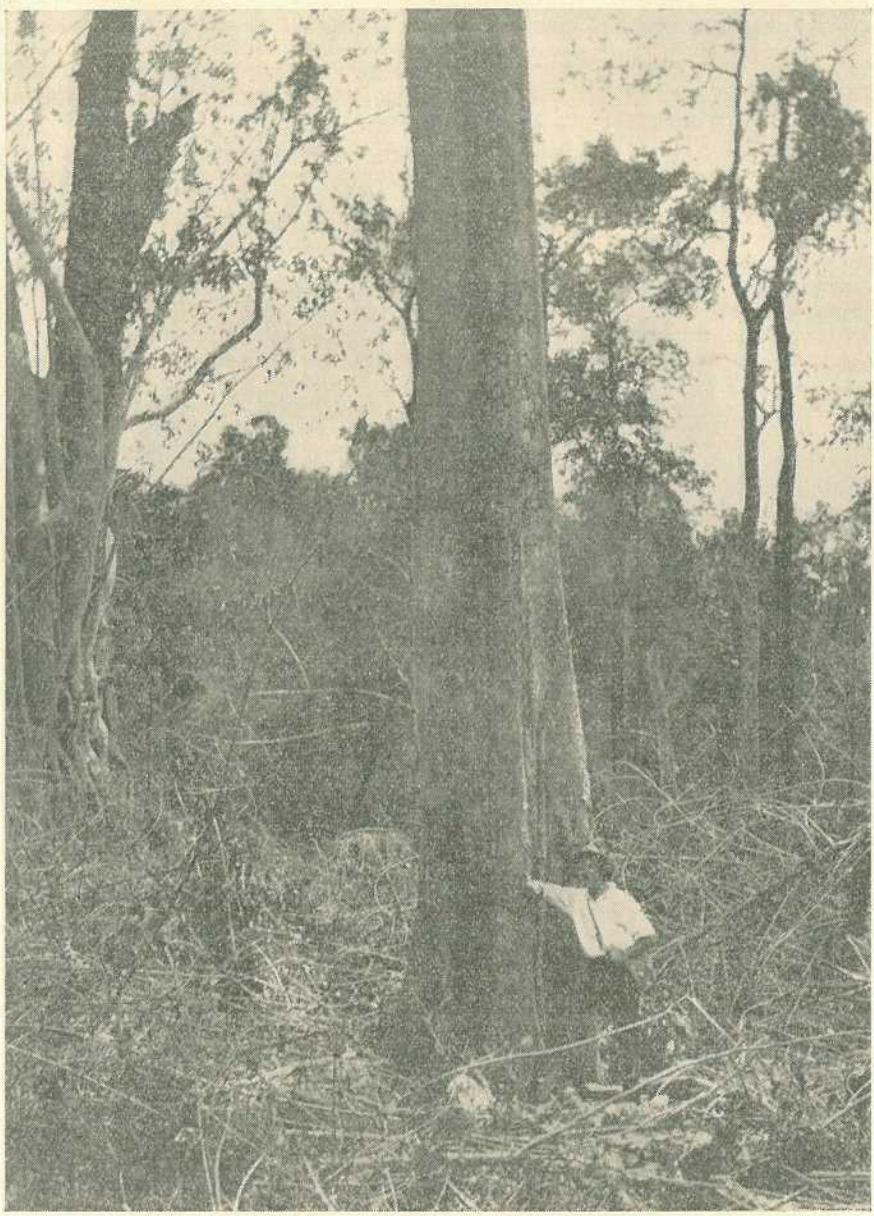


[*Photo.: W. D. Francis.*

Plate 119.

Symplocos spicata ON THE EUNGELLA RANGE.—The large tree on the left of the picture is a species of *Cryptocarya*. The small tree on the right is another specimen of *Symplocos spicata*.



[*Photo.: W. D. Francis.*

Plate 120.

SO-CALLED MILKY PINE (*Alstonia scholaris*).—A tree on flat land near Netherdale, at the foot of Eungella Range. This is a common tree in North Queensland rain forests. The rain forest around this tree had been felled, but not burnt.

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Packing Grapes for Market at Home and Abroad.

J. H. GREGORY, Instructor in Fruit Packing.

CAREFUL handling during harvesting is an essential preliminary to the satisfactory packing of grapes for either the home or export market.

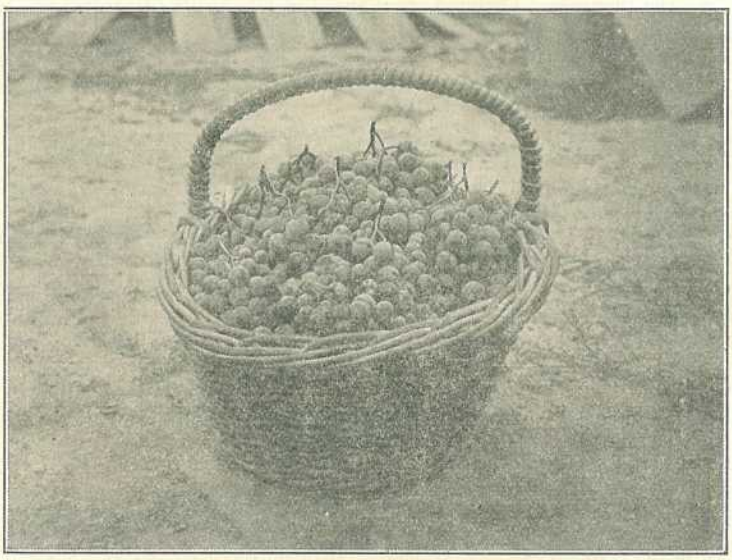


Plate 121.

Showing the method of placing all stalks upward in the picking basket so that bunches can always be handled by the stalks without touching the fruit. This assists in preserving the natural bloom on the fruit.

HARVESTING.

Grapes should be picked in the cool of the day and never while still wet by rain or dew. Whilst being picked, the bunches should be trimmed of all small, damaged berries, care being taken all the time to keep the fruit as cool as possible. Large, roomy baskets make excellent picking containers, and when trimmed the bunches should be placed in these, stems upward. (Plate 121.) The bunches should always be handled by the stems in order to retain the natural bloom on the fruit. The baskets, when full, should be placed in a cool, shady position pending transport to the packing shed. At the shed the bunches should be examined a second time, and any damaged berries missed at the first inspection removed. They should then be spread out on a flat table (Plate 122), on the cool side of the building, again taking care to place them carefully with the stalks up. This will assist in keeping the fruit cool, and also enable the packer to quickly select any particular size or type of bunch which he may need to fill a particular portion of a layer when packing.

SWEATING OR WILTING.

It is advisable to sweat grapes for about twenty-four to forty-eight hours before packing. This is done by storing the fruit in a cool shed where the air has free circulation. Weather conditions have an effect on the sweating period, grapes in warm weather taking less time than in the

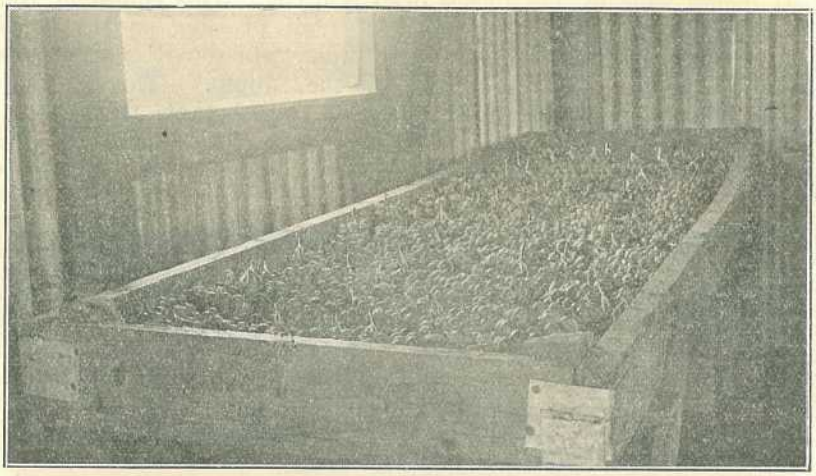


Plate 122.
Fruit spread out on the table prior to packing. Again notice the way all stalks are placed upwards to permit easy handling of bunches.

cooler periods. After sweating, the skin of the fruit becomes tougher and more pliable, enabling it to be handled with greater ease and less risk of cracking the berries or damaging the fruit at the stalk. Sweating also helps to eliminate slackness in packing which is likely to develop during transit through shrinkage when bunches are packed without having been sweated.

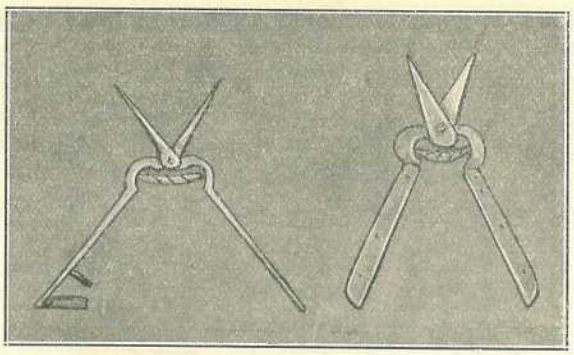


Plate 123.
Types of grape trimming clippers.

PACKING FOR LOCAL MARKET.

Containers.

There are two types of half-bushel cases in use and a quarter-bushel case. Bushel cases are not recommended. The dump half-bushel, 18 inches long by $7\frac{1}{8}$ inches wide by $8\frac{2}{3}$ inches deep, is a good container, but the half-bushel standard case, 18 inches long by $5\frac{1}{4}$ inches wide by $11\frac{3}{4}$ inches deep is better. This container when in transit has not the same weight of fruit pressing on the bottom layer as the half-bushel dump case, the "standard" only having $5\frac{1}{4}$ inches of fruit as against $7\frac{1}{8}$ inches in the "dump." This is a factor for consideration where fruit is sent to distant markets. A quarter-bushel case is also used and is very popular on some markets. Growers are advised to consult with their distributors

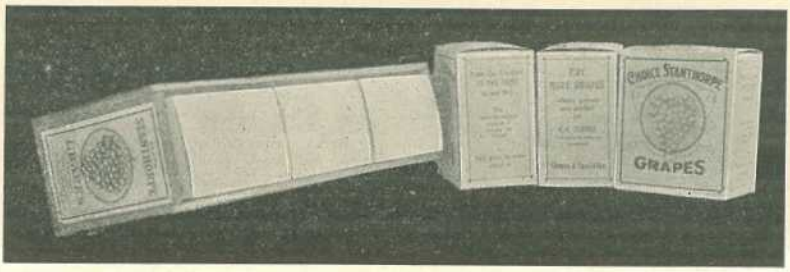


Plate 124.
Cartons used for packing. Three of these cartons fit ¼-bushel case.

before using this package. Another popular method adopted by progressive growers is the use of cartons. (Plate 124.) Some growers use cardboard, but the best type of carton is one made of plywood. This has the advantage of not bulging at the sides when filled with fruit, as happens on occasions with cardboard, making it harder to place the containers in the boxes used for transit. The cartons can be made to a size that will hold approximately 2 or 4 lb. of fruit and will fit the ordinary cases in use. Different sizes of cartons can be used, but growers should be guided by their distributors as to the best sizes for their particular trade.

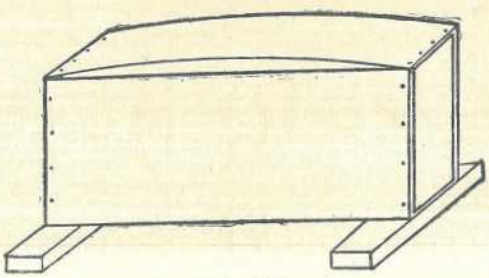


Plate 125.
Method of placing two pieces of timber on the floor of shed. This makes a good solid nailing down bench, and permits the bottom of the case as well as the top to bulge slightly when the lid is nailed on.

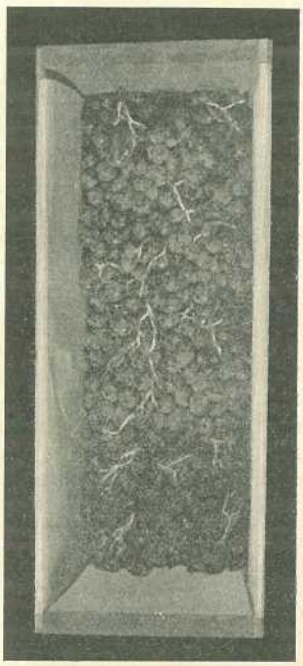


Plate 126.

Method of placing the first layer. Note how all stalks are placed inwards and upwards so that only fruit will show if the bottom board of the packed case is removed.

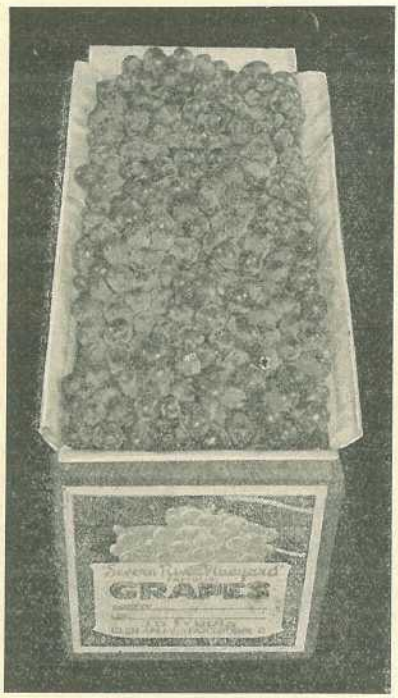


Plate 127.

Finished case before nailing down. Note how all stalks are carefully hidden. If care is taken, all sides of the case will open up showing fruit only.

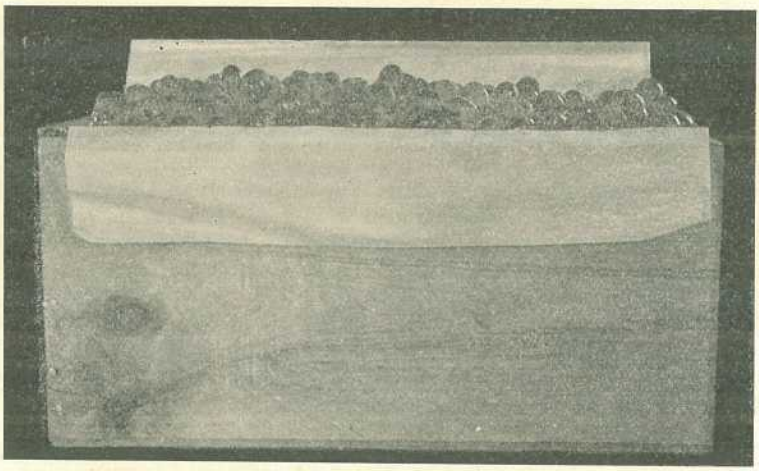


Plate 128.

Side view of case before being nailed down. Note the height of the fruit in the case.

Packing.

The same system of packing is adopted in all types of cases. Packers should endeavour as much as possible to keep all stalks to the centre of the box so that when opened the cases on either top, bottom, or sides show a surface of fruit with practically no stalks visible. (Plates 126, 127, and 128.) This style of packing is easily done. The case should be lined with clean white or coloured paper and the fruit carefully placed in the case in layers. The first layer is started by placing the points of two bunches in the corners of one end of the box with the stalks to the centre of the layer but facing upwards and inwards. (Plate 126.) Bunches are then placed point first into the corners made by these bunches and the side of the box until the layer is finished. The space, if any, between the two lines of grapes of the first layer is then filled by placing bunches into the space with the points to the bottom and the stalks up. This presents a level surface of fruit free from stalks to the bottom of the case. The process is carried on until with the dump case the case is half filled, when the fruit is shaken into position by light bumping. Battens should be placed beneath the ends of the case while this is being done. The standard case should have the fruit eased into position when about one-third full and again when about three-quarters full. The case is finished by packing the fruit in layer by layer, bringing the fruit to a height of 1 to 1½ inches (Plate 128) above the top of the case. Battens are then placed under the ends of the case, the paper folded over, the lid held in position with a gentle pressure placed on the fruit and the case. If sufficient care is taken, the bunches will not be injured in any way. After easing the fruit into position, and before finally nailing down, the lid should be removed and the top of the case inspected. If by mischance any grapes are cracked these should be carefully clipped and removed. The whole success of grape packing is having the fruit tight in the case to prevent movement whilst in transit. Movement in the finished case causes damaged and wet fruit, making consignments wasty and unsaleable.

PACKING FOR EXPORT.

Where grapes are intended to be stored either for lengthy periods or transported over long distances in refrigeration, two materials are used for packing—granulated cork or sawdust and sulphite paper and woodwool. The most favoured method commercially is the use of granulated cork or sawdust as the packing medium. This method of packing has the advantage over the sulphite tissue paper and woodwool, in the fact that a much larger quantity of fruit can be packed in the case. This is an advantage from the buyer's point of view. It also means that the grower does not need such a large number of cases to harvest his crop, thereby greatly reducing his outlay for timber, handling, and cartage. Shipping freights, which are based on the cubic space occupied, also are reduced, as a greater quantity of fruit is contained in a given space. Moreover it should be remembered that overseas buyers buy the fruit on the basis of the weight contained in the case. The sawdust or cork should be absolutely clean and free from taint.

Every variety of grapes grown in Queensland is not suited for export. The best varieties in their order of merit are:—White grapes—Waltham Cross, and Cervant; black grapes—Purple Cornichon, Black Malaga, and Black Muscat; red grapes—Red Malaga and Flame Tokay.

This preference is based on the results of export consignments to the East, New Zealand, and Canada, and experimental packages stored in Brisbane.

After analysing the results of experimental consignments, the periods for which the several varieties may be stored with safety are:—Black Muscats, four to five weeks; Waltham Cross, five to six weeks; Purple Cornichon, Flame Tokay, Red Malaga, Black Malaga, and Cervant, seven to eight weeks.

It must be stressed that safe storage can only be achieved by every attention to careful handling.

Selection of Fruit.

Careful selection of bunches also is an important factor in successful exporting. Large, loose types of bunches should always be selected. Tight bunches are unsatisfactory, as they are harder to clean and trim without damage to the berries. Often the large, tight bunches contain many blemished berries in the centre of the bunch which can only be satisfactorily removed by cutting the bunches into sections. This is undesirable, as the value of the fruit is depreciated by reducing the size of the bunches. Bunches should be selected containing only large, even fruit. Bunches of small fruit are of low commercial value. It is advisable to leave a length of the stalk attached to the bunch when picking. This assists the packer when handling the fruit. Bunches with long stalks appear to carry and open in better condition than those with stalks clipped short.

Containers.

The container used, when packing with cork or sawdust, is the three-quarter bushel with a centre partition. The dimensions of this case clear of the partition when made on the flat are: $24\frac{5}{16}$ inches long by $12\frac{1}{2}$ inches wide by $6\frac{1}{2}$ inches deep. Packing should be done from the side with the case made on the flat. This case is also quite satisfactory for the sulphite paper and woodwool packing. A smaller case is not recommended commercially, although satisfactory results can be obtained with the standard half-bushel case, 18 inches long by $11\frac{1}{2}$ inches wide by $5\frac{1}{4}$ inches deep.

Lining Paper.

Lining paper is used with all packs. To save time, plain white or coloured paper cut to the correct size to fit the case should be used. For the $\frac{3}{4}$-bushel, paper 12 inches by 20 inches wide is suitable and leaves a good margin for overlapping. The paper should be placed in the case neatly, as damaged or torn lining paper creates a bad first impression when fruit is being examined.

Granulated Cork Filler.

Cork is packed in bales ready for use, but pressed into a tight mass. This can easily be broken up by the use of an old chisel with a stabbing motion. The bulk cork should be placed in a bin, for if left open the wind will soon blow it about the packing shed, causing waste, extra work and loss of time in clearing up.

A kerosene tin cut on the flat is a good cork measure, permitting the packer to see the amount of granulated cork he is using. The average case of fruit takes approximately 1⅓ kerosene tins of cork for packing. This will vary slightly whether the cork is fine or coarse, or the bunches tight or loose.

No weight of cork can be given for use to a case, as the different types of cork vary in weight, some being 4½ lb. and others as low as 2½ lb. to the kerosene tin.

The cork should not be too coarse. Care should be taken to see that it is not too finely granulated, as cork of this description adheres firmly to the fruit after storage, spoiling the selling value. It should be remembered that after being conveyed long distances and being stored a long time, bunches cannot be shaken too roughly to dislodge cork, as the berries are not as tight on the stalk then as when picked, hence the necessity of the cork being free from dust and not ground too finely.

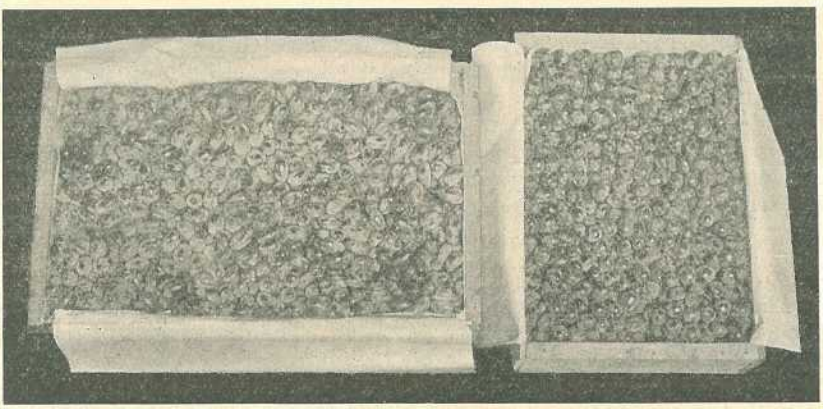


Plate 129.

Standard ½-bushel and ¼-bushel case opened on the side showing the absence of stalks when the fruit is packed correctly.

Packing With Cork or Sawdust.

When packing the case on the flat, it is first lined with paper and a layer of cork or sawdust about ¼ inch in depth spread on the bottom. The trimmed bunches are then placed in a layer upon this, and when the layer is completed more cork or sawdust is poured in until the layer is just covered. This process is repeated until the case is filled (Plate 130) to ½ inch above the top. The contents of the case are then shaken into position by placing the lid over the fruit and gently knocking each end upon the bench. If this is carefully done no damage to the berries will result. If any berries happen to become damaged they should be carefully clipped off and removed. A layer of cork is then spread on the fruit (Plate 131) and the lid applied.

Packing in woodwool and sulphite paper will present little difficulty. The case is first lined with paper, and then a pad of woodwool is placed on the bottom and around the sides of the box. The clipped bunches

are then carefully wrapped in the sulphite paper and placed closely together in the box. Only large-sized bunches should be used. Where bunches are small, two at a time can be placed in the one sheet of paper. This is preferable to wrapping small bunches separately. The packer

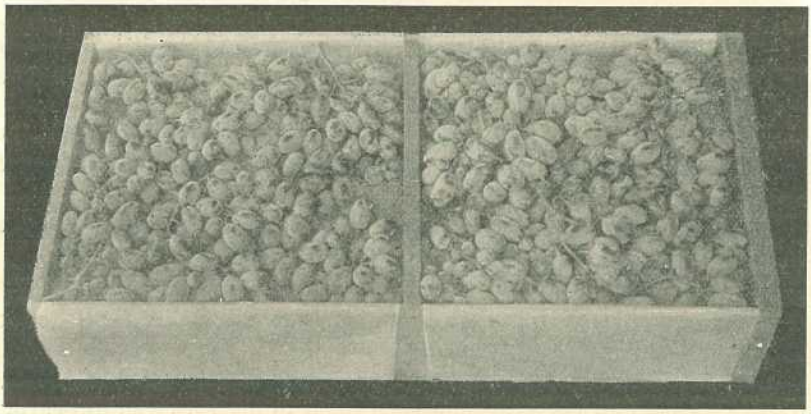


Plate 130.

CASE PACKED FOR EXPORT.—Before nailing down the fruit is covered with a final layer of cork or sawdust.

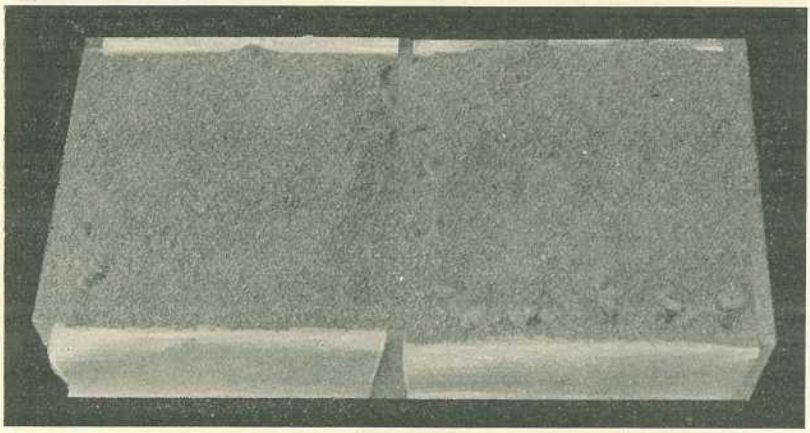


Plate 131.

The same case as in Plate 130 with a final layer of cork applied. This case is now ready to nail down.

should aim at having one layer of fruit in the case. From this it will be seen that only large bunches will adapt themselves satisfactorily to this pack. When the box is filled any spaces between the bunches are carefully padded with woodwool (Plate 132). A layer of woodwool is finally placed on the top of the fruit, and the lid placed in position. The sulphite paper should be cut at least 15 inches by 15 inches in size.

Special points to remember are—

Tease the woodwool into a soft pad.

Keep the bunches tightly packed and well padded so that there is no movement in the fruit after the lid is applied.

Close attention to the following general points when packing grapes will assist greatly in obtaining satisfactory results:—

1. Clip—not pull—all blemished, diseased, and small berries from every bunch. Remember the export trade only wants very high-class fruit. Pulling causes waste.
2. Do not pick grapes after heavy dew or rain, but wait until the fruit has dried. Moisture is fatal to the successful carriage of grapes.
3. Avoid cutting up bunches as much as possible; small bunches or sprigs of berries spoil the sale of high-class grapes.
4. Sweat bunches in a cool, dry place.
5. Do not pack fruit while warm, but allow all fruit to cool completely before being packed.
6. Handle fruit by the stalks only. This helps to preserve the bloom on the grapes, assists them to keep a fresh appearance even after a long period of storage.
7. See that all boards fit closely together when making up cases.

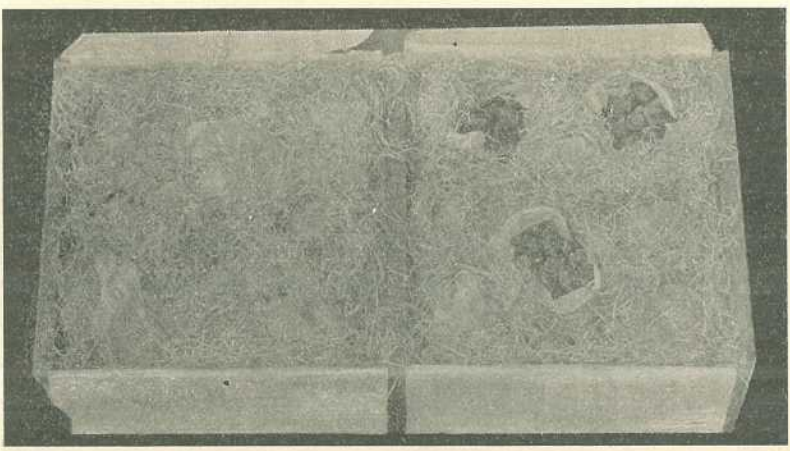
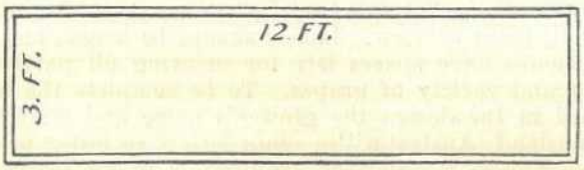


Plate 132.

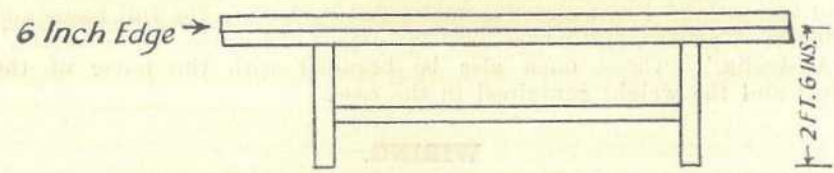
Fruit packed for export using the sulphite paper and woodwool method of packing. The paper on three of the wrapped bunches is torn, showing the fruit.

SHED EQUIPMENT.

The equipment necessary in the packing shed is not very costly. One set of small platform scales, long benches for laying out the grapes ready to pack, packing stands to hold the case whilst being packed, grape trimmers, case-making bench, wiring machine, 1 large bin for holding bulk cork, and kerosene tins cut flat for cork measuring. The benches and stands can be made cheaply at home. Empty galvanised iron crates with the addition of legs make satisfactory benches.



PLAN



ELEVATION

Plate 133.
Table to hold fruit whilst packing.

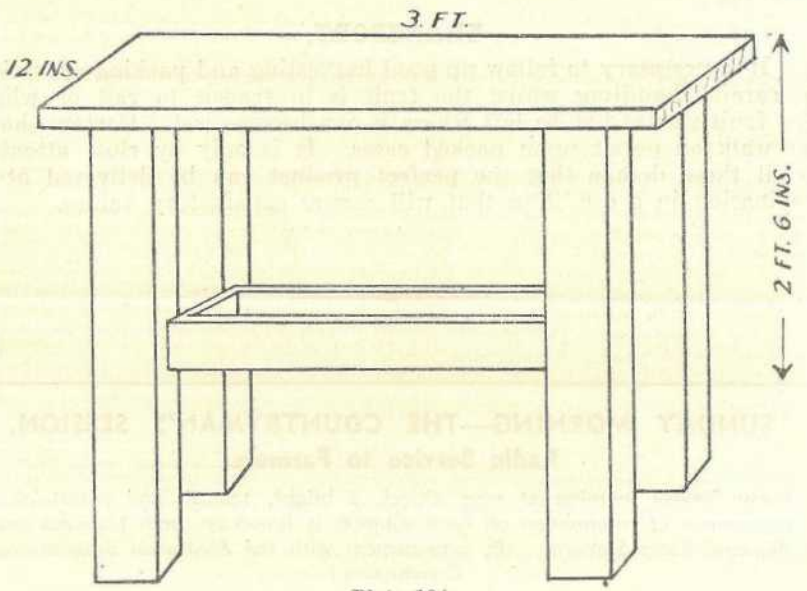


Plate 134.

PACKING STAND.—This stand will hold one export case and the kerosene tin cork container whilst packing.

LABELLING.

The use of a distinctive label is of great assistance from the display and advertising point of view. Labels should be bright and attractive. The design should have spaces left for printing all particulars, such as the weight and variety of grapes. To be complete the label should have embodied in the design the grower's name and address, and the words "Queensland, Australia" in plain letters in order to conform to the Commerce Export Regulations. A label 11 inches by 5½ inches will fit the end of the export case or standard half-bushel. The dump half-bushel label will measure a maximum size of 8 inches by 7 inches.

STENCILS.

Stencils, if used, must also conform to the Commonwealth regulations and Queensland Fruit and Vegetables Act by having the full name and address of packer, and where used for export the words "Queensland," "Australia." Cases must also be branded with the name of the fruit and the weight contained in the case.

WIRING.

Wiring the cases when exporting or sending long distances is a necessity. The wires should be placed around the case ⅛ inch from the inside edge of the ends. Two wires should be used, one at each end in preference to one around the middle of the box. Care should be taken to see that they are placed around the case parallel with the end. This is essential if the wiring is to give the best results. Often when packing for local markets two small boxes can be wired together to advantage.

TRANSPORT.

It is necessary to follow up good harvesting and packing operations by careful handling whilst the fruit is in transit to rail or wharf. The fruit should not be left where it can become wet. Carters should not walk on or sit upon packed cases. It is only by close attention to all these details that the perfect product can be delivered at its destination in a condition that will ensure satisfactory values.

Strawberry Culture in Queensland.

H. BARNES, Director of Fruit Culture.

THE commercial production of most berry fruits is commonly considered to be better suited to temperate climates than to the semi-tropical conditions of Queensland. The strawberry, however, is an exception which, because of concentration largely on locally raised hybrids, can be and is grown to perfection in this State. It has, moreover, attained a position of considerable economic importance in the fruit industry. It yields a quick return, and has thus been the means of tiding many orchardists over the difficult period during which slower maturing crops are coming into bearing.

The main centre of production is the coastal district, extending about 300 miles northwards from the New South Wales border, and there the strawberry has proved itself to be a hardy plant, yielding prolific and early crops of excellent quality.

Production on a small scale has extended over the remaining portion of the coastline as far north as Townsville, where, although within the tropics, quite good results are obtained under favourable conditions of alluvial soils and irrigation. Some berries are also grown on the tablelands adjacent to the coastline, where rainfall is sufficient or irrigation is practicable, but, as previously stated, the big production comes from the southern coastal area within easy access of the metropolitan market and the canneries.

There is a good demand for the fresh fruit, both locally and for the early shipments sent in cool storage to Southern capitals, while factories are using greater quantities each year for canning and jam making.

SOILS AND THEIR PREPARATION.

The best soil for the strawberry is a rich light to medium loam of either scrub or forest origin. Heavier soils may be used, but are not considered to be as suitable. In any event, whatever soils are used, they should be well supplied with humus and possess good, natural, drainage. Heavy clays and soils which are cold and poorly drained are not suitable, and their planting will only result in endless trouble for the grower.

Preparation of the soil must be thorough. Virgin lands are, as a rule, fairly rich in humus, and, after clearing, should be ploughed shallowly, cross ploughed, and then finally ploughed deeply and well harrowed several times to break them down to a fine tilth. On such soils, unless they are very poor, it is often unnecessary to apply fertilizers for the first crop, as there is usually plenty of available plant-food present in the soil. For subsequent crops, however, fertilizing is important. On old land or land deficient in humus, systematic fertilizing with animal manure at the rate of 40 loads to the acre, or, if that is unavailable, the ploughing in of green manure crops is necessary.

Humus has a very important influence on soil fertility. Its presence also enables the soil to retain a much greater percentage of moisture. This is of the utmost importance in soils devoted to strawberry growing, as the plant is shallow-rooted, and soon wilts when there is any shortage of moisture.

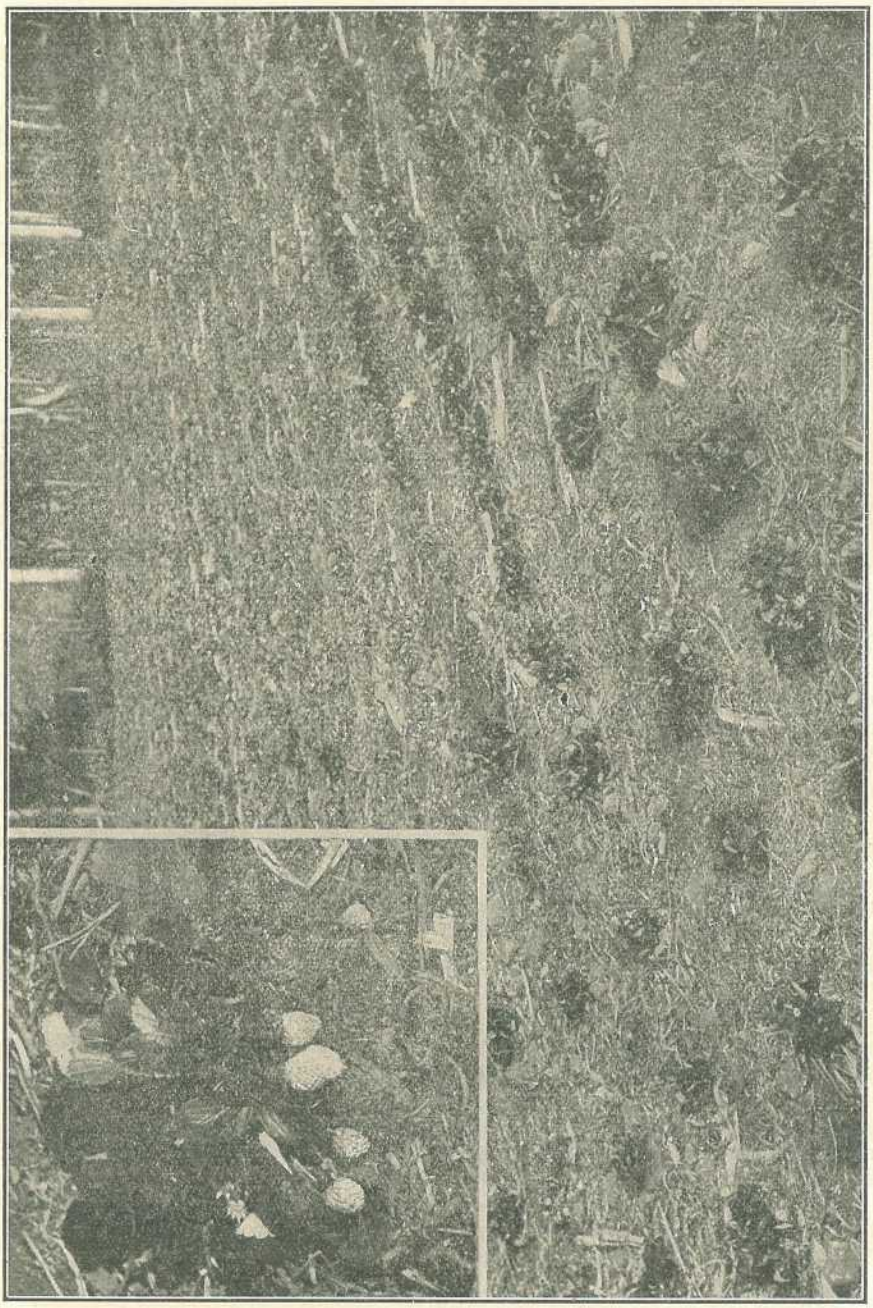


Plate 135.
A Strawberry Garden on the Near North Coast.

When leguminous plants—such as cowpea, Poona pea, vetch bean, and Mauritius bean—are grown as summer green manure crops, or field peas, vetches or tares are grown as a winter crop, it is advisable to assist their growth by broadcasting a light dressing of fertilizer made up of 2 cwt. of superphosphate and 1 cwt. of muriate of potash per acre. No nitrogen need be applied, as the plants will obtain their requirements from the air. When the green crops are ploughed in, the soil will not only be enriched by the plant foods contained in the fertilizer applied to the soil to produce the crop, but also by the nitrogen that has been absorbed by the crop from the air.

FERTILIZING.

The fertilizing of strawberry plants should consist of an application of one of the commercial strawberry fertilizers sold by recognised firms, at the rate of about 10 cwt. to 12 cwt. per acre, or the following complete mixture, which is recommended by the Agricultural Chemist, per acre:—

2¼ cwt. sulphate of ammonia;
6 cwt. superphosphate; and
3 cwt. sulphate of potash.

This should be applied as follows:—7¼ cwt. before planting, and four top dressings of 1 cwt. each at fortnightly intervals from the time the fruit is first forming. The first application should be distributed along the rows, and worked in a week to ten days before setting out the plants if a new planting is to be made; or if used on old plants the fertilizer should be spread along both sides of the rows some time in March, and worked in. The top-dressings should be worked in lightly with a hoe.

SELECTION OF PLANTS.

Only strong runners from healthy, prolific plants should be used. The first rootings of the runners nearest to the parents are to be preferred, as they are invariably the strongest and best-rooted plants. They grow vigorously and come into bearing early. If not enough first rootings are available, the second rootings of the runners are the next best plants, and so on. They may not fruit as early as the first runners, but, nevertheless, they will produce good crops, and frequently continue to bear when the earlier fruiting plants have ceased bearing.

PLANTING.

March and April are the main planting months. After having secured suitable plants, the roots should be trimmed with a sharp knife to about 3 to 4 inches long, care should be taken not to let them dry out. It is not sufficient for good results merely to push the plants into the ground and fill in some soil. Planting should always be done carefully. The roots should be spread out evenly, leaving the heart, or crown of the plant, as it is better known, just above the level of the ground. Fine soil should be placed round the roots and pressed down. In Plate 136, Fig. 1 shows a plant set too deeply; in Fig. 2 the roots are all bunched together, so the plant has not got a firm hold of the ground. Fig. 3 illustrates a plant with the crown too far above the ground, while in Fig. 4 the plant is shown planted at the correct depth and the manner of spreading the roots.

Planting is usually done by hand, or with a trowel. A planting-wire stretched across the field will act as a guide in keeping the rows straight.

Careless planting is responsible for the failure of many plants, especially planting too deep, as no strawberry will thrive if the crown is buried under the soil.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Plate 136.

The distance at which to set out the plants varies in different districts, but in any case it is not advisable to over-crowd them. In single-row planting, the plants are often set 12 to 15 inches apart in rows 24 to 27 inches apart. This system has a disadvantage in that there is a tendency when cultivating and harvesting to walk up and down each row, and so tramp the soil hard. Double-row planting is most favoured. By this method the plants are set out 12 to 15 inches apart in double rows, which are 20 to 24 inches apart, while between each double row a distance of about 30 inches is allowed. The greater width between each double row becomes eventually and automatically a pathway from which all weeding, harvesting, and fertilizing can be done without tramping the ground all round the plants.

CULTIVATION.

Strawberry plants must be only surface worked while growing or bearing fruit. The object is to keep down weed growth and to prevent the surface of the soil from caking; but the cultivation must never be so deep as to injure the roots. A useful implement is the Planet Junior hand cultivator or similar machine; or, failing that, a good Dutch hoe.

If the plants are to be kept for a second or third year's cropping, the whole of the runners, other than those required to make good any losses of the original plants, should be removed as they appear. Early in the following March the ground between the plants should be well broken up and fertilized again, so that the plants will be ready to produce another good crop in the next season.

MULCHING.

Mulching is not practised to any extent in Queensland, other than the soil mulch produced by surface working. A few growers use dried grass or straw, and this is considered good practice, since it keeps the berries cleaner, and also aids in conserving moisture.

The use of paper mulch has a lot to recommend it, since it also prevents weed growth, but the outlay of about £16 per acre has to be taken into consideration.

IRRIGATION.

Where water is obtainable, it should always be made available for the plants' use during dry weather, as the ability to maintain an adequate supply of moisture in the soil at all times, and thus maintain an even growth, will result in larger and better fruit and a heavy increase in yield. Strawberries pay well for intensive culture, and the money spent in providing a good system of overhead or other method of spray irrigation will be a very profitable investment. A combination of mulching and spray irrigation will enable a grower to maintain a regular supply of first-class table fruit throughout the season.

VARIETIES.

Although most of the standard varieties of strawberries have been grown in Queensland at one time or another, experience has shown that no one variety has proved permanent, and that it is necessary to raise new kinds from seed. Varieties producing perfect flowers have proved more profitable than pistillate sorts, and are, therefore, more common.

After being grown for a few years under Queensland conditions most varieties become weaker in growth, more liable to disease, and less prolific, so that they have to be rejected. The production of new sorts is thus essential, and there is no better way of doing this than by raising local seedlings. Some of the best varieties ever grown in the State have been locally-raised seedlings, of which the Aurie, Anetta, and Phenomenal are good examples. There is no reason why others, equal or even superior to these, should not be produced. Of the well-known standard varieties—such as Marguerite, Trollops, Victoria, British Queen, Pink's Prolific, Federation, Melba, and Edith, and several others which have been grown from time to time—few are now planted. Phenomenal (a Gympie-raised seedling) and Aurie (another variety of local origin) are now the most common varieties. Other new varieties are being tested, and some of them may prove adaptable to local conditions. The type of strawberry best suited to Queensland conditions is a vigorous healthy grower—that is, a heavy bearer of highly-coloured fruit of firm texture and fine flavour; a fruit which keeps and carries well, and which meets the requirements of both the fresh fruit trade and of the jam maker.

As strawberry seed is produced freely and germinates readily, raising seedling plants, which usually fruit the following season, is recommended. By careful selection, there is reasonable possibility of improving on existing varieties. Seed should not be collected indiscriminately, but from fruit produced freely on plants showing marked vigour.

DISEASES.

A pamphlet, dealing with the control of diseases, is obtainable from the Under Secretary, Department of Agriculture and Stock, Brisbane, B. 7.

Australian Native Vegetables.

E. HIRSCHFELD, M.D.

BEFORE the white man came to Australia, the aboriginals lived on what their soil could bring forth—game, animals of every description, and insects supplied them with flesh-food. The seeds of grasses, plants, and trees furnished grain. A wide range of herbage served them with vegetables, particularly during the winter months. There was no need to cultivate the soil, as the produce could be gathered with little effort. Physically, we know, they were a fine race; so their food supply must have been ample for their needs.

The white man pushed his way from the coast into the back country and built up his home in this new land, where everything was strange to him. He was forced to learn his bush-craft from the natives, who were experts at gaining their living from the soil. Vegetables must have been even scarcer then in the bush than they are now in the West. We can readily imagine white women making salads from "pigweed" or boiling it for cabbage, cooking what later on became known as New Zealand spinach. Probably the aboriginal servant taught her mistress how to prepare this native herbage. We must remember that in those days the dread of scurvy was uppermost in the minds of all who had to travel a long way by sea. Scurvy and its symptoms were then as well known as influenza is nowadays.

Gradually communications with the coast were being improved; seeds of European vegetables came out to the settler from the home country, and the English vegetables which they had done so long without were once more appreciated by palates which had been accustomed to them all their lives. Thus the native article fell into disuse, except in the further West, where the shortage of rain made the cultivation of English vegetables a matter of difficulty. Mrs. Duncan-Kemp in her book, "Our Sandhill Country," gives a most interesting and varied account of the native vegetables she learnt to prepare from the blacks on Mooraberrie station on the Diamantina. But except for isolated accounts here and there, most of which are difficult to get at, the bulk of the knowledge and lore that the aboriginals had once possessed and passed on to the pioneers is practically lost. Yet it is an admitted fact, that the lack of fresh vegetables in the West causes ill-health amongst the settlers and may stunt the growth of children. The tragedy of it all is that, in many cases, fresh vegetables are within the reach of the settlers, if they but knew it. The herbage growing at their very doors contains vegetables, perhaps not as tasty as the ones they have been used to but otherwise wholesome.

Like most settlers in the West we had been aware that some of the herbage favoured by the stock was also good for man to eat. But when one sees the same thing day by day one is apt to take things for granted without further inquiry. The following incident focussed our attention on to the matter. My son, R. S. Hirschfeld, and I were camped on the banks of Comorrin Creek, which runs through our holding—Bybera—in the Goondiwindi district. He was telling me of a droving trip from near the South Australian border to Bollon, having been one of the outfit that was taking 1,800 cattle on this fairly long trek. One day it had fallen to his lot to watch a gate and count the bullocks as they were passing through. Near the gate was a lot of herbage growing which looked like spinach, and was probably creeping

saltbush. Having been on damper, corned beef, and black tea for many weeks, he tasted it, and finding it good to eat fairly gorged himself with it. The feed seemed to make a different man of him; not only did he feel in better health, but the sores on his hands started to heal up. Interrupting his yarn, he pointed to some black-polled cattle which had come to graze not far away. "You see those steers over there; they are after a plant which is growing on this sandy soil. Some stock can always be found over that part of the run. I wish I knew what it was! Come along and I'll show you, then you can take it down to Brisbane and submit it to Mr. White. He'll know." It was a creeping plant with fleshy, juicy stem and leaves and a sky-blue flower. The Government Botanist, as usual, was a mine of information. He identified it as *Commelina cyanea*, usually known as "scurvy grass." It is moderately common all over the western country, generally preferring sandy soil. Its fleshy stalks and juicy leaves were eagerly sought after by sheep and cattle. Its usefulness did not end there. It could be used as a vegetable for man. When boiled it resembled cabbage, but was often eaten raw. It had acquired a reputation for protecting people against scurvy and curing them of it. Hence its name.

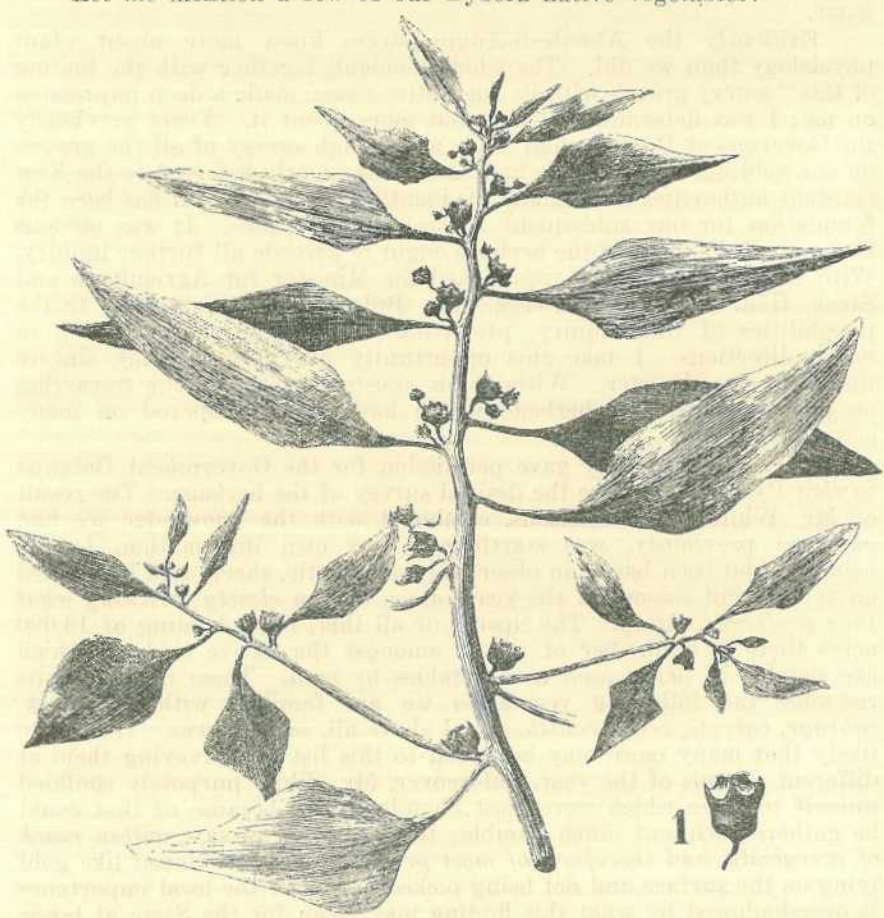
Evidently the Aberdeen-Angus steers knew more about plant physiology than we did. The whole incident, together with the finding of this "scurvy grass" with its suggestive name, made a deep impression on me; I was determined to find out more about it. Years previously the Government Botanist had made a thorough survey of all the grasses on our holding. The survey had been subsequently referred to the Kew Gardens authorities in England, re-identified by them, and has been the foundation for our subsequent researches on grasses. It was obvious that a similar survey of the herbage ought to precede all further inquiry. With this in my mind, I approached the Minister for Agriculture and Stock, Hon. Frank W. Bulcock. Mr. Bulcock was keenly alive to the possibilities of this inquiry, promising and rendering much help in many directions. I take this opportunity of expressing my sincere thanks to the Minister. Without his assistance most of our researches on grasses, soils, and herbage would have been hampered on many occasions.

Mr. Bulcock readily gave permission for the Government Botanist to visit Bybera and make the desired survey of the herbage. The result of Mr. White's investigations, combined with the knowledge we had gathered previously, was startling. Our own information, I may mention, had been based on observing what cattle, sheep, and horses fed on at different seasons of the year; *above all, on closely watching what they preferred eating.* The upshot of all this: On a holding of 13,000 acres there is a number of plants amongst the native herbage which are capable of being used as vegetables by man. These native plants resemble the following vegetables we are familiar with:—*Spinach, cabbage, carrots, cress, radishes,* and above all, *salad leaves.* It is quite likely that many more may be added to this list by surveying them at different seasons of the year. Moreover, Mr. White purposely confined himself to those which were most abundant, and because of that could be gathered without much trouble; that were, so to say, *within reach of everybody, and therefore, of most practical use.* It seemed like gold lying on the surface and not being picked up. But the local importance is overshadowed by what this finding may mean for the State at large. Most of these plants are spread all over the western country. Many

other plants useful to man which cannot be found on Bybera are growing in the Far West, where the need for green vegetables is most urgent. I made it my business to look up the scanty records available: the reports by the late Dr. Roth (Protector of Aboriginals), old Proceedings of the Royal Society of Queensland, &c. Since the publication of my article in the "Courier-Mail" recently, many communications have reached me from correspondents from the West full of instructive hints new to me. They were mainly from ladies who had practical experience in preparing these native vegetables for the table. My own qualifications are weak on the cookery side, and I am deeply appreciative of this additional information. When one receives these letters from women eager to do their best for their men-folk, and anxious that their children should not wilt because of the lack of green foodstuffs indispensable to them, it is brought home to one *how widespread is the need for green vegetables in the West, and how urgent is the need for early action that will make good the shortage. I am merely voicing what many feel.*

LIST OF NATIVE VEGETABLES.

Let me mention a few of our Bybera native vegetables:—



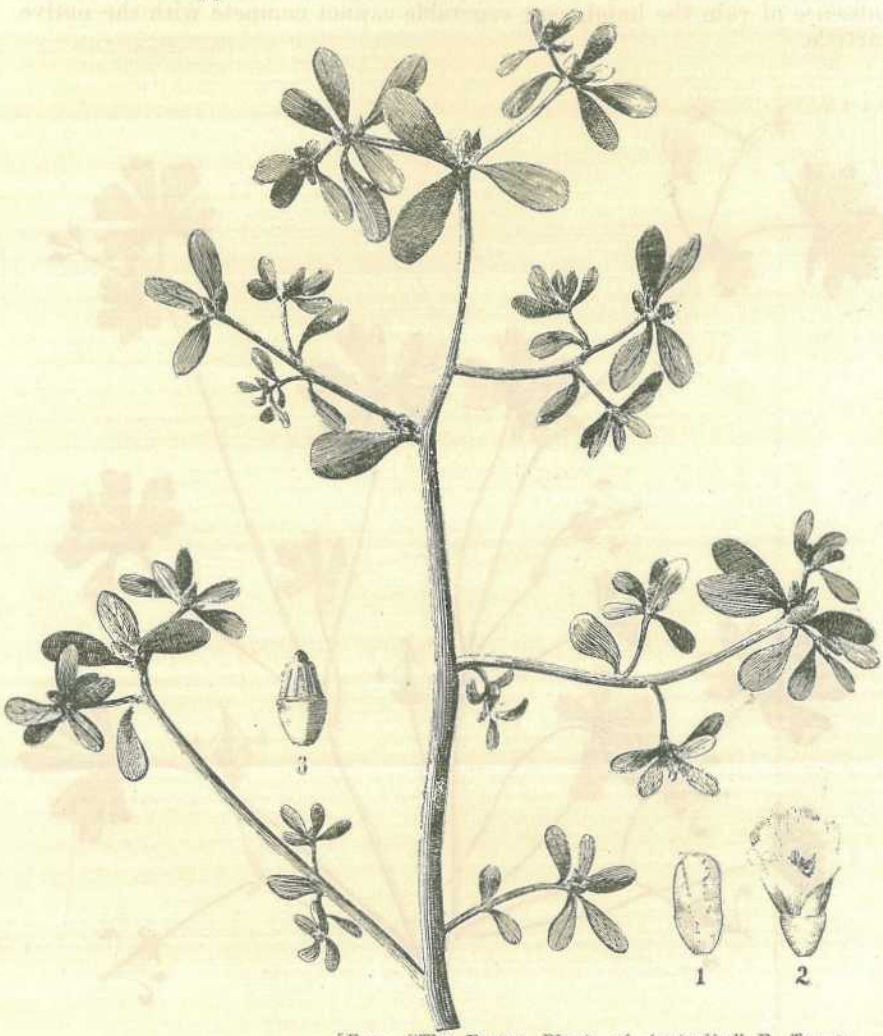
[*From "The Forage Plants of Australia," F. Turner (New South Wales Department of Agriculture*, 1891).

Plate 137.

Tetragonia expansa, Murr.—"Warrigal Cabbage," "New Zealand Spinach."

New Zealand Spinach.

It is also known as Warrigal cabbage, its botanical name is *Tetragonia expansa*. It is plentiful not only over the western country, but all over the State as far as the coast line. Its history proves once more that a prophet has no honour in his country. It came by its name through being first imported into England from New Zealand. Mr. Bick, the Curator of the Botanic Gardens, informed me that Lord Lamington, when he came to Queensland as Governor, insisted that this New Zealand spinach be cultivated in his kitchen garden. In the West it leads an unappreciated existence.



[From "The Forage Plants of Australia," F. Turner (New South Wales Department of Agriculture, 1891).

Plate 138.

Portulaca oleracea, Linn.—"Purslane."

Pig-Weed.

The pig-weed is one of the most common "weeds" in the West, as well as in the coastal belt. It grows plentifully on unoccupied allotments all round Brisbane, and since attention has been drawn to its

usefulness as a table vegetable many people have gathered the pig-weed and tried it both uncooked as a salad and lightly cooked as a substitute for cabbage. The more aristocratic name of pig-weed is *purslane*, but the man in the bush would hardly know it by that name. Besides the stalks and leaves, it has a big tap root which is not unlike radish. The Oxford dictionary defines purslane as a low succulent herb used in salads and pickles. Its botanical name is *Portulaca oleracea*.

The plant produces seed in abundance, and they germinate so readily that this explains its rapid spread in vacant allotments. The very fact that pig-weed abounded during the recent dry spell while there was such a scarcity of European vegetables, proves that in the absence of rain the immigrant vegetable cannot compete with the native article.

[*From "The Forage Plants of Australia," F. Turner (New South Wales Department of Agriculture*, 1891).

Plate 139.

Geranium dissectum, Linn.—"Crane's Bill" or "Crow's Foot."

Parakeelya.

Parakeelya belongs to the same family as pig-weed. It possesses thick fleshy stalks and leaves of similar character. Both of them are full of moisture. It is much appreciated in the West, where sheep can live a long time on it, as the parakeelya serves them not only as feed, but the high water contents of the plant also assuage the thirst. It has bright pink flowers, and can be eaten both raw and cooked.

Native Carrot.

This is the wild geranium (*Geranium dissectum*). It is a perennial plant capable of resisting lengthy droughts. This is mainly because of its lengthy root stock, which penetrates the earth for many feet in search of water. The roots swell in places and resemble carrots, hence its name. This carrot is appreciated both by man and beast. The aborigines used to roast these carrots, but they also may be eaten raw. Sheep are particularly fond of them. In drought-stricken country where no grass is visible above the surface, you can see sheep rummaging the ground until they have unearthed some of these carrots. You can tell that wild geranium is about by the sheep having blackened teeth from having burrowed in the soil. As long as a portion of the root stock survives, the plant will spring up from the ground as soon as rain falls; it flourishes in the spring before the summer grasses have made their appearance.

Old Man Saltbush.

The saltbushes are a large family thriving all over the interior of Australia, but the greatest of them all is the old man saltbush. It is a plant *that lasts longer than the drought*. There is practically no end to its usefulness as a native vegetable and as a stock fodder. Because it is so much appreciated by all sorts of animals, it is eaten down by the stock wherever they can get at it. The whitish green leaves are rich both in mineral and vitamin contents. You can see men and children pluck a handful of leaves and chew them. Placed in corn-beef sandwiches they are a most wholesome addition. We have them in the place of lettuce between bread and butter at afternoon tea. When boiled, including even the tender young stems, they make an eatable spinach, and other leaves can, of course be made into salad. What makes the saltbush so valuable as a vegetable is the fact that its fibre content is so low. Hence it is easy of digestion.

Apart from old man saltbush, there is quite a number of other saltbushes which may be available for human consumption. Creeping saltbush is most abundant on Bybera, although nothing like as popular as old man saltbush as far as the stock is concerned. It ought to be palatable when cooked as spinach, although we have not tried it yet in that form. The whole family of saltbushes requires thorough investigation from the point of view of being a useful vegetable for human consumption, as nearly all of them are greatly favoured by the stock.

This is only a brief and incomplete list of native vegetables. There are many more available as food for man. A systematic survey will bring forth a great number. My object was not so much to produce a complete and final catalogue as to draw attention to the fact that *Nature has provided us in Australia with many native vegetables, which in wet and dry season, can take the place of European vegetables, or at any rate supplement them.*

Plate 140.
Saltbush on Bybera, 7 feet high.

SURVIVAL OF NATIVE HERBAGE.

The man who grows his own cabbage in his back yard knows that he has little chance of obtaining a good cabbage unless he waters it daily; otherwise it will become stringy and uneatable. This man will be hard to convince that a succulent vegetable can grow in the West where little or no rain may fall for many weeks or months. Yet the native vegetables may flourish in this dry, hot country, where ordinary European vegetables would perish. It is a fascinating study, enquiring into the causes that enable the native herbage to survive under such adverse conditions.

The plant which grows in a climate of insufficient and unreliable rainfall is altogether differently constituted. Transpiration is a big factor in the life of each plant. The root draws up moisture and

nourishment from the soil and sends it up through the stem into the leaves. There the nourishment is absorbed while the excess of moisture is given off through the pores of the leaves. Thus a constant stream of water is drawn up from the roots, the bulk of which goes back to the atmosphere. That is the reason why the European cabbage has to be watered each day to make good the loss by transpiration. The plant as a matter of fact sweats just as man does.

Much of the native herbage is built on different lines in a dry, hot climate. The moisture which is drawn up from the roots is a precious article, not easily replaced, and, therefore, cunningly husbanded. Take two plants which are known to everybody, the hydrangea and the

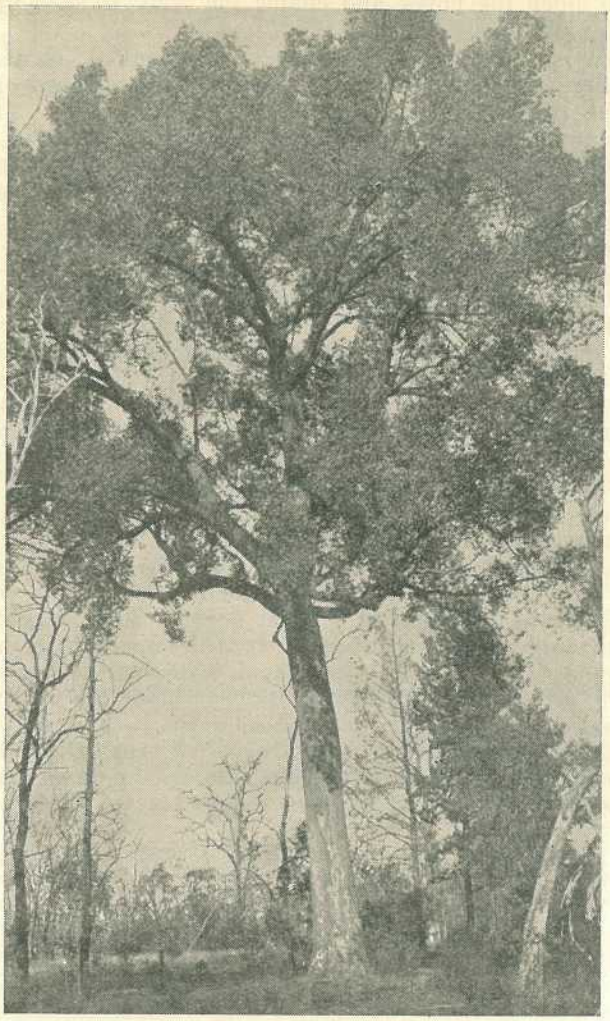


Plate 141.

A FINE SPECIMEN OF KURRAJONG, A USEFUL NATIVE TREE.

Of the seeds of the Kurrajong, Turner in his "Forage Plants of Australia" writes:—"The number of seeds in each follicle is about 20, and, according to Mr. Hamlet, Government Analyst, they contain 1.8 per cent. of caffeine, which is more than the coffee of commerce. If these are roasted, pounded, and macerated in hot water, with a little sugar added, when allowed to cool it makes a capital beverage. The roots of this tree, which resemble turnips in consistency, but are sweeter to the taste, are used by the aborigines as an article of food."

prickly-pear. The hydrangea only thrives with abundant watering, while the prickly-pear will endure the most lengthy drought in the West, where the hydrangea would have no chance of living even for a fraction of the time. Yet, cut off one of those prickly-pear leaves which may have had no rain for many months, pull back the thick outer skin and you will find a moist spongy tissue. It has been computed that the hydrangea, weight for weight, loses 500 times more water by transpiration than the prickly-pear does. How does the prickly-pear manage it? In the first instance its pores are few and far between. Instead of opening on the surface they are sunk below the surface. These pores, moreover, are surrounded by cells which act as a guard—they close up the pores during the daytime, particularly when a dry, hot westerly wind is blowing. At night-time these guard cells relax their watch, open the pores, and enable the plant to soak up any dew that may be falling.

The dew is a factor which is generally left out of calculation. We constructed on Bybera a dew gauge to measure the amount of dew, and reported the result at a meeting of the Royal Society. The highest amount we found was 3 points, which is equal to 3 tons of water per acre. Admitting that this is an exceptional case, even much smaller amounts of dew must play a big role in maintaining the life and condition of the plant.

Another contrivance which distinguishes many plants in the West, is that both stem and leaves are waterproofed with a waxy substance which carefully economises the precious watery contents beneath that skin. Look at the cabbage, how it stands upright with its broad leaves exposed to the sun and the drying winds. Compare with it the native vegetable. Its thick fleshy stalk mostly creeps close to the ground. Many of these plants, moreover, grow close to each other, thus obtaining shade and protection. When you cut open the thick fleshy stem abundant moisture is found furnishing, in many cases, not only food but sufficient water to assuage the thirst of man and beast.

All these contrivances enable much of the Australian herbage to save and store water during the dry months. The main source of the moisture is, however, in the soil itself. Take the native carrot named (*Geranium dissectum*). The stems are usually close to the ground, but its roots penetrate the earth to a great depth, where it goes foraging for water through many feet of soil. It will come as a great surprise to most people, as it did to me, how much water is really stored in the soil. At the end of last winter with its very moderate rainfall, I took twelve samples of soil from the surface down to a depth of 3 feet, and through the good offices of the Minister of Agriculture and Stock, Mr. Bulcock, these samples were immediately analysed as to their moisture content. The results were as follows:—

Sample No.	Anal. Nos. 2418-2429. Depth.	Moisture.
	Inches.	Per Cent.
1	3–6	10·7
2	6	12·3
3	9	12·8
4	12	13·0
5	16	12·2
6	18	12·0
7	21	12·1
8	24	12·6
9	27	12·8
10	30	12·5
11	33	15·0
12	36	12·2

These figures prove that roughly 12·5 per cent., or one-eighth of the substance of the samples submitted from the Bybera soil, consists of water. Each foot of earth spread over 1 acre of ground weighs roughly 1,500 tons; hence as the moisture content is one-eighth of the whole of the weight there are nearly 200 tons of water stored in each 12 inches of soil over a surface of one acre. Two hundred tons of water correspond to 2 inches of rain per 1 acre. If the root stock of the native carrot only penetrates 3 feet in depth it would have a storage reservoir of 600 tons of water, equal to a rainfall of 6 inches, to exploit. These samples, it must again be pointed out, were not taken after an abundant rainfall, but at the end of winter before the rain came in October and November.

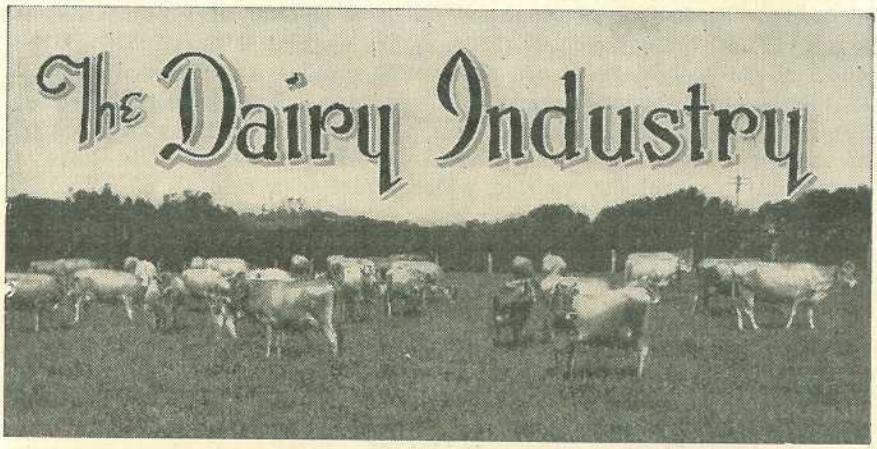
The remarkable capacity of the Australian soil in the brigalow and belah country to store water is mainly because of the colloidal character of the subsoil. While sandy country after a rainfall parts with its water readily, the colloidal subsoil in the West stores the water for great lengths of time. Around each particle of soil with its moisture contents a thin colloidal film is formed which prevents evaporation, and the stored water within this film remains there till the chemical action of the roots dissolves the film and makes it available to the plant. *It is this colloidal character of the subsoil which forms the foundation of the wealth of the western country of Queensland. It is a source of wealth greater than all the gold mines of Queensland.* The occasional or periodic rainfall is stored in the ground and made available to plants and grasses in the drier season.

Incidentally, it also explains why *succulent native vegetables can grow in the West through long periods of dry weather.*

THE CALL OF THE COUNTRYSIDE.

In the old country they are still worried about the continual drift of population from the country to the towns. Apart from points in farming practice and live stock feeding and breeding, the thing that impressed a recent visitor to the Old Land most was this drift to the cities which, he said, is producing a disastrous effect on the economic balance of the country and in the distribution of employment. "I cannot imagine," he went on, "that there would be in any quarter dissent from the simple proposition that the maintenance of a strong and vigorous agricultural population is essential to the wellbeing of the nation." Then he went on to say that to read the arguments for, and against, schemes for agricultural development it might be thought that the whole matter consists of little else than bookkeeping by double entry. "Are not men and women as important as material wealth?" he asked. "Consider for a moment the way Germany is tackling her agricultural problem," he added. He saw thousands of the youth of that country mobilised for land work in labour camps, with the dual benefits to the State of providing a reservoir of man power whose physical fitness is unsurpassed, and at the same time bringing into intensive cultivation every available acre of farming land.

British people, however, do not take kindly to regimentation, but even if we dislike the German methods there is no sense in ignoring their results. All will agree that the foundation of any plan to build up a better and sounder race is to preserve and foster a healthy population on the land. This is a fact consistently proved by the history of the rise and decline of nations.



The Importance of Blending Cream.

AN examination of cream on the receiving platform of almost any factory will indicate the necessity for careful treatment and storage on the farm. Proper blending of the cream after separation is essential.

The process of cream ripening assists the production of delicate butter flavours.

The development of lactic acid in the cream is desirable, because the lactic acid bacteria, if present in large numbers, prevent the undesirable off flavours and taints from developing.

Small quantities of cream are more difficult to hold in a satisfactory condition than larger quantities, and, consequently, the dairy farmer should keep his supply in as large a bulk as possible.

Objections to blending have been raised by some dairy farmers, who claim that if the cream from each milking is kept separate, only portion of the supply will be graded second-grade when sent to the factory. To this objection, however, it might be stated that the aim of dairy farmers to-day is, or should be, to have all and not merely part of their cream of the highest "choice" quality.

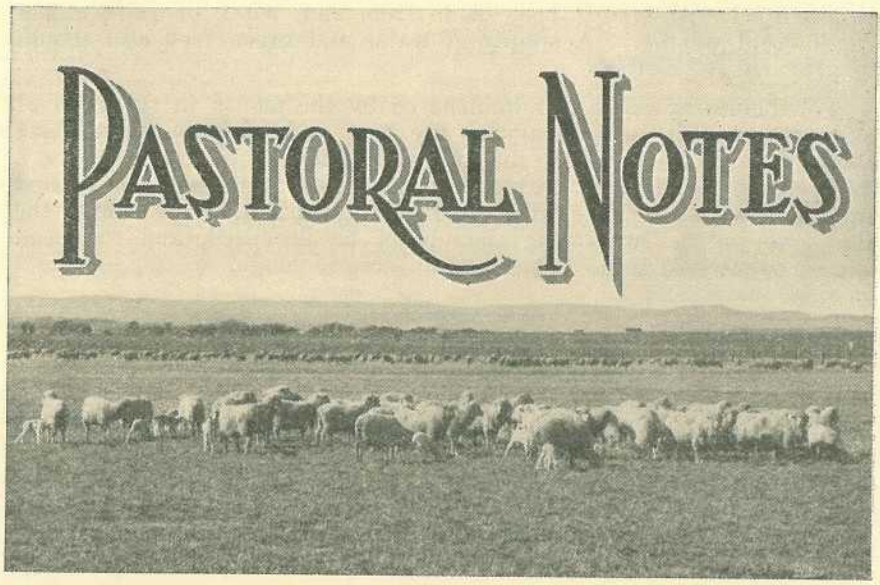
To blend correctly, the cream from each separation is first cooled for about an hour before adding to the bulk supply, which should always be kept as cool as possible.

If the use of the cooler and aerator has been effective, the cream should then be ready for blending—the farmer must satisfy himself, however, in all cases that the cream is sufficiently cooled before attempting to add it to the bulk.

Thorough and frequent stirring with a metal stirrer is necessary for correct blending.

If two or more cans are to be sent to the factory, approximately equal portions of the cooled cream from each separation should be placed in each can. This will ensure that a standard cream is supplied.

—*E. B. Rice.*



Care of Sick Animals.

STOCK owners are frequently required to diagnose and treat sick animals and, from their constant observation of stock in good health, are quick to notice any abnormal behaviour due to sickness. A knowledge of the normal temperatures, pulse and respiration rates of various animals is most valuable in arriving at a correct diagnosis of the trouble. The temperature of all young animals is somewhat higher than that of older animals, and various influences—such as periods of oestrum (heat), time of day, external temperature, and so on—may alter the temperature of the mature animal. The temperatures of healthy farm animals are —horse, 99.5-101 degrees; cow, 100-101 degrees; sheep, 103 degrees, pig, 102.5 degrees.

The temperature of an animal is usually measured in the rectum, and a self-registering thermometer such as is commonly used in ordinary medical or nursing practice may be used. Care should be taken to see that the column of mercury is shaken down. A small quantity of vaseline smeared on the bulb as a lubricant to assist the passage of the instrument is desirable, and it is inserted with a circular motion between the fingers, forward in a line with the backbone, and allowed to remain for a few minutes before it is withdrawn carefully and the reading taken. If the temperature of an animal is found to be about 2.5 degrees above normal it is said to have a low fever, if it reaches the vicinity of 4 degrees above normal a moderate fever is indicated, and if in the neighbourhood of 6 degrees above normal it has a high fever.

In some diseases, such as tetanus and sunstroke, the temperature may be as much as 10 degrees above normal. Having decided by use of the thermometer whether the sickness is of a febrile (pertaining to fever) or non-febrile nature, treatment and nursing must be considered.

Good nursing is of the utmost importance. The patient should be provided with a soft bed, shade from sun, wind, or rain, and a rug in cold weather. A supply of water and green feed also should be provided if possible.

Medicines are usually administered by the mouth in the form of a drench, and it is necessary to use care and patience when using this method. The head of the animal should not be raised above a horizontal position, and only small quantities of the drench poured into the mouth at a time, allowing time for swallowing. Pinching the throat to induce swallowing should not be practised, and the head should be lowered if the patient commences to cough.

BRUISING IN CATTLE.

The meat export industry is seriously prejudiced by the bruising of cattle when travelling to the meatworks, and the annual loss to both the owner and the State is considerable. Bruising is caused by many factors, particularly so when journeys are long, but the two chief causes are ill-treatment and horning, because of faulty supervision during trucking and in transit.

Cattle travelled to market on the hoof always give a higher percentage of first-class beef than railed stock, provided, of course, they have the condition and weights essential for export. Much of the bruising attributed to train travelling is caused in the trucking yards. In many instances, every endeavour is made to load the trains in a minimum of time. This is a mistake. Care should be taken to avoid crowding in gateways, because, where jamming occurs, the outer beasts are bruised on ribs and hips. Precautions are necessary both at the crush entrance and in the crush. If cattle are trucked in "single file," their sides do not come in contact with the rails. Drovers in charge should insist that no unnecessary force is used to drive the cattle, for every injury affects the quality of the carcase.

Competition in the chilled and frozen meat trade to-day is keen, each competing country endeavouring to produce a better carcase. Therefore, if Australia is to retain or increase her output of first-grade beef, the cattle received at the meatworks must be of prime quality and free from injuries of any kind. Growers and dealers may assist the trade by judicious handling of stock. Dehorning is essential. This is a simple operation and should be done when branding. Records prove conclusively that polled cattle give a much higher percentage of first-quality beef than horned cattle.

Dehorned cattle are also much more docile in the paddocks, cover less country when feeding, and retain condition longer.

PROTEIN AND MEAT MEAL.

Protein meal is a meat meal prepared from the clean edible portions of viscera of animals slaughtered, inspected, and passed for human consumption, together with carcases which have been rejected because of some fault rending carcase unsuitable for human food. The carcases of immature calves are also utilised for purposes of stock food manufacture. In process of manufacture of protein meal, a soft bone meal

is added to the meat to assist in more complete treatment of the meal when passing through the grinding and sieving machinery. The whole mixture is then subjected to cooking at 60 lb. steam pressure for 4 to 6 hours, the time varying with the assortment of the charge (i.e., the mixture). Further heat treatment is then required to render the fat highly mobile for purposes of separation from the crackling (or remaining fatty fibrous matter). This treatment alone is sufficient to render the finished article sterile and free of risk from a disease point of view, hence protein meal is quite a safe product to use.

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

PASTURE MANAGEMENT.

Many of the pastoral areas in Queensland will soon be well covered with grass and herbage, as a result of recent rains. If further widely distributed summer rains fall—a likely prospect at present—a good autumn crop of long grass will be assured. The effect of this autumn long grass is to supplement the organic constituents of the soil. This augmented organic content will tend to maintain the fertility of the pastures. In ordinary circumstances, pastures should not be burnt off. This applies especially to sown pastures, such as paspalum and Rhodes grasses. The effect of a severe grass fire is to reduce greatly the potential supply of the organic constituents of the soil. If persisted in, the practice of burning off may result in sterility of the soil. It is possible that bush fires recurring annually form one of the principal factors in the reduction of the fertility of much open forest country to far below that of rain-forest country.

In burnt-over areas, an invasion of non-nutritious grasses may always be looked for. In particular, the farmer with paspalum pastures can watch for the entrance of carpet grasses and rat's-tail grass. The prompt eradication of these almost worthless intruders may mean the saving of many weeks of labour in two or three years' time, when, otherwise, these invading grasses shall have spread and seeded.

In paspalum pastures, ordinary white clover should be fostered. A good pasture of this kind can often be established by broadcasting a few ounces of white clover seed to the acre in a paspalum paddock. This can be done during autumn. Generally, white clover prefers a sandy soil.

—C. W. Winders.

A Sheep Dip Suitable for a Small Flock.

JAS. CAREW, Senior Instructor in Sheep and Wool.

FOLLOWING are particulars of an unusual type of sheep dip suitable for a small flock, which was inspected recently on the property of Mr. James Porter, Wallan View, Miles. The design was taken from that of Mr. W. A. Raff, Karara, who kindly supplied the subjoined particulars of its construction:—

With the accompanying photograph and cross-sectioned sketch as a guide, little trouble should be experienced in constructing this type of dip at a very small financial outlay, viz.:—

	£
12 bags of cement at 5s.	3
Hired help	2
Total	5

Details of Construction.

Make an excavation 7 feet 10 inches in diameter and 4 feet 6 inches in depth, great care being taken to keep the sides perpendicular. Next sink a hole about 2 feet deep in the centre of the excavation to set in concrete strainer post, 6 feet 6 inches by 12 inches in diameter, then roughly cement all the bottom of the excavation about 3 inches thick and allow same to set. Cut both the top and bottom out of an old 1,000 gallon squat tank, 7 feet 4 inches by 4 feet 2 inches, and place it in the excavation. If the excavation is true, it will be noticed that there will a space of 3 inches between the tank and sides. Mark off a width of 4 feet where you require your walk-in-and-out, and pack and ram concrete all the rest of the way round between the tank and sides of the excavation. Then give the bottom a final coat of fine cement about an inch thick, and allow it to set completely. Cut a part of the tank away from the 4-feet space left for the walk-in-and-out to within 1 foot from the bottom. From about 6 feet back, slope a cutting 3 feet 6 inches wide down to about 6 inches from the bottom of the hole and

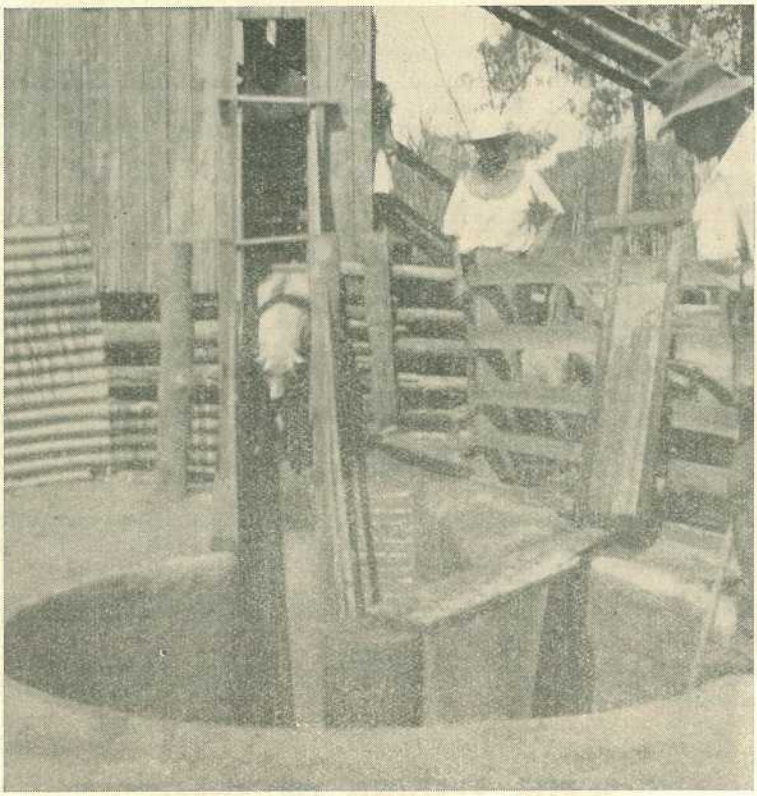
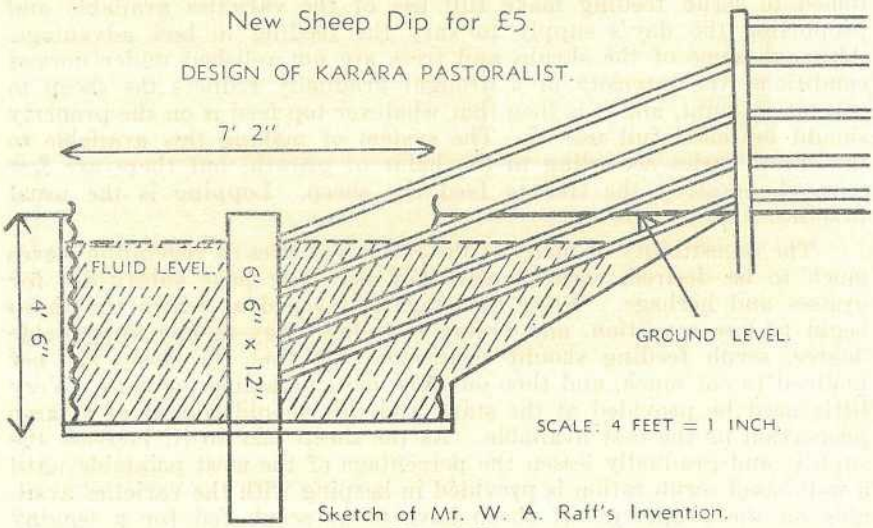


Plate 142.
A new type of Dip for the small Flockowner (see sketch below).



Sketch of Mr. W. A. Raff's Invention.

Plate 143.
Sketch Plan of Dip pictured above.

round the corners off back to where the tank has been cut away. Concrete both the sides and bottom of the cutting about 6 inches thick and then cement inside of the tank. From the centre strainer post run a fence back through the middle of the cutting—thus utilising one side for the walk-in and the other for the walk-out, this side being battened to facilitate an easy exit.

With the simplicity of construction of this dip, it can easily be placed at a corner of the shed yard, and when small flocks have to be dipped, two small draining pens of 7 feet by 6 feet will be found sufficient, while a small ramp along the entrance race will prevent dirt being carried into the tank.

As many as 300 sheep has passed through this dip in an hour, while 1,200 have been treated similarly during a morning. It will be noticed that the sheep have a swim of approximately 21 feet, and for larger numbers, of course, a bigger tank could be made, while practically no expense is necessary for the erection of new yards.

The cost of construction will naturally vary a little according to the facilities available. The dip illustrated was constructed in very hard, rocky country with access to good sand and gravel.

Finally, for the best results we recommend the use of either Quibell's liquid or powder dip.

Such an inexpensive dip should be a valuable asset to the small flock owner.

SCRUB FEEDING OF SHEEP.

Edible shrubs and trees which are useful as a supplementary ration for sheep cover a large area of Queensland. Methods of feeding vary according to the class of edible bushes available. Stock owners accustomed to scrub feeding make full use of the varieties available and proportion the day's supply to vary the feeding to best advantage. Although some of the shrubs and trees are not relished under normal conditions, the intensity of a drought gradually reduces the sheep to starvation point, and it is then that whatever top feed is on the property should be made full use of. The system of making this available to the sheep varies according to the habit of growth, but there are few now who destroy the tree to feed the sheep. Lopping is the usual practice.

The digestibility of many of the edible varieties of vegetation leaves much to be desired, consequently they are very poor substitutes for grasses and herbage. When the stage is reached at which the sheep begin to lose condition, and before they fall away to any appreciable degree, scrub feeding should commence. At first the sheep are not inclined to eat much, and then only the most palatable portions. Very little need be provided at the start, and this should consist of a large proportion of the best available. As the sheep take to it, increase the supply, and gradually lessen the percentage of the most palatable until a well-based scrub ration is provided in keeping with the varieties available on the property. If sheep have to be scrub fed for a lengthy period, they are likely to develop digestive disorders, but this is influenced by the nature of the shrubs or trees they feed on. Some varieties will carry them on for many months without showing any

ill effects on their condition, but a good lick should be of considerable help in retaining their normal health and condition, no matter what class of vegetation they are fed on. The water to which they have access should be the first point for consideration before preparing a lick, for during very dry weather sheep will drink much more water than they do when juicy food is available.

If the water is slightly salty, say 30 grains to the gallon, it can be considered normal, but if over that amount the salt in a lick may be reduced until the total reaches 250 grains to the gallon, when no salt is needed. Salt alone is not the only ingredient required in a lick as many other minerals, the chief of which are lime and phosphoric acid, are equally essential.

Analyses of most of our trees and shrubs show rather a low and an uneven mineral content, the lime being fairly well supplied, but they lack in phosphoric acid. Analyses also show rather high carbohydrate and usually a low available protein content. It may, therefore, be assumed that a lick should be based on the salt content of the water available and carry protein, phosphoric acid and lime. As sterilized bone meal carries these three ingredients, it is recommended as the base of the lick, say 60 parts. Other ingredients are salt, 30 parts; epsom or glauber salts, 5 parts; and molasses, 5 parts. As the protein content of bone meal is low, this ingredient can be added by using meals—such as cotton seed, peanut, wheat, linseed, or other such meal—all of which supply a most important want. Blood and meat meal, however, carry a greater protein content and may be used to advantage in supplying this element in a lick. Neither is attractive to sheep, however, therefore any mixture supplied should carry an ingredient to induce the sheep to take to it. If salt is lacking in the water, it may be used to advantage in inducing sheep to take the desired amount of mixed lick. In the absence of salt, cotton seed or similar meals are attractive, and the intake of lick regulated to about ½ oz. per head per day through their use. The action of a good lick is to stimulate the digestive organs and so whet the appetite as to cause the sheep to eat more and, at the same time, make better use of the food consumed—a decided advantage when scrub feeding.

Practically all our Western timbered country carries a proportion of useful edible shrubs and trees, which include a wide range of varieties (too numerous to mention here) growing over large belts of country. Too much value cannot be placed on the useful fodder trees of the West, and when scrub feeding becomes necessary every effort should be made while obtaining the feed to preserve them.

Jas. Carew.

DRENCHING FOR WORMS IN SHEEP.

About this time of the year worms are usually very troublesome in sheep. Before drenching, an effort should always be made to ascertain which species of worm is the cause of the trouble, and this can readily be done by a post-mortem examination of a badly-infested animal. The fourth stomach, small and large intestines should be cut open and examined carefully, and if the animals are coughing attention also should be given to the lungs.

For the worm that occurs in the fourth stomach—the barber's pole worm—bluestone is recommended. Carbon tetrachloride is also very effective against this worm, but there is some risk attached to its use, and it is therefore no longer recommended by the Department of Agriculture and Stock.

Bluestone and nicotine sulphate are used for the removal of the small hair worms, which inhabit the small intestine. Hair worms are the cause of a disease known as "black scours." Infestation is most severe among young sheep, in which the losses may be very heavy. Bluestone and nicotine sulphate is the only drench which is of any value against these small worms.

Where a mixed infestation of stomach worms and hair worms occurs—a frequent experience, especially in young sheep—the bluestone-nicotine sulphate drench should be given, as this drench is effective against the stomach worm also. Moreover, it may be used for the removal of tapeworms from lambs, although these worms may also be removed by arsenic and epsom salts.

For the nodule worms in the large intestine, there is as yet no efficient method of removing them by means of drenches which are given through the mouth. They may, however, be combated by the use of an enema containing sodium arsenite, which, if administered carefully, has a very high degree of efficiency.

Lung worms are treated with certain drugs which are injected into the windpipe, the formula being—

Oil of turpentine—1 cubic centimetre.
Creosote—0·5 cubic centimetre.
Olive oil—2 cubic centimetres.
Chloroform—0·5 cubic centimetre.

This formula represents a dose for one adult sheep. For lambs, the dose is reduced by one-half.

In country subject to worms, the sheep should be given treatment at regular three to four weekly intervals during the spring and summer months, for otherwise little or no benefit from the treatment may be evident. Treatment is to be regarded only as a temporary measure in the fight against worms, for it must be realised that when paddocks are heavily infested with worm larvæ the animal is no sooner freed of worms by treatment than it is attacked again by larvæ which are picked up by the animal when grazing. In about three to four weeks' time the larvæ have grown and have reached such a size and attained such numbers that the health of the animal is again affected.

Further information on mixing and administration of these drenches may be obtained from the Animal Health Station, Yeerongpilly.

DIPPING SHEEP.

Dipping is the only sucessful method of freeing the flock from lice and ked. For dipping, a recognised proprietary material should be chosen and the directions for mixing followed implicity.

Ordinarily, dipping should be done within a month after shearing, but not before all cuts or wounds have healed. A fine day should be chosen for the job. Extremes of heat or cold should be avoided.

Sheep should never be dipped when in a heated state. Yard them, if possible, the night before.

Immerse the sheep completely. Allow them to drain and, if possible, dry in the shade. Avoid driving them long distances to paddocks after dipping.

Dipping pays, and, in addition, gives some protection against the blowfly.

—*J. L. Hodge.*

CRUTCHING AND JETTING FOR FLY STRIKE.

There is often controversy as to whether crutching or jetting is the better method of combating blowfly attack. There should be no argument on this score, for, with the increasing severity of fly invasion, both methods have their place in the protection of the flock.

There is a school of thought which insists that the wool should be left on the crutch of the sheep and jetting alone resorted to. Other graziers pin their faith to crutching and will not consider jetting.

It is thought that, singly, either of these methods may be unsatisfactory to some extent, inasmuch as both methods should be used in conjunction. To get the greatest immunity from fly strike, the grazier is advised to carefully crutch when—or before if practicable—the first fly invasion is likely to occur. This should give the flocks immunity for about two months. Should further treatment then be necessary, jetting the previously crutched sheep is advised. Thus with the intelligent combination of the two methods, reasonable protection should be assured.

—*J. L. Hodge.*

LAMB COOKING TEST.

A comparative test made recently between the cooking qualities of Australian, New Zealand and United Kingdom lamb turned out very favourably for the Australian joint. This fact should be of great assistance to a scheme just launched for the popularisation of Australian meat in the Old Country.

The object of this scheme is to bring Australian meat under closer notice of the wholesale and retail trades.

Points for Pig Exhibitors.

IN planning the exhibition of pigs at shows several important points must be kept in mind. The exhibitor should study carefully the prize schedule long before he proposes to exhibit, and should aim at having animals entered in the class or classes for which they are most suited.

The award for a class for boar over twelve and under eighteen months, or under two years, is more readily won, other things being equal, with a boar carrying all the age the class will allow than with a younger animal. The prize for sow with litter not more than eight or ten weeks old is more frequently won with a really good sow with a litter eight or ten weeks old than with an equally good sow with a litter eight or ten days old. Size for age is important. In a class for sow twelve months of age, the sow should be fairly forward in her gestation period. A sow not in pig at that age creates suspicion in the mind of the judge, and she does not or should not stand the same chance of winning. Mature animals should be guaranteed breeders. Pigs are judged on a performance basis, as well as on conformation plus pedigree, plus age.

Selection of Stock.—The possibility of securing premier honours, while depending very largely, under present conditions, on bodily conformation, colour marking, and freedom from faults, depends also on the time the exhibitor is willing to give to the preparation of his stock, and the businesslike attitude he adopts towards the job. Successful exhibitors spare no effort to ensure having their stock ready at the time of judging. Some animals are good feeders and are contented, others are stubborn and dislike strange surroundings—refusing to eat and losing bloom.

Condition and Management.—Show pigs should not be fattened to excess. This reduces their breeding capabilities. Fat covers a

multitude of minor faults which should not be present in prize-winners. If pigs cannot win in medium breeding condition—other things being equal—they should not win at all.

Appearance catches the eye of the judge, whether it be of live pigs or of other exhibits. The animals should be shown in a clean, attractive condition. Warm water, soft soap, a stiff dandy brush, a softer oily brush, and a sharp knife for trimming the hoofs are necessities. Some pigs have overgrown hoofs, which gradually cause the forelegs to become inbent or the hindlegs misshapen. Removal of natural markings and clipping of the hair of pigs is objected to, and may result in disqualification. Clippers are not necessary in the show pig pen. For dressing the hair and softening the skin, a colourless oil should be used. Cocoanut oil is best, but rather expensive. Petroleum jelly is very useful. Some traders sell a special oil for pig dressing. The oil may be applied after washing: the objective is a clean, glossy coat of hair on a mellow skin.

Preparation and Exercise.—Avoid selecting animals with definite faults—such as an overgrown tongue, ears torn or damaged, and irregular markings. Bad tempered, snappy animals should not be exhibited.

Train the animals to move about at will and to become used to strangers. Mature animals should be paraded before the judge in order to show off their good points. Bacon and pork pigs and younger classes are not paraded at most shows, but they may be moved about judiciously in their pens.

Agricultural shows provide opportunities for displaying stock for sale that do not present themselves on the farm. Full advantage should be taken of such opportunities.

Finally, the exhibitor should be a good sport—a good loser as well as a good winner.

—*E. J. Shelton.*

PIG CARCASE COMPETITIONS.

The all-Australian export baconer and porker carcase competitions will be continued this year when judging will be held in London in June. Entries for this series will be due at bacon factories and meat works not later than the 15th April, 1939.

The competitions were started mainly to provide a means of demonstrating to Australian pig raisers the requirements as to type and conformation of the United Kingdom market. Australia's share of that market has increased steadily during recent years and, to enable Australian pig products to continue to compete, it is essential that the needs of United Kingdom consumers should be known and supplied. Prices are at present good for the Australian supplier, and, as exports are regulated, are likely to remain so.

Carcases entered for the competitions are judged in London according to a system of measurements and photographic standards devised by Dr. John Hammond and other English authorities. Marks are awarded for various points—such as body length, leg length, hams, shoulders—and a full list of these marks is supplied to each entrant to

enable him to see how far and in what respects his pigs fall short of the ideal. Apart from the prospects of success in winning a prize—a sum of £25 is distributed in prizes in each section—the competitions thus provide a valuable service to entrants.

Entry forms may be obtained from meat works which treat pigs for export, the Department of Agriculture, and the veterinary officers of the Commonwealth Department of Commerce in each State.

—E. J. Shelton.

MAIZE AND PORK QUALITY.

Because of its relatively high fat content and the low melting point of its fat, maize can cause the production of soft fat in pork and bacon.

A sweeping statement is sometimes made that "maize fed" pigs are soft as compared with pigs which have been fed on wheat or barley. The statement really needs some qualification so far as Queensland pigs are concerned. A large number could be classed as "maize fed," but they rarely receive sufficient maize to cause soft pork or bacon.

Maize is the most widely grown grain in Queensland, but the pig industry is not dependent on this crop. It is very closely associated with dairying, the pigs being used primarily to consume the milk by-products—separated milk, buttermilk, and whey. Pasture, forage crops, and root crops also form a large part of the diet of pigs on some Queensland farms, and the grains—maize, wheat, and barley—are really only used as supplementary foods.

These points should be borne in mind when reading the advice of some overseas authorities, who state that maize should not constitute more than about 35 per cent. of the grain allowance of pigs. This may be sound advice under English conditions where pigs frequently receive a diet which is about 90 per cent. grain and which usually does not contain milk products, but under Queensland conditions, where the feeding systems are as stated, there appears to be little danger of pigs receiving sufficient maize to injure their carcase quality.

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

—L. A. Downey.

POINTS OF A GOOD BOAR.

When selecting a boar the best available should be bought, for during his life he may be the sire of hundreds of pigs, while the sow can only produce a limited number. If the boar is good he will improve the standard of the herd. His selection, therefore, is of very great importance.

The boar should come from a large, thrifty litter, and be obtained from a reliable breeder. He should be a little more on the compact side than the sow, not too chunky or short, but showing full development at every point, and of a strictly masculine type representing the full type of his breed. He must show quality, smoothness and evenness in every part, have a typical masculine head, with eyes and ears wide

apart, the jowl reasonably full and well laid on to the shoulders, which should be smooth and free from wrinkles. He should have a full heart-girth extending well down to the bottom lines, nearly or quite on a level, with as deep a flank as possible. He should possess rather short or medium length legs, with bone of fair size and quality, pasterns short and straight, and the hoofs well set, legs standing square, straight and well under him. A long, wide and deep ham, and tail well set up are also desirable characteristics.

—L. A. Downey.

CHARCOAL FOR PIGS.

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

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

(i.) By feeding easily digested material;

(ii.) By grinding the less digestible foods;

(iii.) By ensuring the animals sufficient feeding room;

(iv.) By arranging for some open grazing where the animals may eat at their leisure;

(v.) By feeding aids to digestion.

It is the last with which this note is concerned.

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

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

WHEN A PIG STY WAS A DIGGER'S COMFORTABLE CAMP.

The following extract from a letter from Mr. F. Elworthy, Mackay, to the Senior Instructor in Pig Raising, Mr. E. J. Shelton, will awaken memories of similar experiences of billets in France by many of our readers:—

During my service overseas with 108th Howitzer Battery, A.I.F., I now recollect my various experiences when billeted in farm houses in France and Belgium, where buildings of brick were provided for cows, horses, pigs, sheep, and rabbits.

Cows and other animals were housed and fed during winter, and tethered out on pasture in spring and summer. Hurdles made of woven brambles were used to enclose sheep on pasture.

On one occasion I cleaned out and disinfected a pigsty which made a very comfortable billet during our stay in that area.

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
E. J. Blake, Rosewood ..	Sunnyville ..	White Leghorns, Australorps, White Wyandottes and Rhode Island Reds
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

Name and Address.	Name of Hatchery.	Breeds Kept.
S. V. Norup, Beaudesert Road, Cooper's Plains	Norup's ..	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
C. L. Schlencker, Handford road, Zillmere	Windyridge ..	White Leghorns
A. Smith, Beerwah	Endcliffe ..	White Leghorns and Australorps
T. Smith, Isis Junction	Fairview ..	White Leghorns and Langshans
H. 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 February, 1939:—

Name and Address.	Name of Hatchery.	Breeds Kept.
Dr. W. Crosse, Musgrave road, Sunnybank	Brundholme ..	White Leghorns, Australorps, and Rhode Island Reds
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
D. J. Murphy, Ferndale, Marmor	Ferndale ..	White Leghorns, Brown Leghorns, Australorps, Silver Campines, and Light Sussex
H. W. & C. E. E. Olsen, Marmor	Squaredeal Poultry Farm	White Leghorns, Australorps, Black Leghorns, Brown Leghorns, and Anconas
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
J. Richards, Atherton	Mount View Poultry Farm	
A. J. Teitzel, West street, Aitkenville, Townsville	Teitzel's ..	White Leghorns
W. A. Watson, Box 365, P.O., Cairns	Hillview ..	White Leghorns

REGISTERED HATCHERIES IN QUEENSLAND.

Registration of hatcheries is a scheme which has been adopted with the object of improving the class and health of the chickens sold throughout the State.

The principal disease to which young chickens are subject is known as pullorum disease, frequently referred to as B.W.D. (bacillary white diarrhœa). This disease is transmitted in the first instance from the parent to the offspring through the egg. It is a disease that is also

readily transmitted to chickens during the first few days of life by the contamination of the food and water supply by the droppings of diseased chickens.

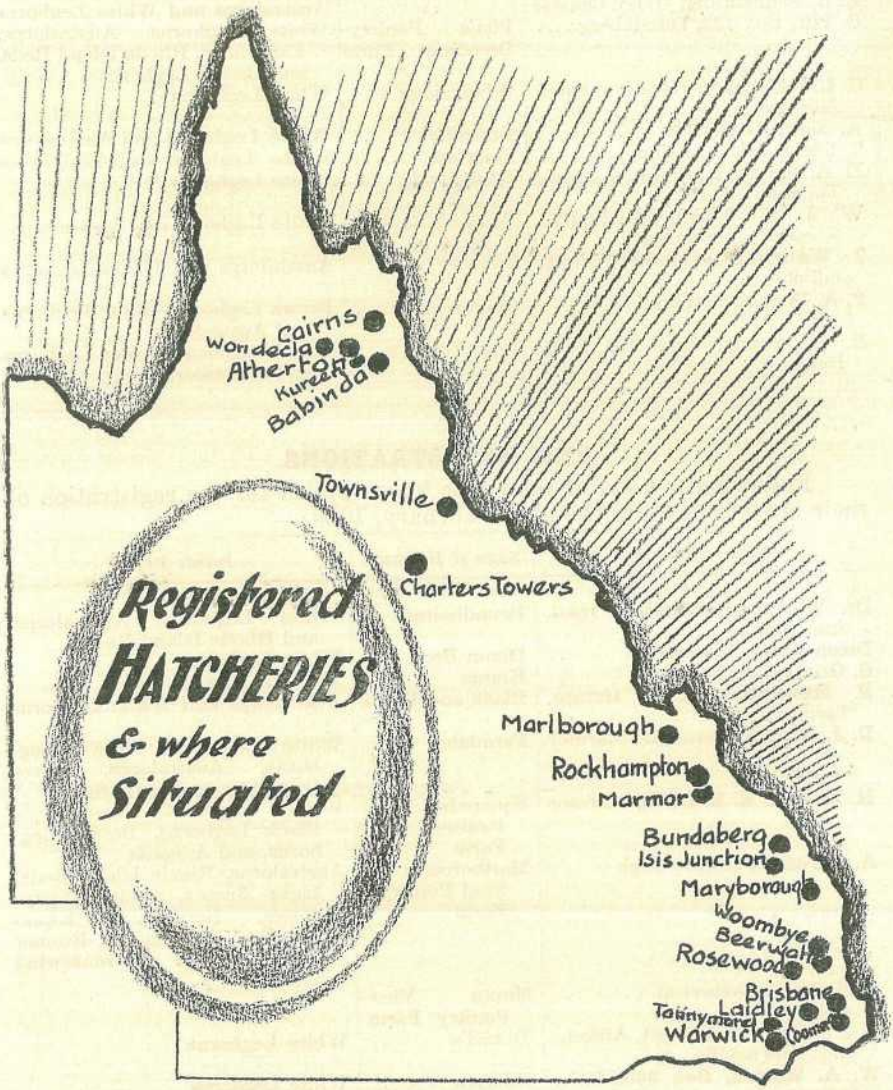


Plate 144.

There is no known effective treatment for pullorum disease, and control lies in the direction of the detection and slaughter of the adult bird that may be used for breeding purposes. The carriers of this disease are determined by a blood test, as the carriers usually appear to be quite normal. The testing is done by officers of the Department. At the time of testing, a rigid culling is generally practised, which is of great value in itself.

During the year 1938, the flocks of 34 hatcheries were blood tested, 33 being registered. To the end of February, 1939, 46 breeders have applied for the registration of their hatcheries, which will entail the blood testing of over 70,000 birds, consequently, registration of hatcheries is bound to have a marked influence in the efforts that are being made to eliminate pullorum disease.

The accompanying map illustrates the development of this scheme, and for the information of the public, a list of registered hatcheries, indicating the breeds that they have available, is published in this Journal from month to month.

THE PURCHASE OF POULTRY.

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

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

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

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

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

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

—P. Rumball.

MARKING EARLY LAYING PULLETS.

Where the trap nest is not used, the marking of early laying pullets provides a practical method of selection.

Trap nesting records in different parts of the world show that—

(1) Early laying pullets are, as a rule, the highest producers;

(2) Birds that lay late into the autumn and are late in moulting are also high producers.

As the early layers and late moulters are high producers, a marking system will assist in distinguishing between profitable and unprofitable fowls.

In one convenient system of marking, a coloured leg band is placed on the left shank of all pullets which start to lay before six months of age. A band of another colour is attached to the left shank of pullets starting to lay when six and seven months of age, and a third coloured band is used for fowls which commence to lay in the eighth month. Pullets that do not lay until after the eighth month should be culled from the flock, or kept in a pen by themselves, and forced for egg production.

Pullets which are early layers show the following characteristics:—

(1) A large red comb;

(2) An active disposition and a ravenous appetite;

(3) Roominess between the keel and pelvic bones;

(4) An occasional disappearance of the yellow coloration round the vent in some yellow shanked varieties.

In small flocks, individuals showing the abovementioned characteristics may be caught in the nests and then marked.

During the following season, all fowls which were marked as late maturing the previous autumn and moult in December, January, and February may be culled. All the early laying birds and those that moult after 1st March may be kept for layers or placed in a special breeding pen and mated to a male known to have come from a high laying hen that has been trap nested. In this way the egg production of the offspring may be raised.

The points outlined provide a simple method of selection which will, properly used, raise the level of production in a flock.

—*P. Rumball.*

WORMS IN POULTRY.

Many young birds will now be commencing their first season of production. During the rearing of these birds diseases such as coccidiosis, pullorum disease, and roup will have taken their toll. These diseases are spectacular in their onset and the symptoms manifested and the mortalities experienced have compelled the poultry farmer to undertake control measures in order to minimise his losses as much as possible.

In many instances, however, worm infestation has been overlooked. The effects of worm infestation are usually insidious in nature, and

being accumulative do not attract attention until the birds are seriously affected. Such effects include failure to make normal growth and even loss of weight, loss of appetite and activity, dull, ruffled plumage, and a paleness of the comb and shanks. The mortality, especially among young birds, may be serious. More important still, young pullets, while maintaining a ravenous appetite and being apparently in fair health, may not be producing their normal quota of eggs.

Of the various worms which infest poultry one of the most important is the large roundworm, which grows up to 4 or 5 inches in length, and is found in the intestine. Where the farmer pays careful attention to sanitation and cleanliness, this and other worms rarely become dangerous. By the regular removal of droppings and the adoption of other measures which promote cleanliness, the source of infestation is removed. Prevention of infestation is most important in the control of parasitic worms. There are, however, certain drugs which may be employed to remove the worms from the birds, and if treatment is employed regularly the infestation should be of no great importance. Treatment of poultry for worms may be undertaken either by mixing certain drugs with the mash (flock treatment), or else by giving the drug to each individual bird (individual treatment).

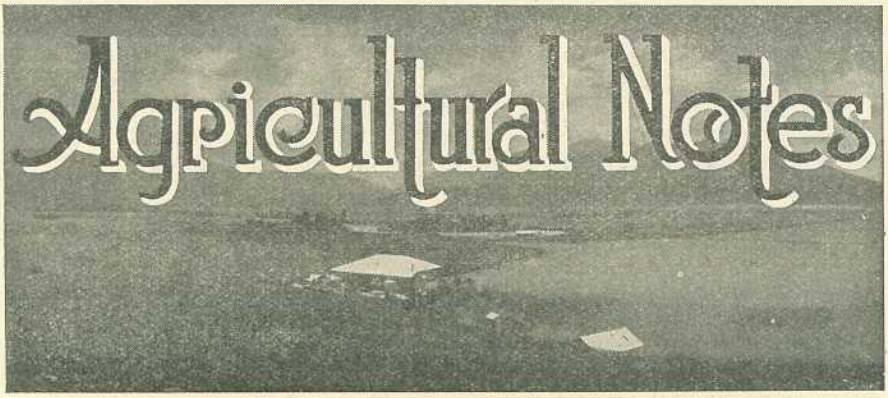
Flock Treatment.—Flock treatment can be applied with success only when the birds are kept under intensive or semi-intensive conditions. The procedure is to mix nicotine sulphate with the mash at the rate of ·5 cubic centimetre of nicotine sulphate for every 1 lb. of dry mash. The amount of nicotine sulphate required is incorporated with just sufficient water so that when mixed the mash is flaky. About 1 part of nicotine sulphate to 400 parts of water is usually adequate. The mixing should be thorough so that no lumps remain. This treated mash is mixed fresh daily and fed continuously for four days.

Individual Treatment.—The best drug to use for individual treatment is carbon tetrachloride. This may be given in capsules or by means of a syringe and rubber tubing. The birds are starved overnight and treated next morning. They may be fed immediately after treatment. The doses range from ·5 cubic centimetres to 2 cubic centimetres, depending on the size of the bird. If the springe is used great care must be taken to avoid delivering the drug into the windpipe, which would cause instant death. Before undertaking this treatment farmers should apply to the Animal Health Station, Yeerongpilly, for further details.

—*Dr. F. H. S. Roberts.*

MOVING WITH THE TIMES.

To-day brains and education were never more needed to run a farm successfully. A knowledge of science—that is, the science that any level-headed farmer can acquire—ought, if directed properly, to put an enhanced value on our practical work. A little more study of the scientific side would help to lighten the drudgery now so much associated with the lives of many producers. Farm science with a reasonable amount of practical knowledge is the strongest sort of combination that could be applied to the task of getting the most and best out of a farm. Of course, we all know the farmer who says that he hasn't got time to waste on reading up what is new. But it is a good policy, and it pays to find out what other farmers are doing and what research workers are finding out, and what general progress is being made in the industry. Farmers, like everyone else, can't afford to stay in one place. We have to move with the times and make use of the latest knowledge and gadgets if we are to get what we should get from our land. —*New Zealand Farmer.*



Establishing Lucerne.

LUCERNE is grown for hay purposes chiefly in warm districts on deep calcareous soils provided with abundant moisture. In such situations heavy crops are produced over a number of years. Within recent years the cultivation of lucerne has been extended into fairly dry districts, but most success may be expected on soils rich in lime and with ample moisture available to the plants.

Land intended for lucerne is best cropped with a cereal—such as wheat, oats, barley, or rye—or panicums and millets—prior to its preparation for lucerne. Stubbles should be cultivated to induce volunteer growths of weeds and other seeds; these should be turned in subsequently by ploughing. For a first cultivation, two deep ploughings should be given at right angles to each other. Moisture should be conserved by frequent cultivation. In dry districts, where a good rainfall cannot always be depended upon at seeding time, fallowing is particularly necessary for the purpose of conserving moisture. The land may therefore be ploughed in late autumn or early winter the year before it is intended to sow. The depth of the ploughing is governed by the character of the soil. Alluvial soils should be ploughed to a depth of about 7 inches, but on other classes of soil of lighter or more porous nature a depth of 4 to 5 inches is sufficient. The ploughed land should then be allowed to lie in the rough state for a month or so and be broken down with harrows after summer rains. During summer the land should be frequently worked with harrows or cultivators, so as to allow neither growth of weeds nor the formation of a hard crust on top. If the seed-bed cannot be worked down sufficiently fine with the harrows, a one-way disc cultivator or roller will do all that is necessary. If the land is rolled, it should be harrowed immediately after the rolling. Where the soil surface shows a tendency to dry out just prior to sowing, a light ploughing may be given and followed by the harrows. Sowing on top of the harrowed surface, followed either by a light rolling or by brush-harrowing, is a good practice—but if rolling is adopted, a set of light harrows should be used immediately afterwards. Rolling assists in bringing the soil particles in closer contact with the seed and works in the same manner as compressing a partly dried-out sponge.

Lucerne is best sown in April or May, the young plants then being sufficiently well established before the onset of cold weather to enable them to survive. Provided the seed is drilled in, a sowing rate of 12 to 14 lb. per acre is ample, and often too much, in the best lucerne-growing districts. If hand broadcasting is practised, slightly more seed should be used. The rate of seeding should be lighter in dry districts, and for grazing purposes a seeding of as low as 2 lb. per acre is permissible. Seed sown on the surface should be covered by means of a light harrowing.

Though fertilizers are not used to any considerable extent in the main lucerne-growing areas, many growers have obtained payable results by applying up to 1½ cwt. of superphosphate per acre, either drilled in with the seed or used as a top-dressing. Nitrogenous fertilizers appear unnecessary.

Fully a month or six weeks will pass before the young root system becomes established and the lucerne is fit for its preliminary cutting by the mower. An early mowing, before the young lucerne flowers, acts as a pruning and stimulates the root growth. After the preliminary cutting, a light harrowing may be made if absolutely necessary because of foreign growths.

Often promising stands of lucerne, following good germination, are destroyed through cutworm attacks. Damage at this time is irreparable, for the blank spaces are filled with weeds which considerably lessen the value of the crop. The Paris green-bran cutworm bait broadcast at the rate of 30 lb. per acre gives effective control, provided it is distributed as soon as the depredations of the pest become apparent. The necessary materials should therefore be held in stock on the farm for emergency. Cutworms attack only very young lucerne and intelligently applied baiting is then quite safe. Bait distribution in established crops is undesirable because of the possible risk of stock poisoning.

PREPARATION OF WHEAT LAND.

Fields ploughed during December will now be in good physical condition, provided weed growth has been controlled by judicious cultivation.

Where sheep have access to the fallowed areas weeds will not be troublesome, but elsewhere every effort should be directed towards the eradication of all such growths. If it has been possible to control weed growth, all workings following the initial ploughing can be done entirely with rigid tine cultivators, or spring-tooth implements, and with harrows. Cultivation to the desired depth in order to break the crust and form a good surface mulch should be done soon after all substantial rains. As a firm seed-bed is required, it is important to progressively reduce the depth of working towards seeding time, particularly where sheep are not available to assist in consolidation.

Well prepared land containing ample reserves of moisture is often fit for sowing at a seasonable period, according to the variety selected, independently of favourable rains. On the other hand, hurriedly prepared land may have to await later rains to effect germination—a great disadvantage, for early or seasonably sown crops invariably give the best average returns.

The wheat yield for the 1938 season again exceeded the average annual return for the previous decade, a fact which can be attributed largely to the increased attention given to the thorough preparation of the land. The growers who consistently practise summer fallowing have been amply rewarded for their efforts during recent years when winter and spring rains have been under average, a fact which cannot have escaped the attention of neighbouring farmers.

Where wild oats and other weeds are assuming pest proportions, it is suggested that the land be sown to a good fodder oat, which can be grazed as required, ploughing in the residue in sufficient time to prevent the maturity of wild oat seed.

Weed infestation during the following year can thus be greatly reduced, besides providing valuable feed, and a rotation crop of benefit to the land.

LUCERNE ON THE DOWNS AND MARANOA.

Although comparatively few settlers in the Western Darling Downs and Maranoa districts have established lucerne stands it is significant that most of those who have done so plan a considerable increase in acreage. The qualities of lucerne as a grazing proposition, both for sheep and cattle, are gaining wider appreciation outside the recognised agricultural regions. The results obtained on scrub and forest lands during the dry spells of 1936 at Guluguba, Columboola, Wallumbilla, and other localities are very encouraging. An adaptation of lucerne to a wide range of soils, and a capacity for giving good results under adverse climatic conditions were clearly demonstrated.

In sowing lucerne high seeding rates are unnecessary and have been the cause of many failures in the past; 3 to 4 lb. per acre is quite heavy enough for the districts named.

With the wide variation in farming conditions and soil types that obtain in these districts, hard and fast rules regarding sowing are not practicable. The following points are, however, important:—Deeper sowing than ¾ inch is inadvisable in all soils, except those of a self-mulching nature where, if necessary, the depth may be a little greater —provided that there is sufficient moisture to give the plant a good start, in addition to germinating the seed.

Where old wheat land is to be converted into pasture, it is usual to sow the lucerne with the last crop of wheat. This method reduces costs to some extent; but, in soil that has a tendency to pack or cake after rain, it is advisable to drill the wheat in first and then follow with the lucerne—having the drill hoes out of the ground, and covering with light harrows. This avoids planting the lucerne at the same depth as the wheat—i.e., 2-2½ inches.

When broadcasting, it is difficult to get an even sowing with the small seed; but if two sowings are made, one across the paddock and the other in the opposite direction, a more even crop can be obtained. Only light harrows should be used to cover the seed.

On small holdings where more intensive culture is practised, a method of sowing which might commend itself to dairymen, particularly in the Maranoa district, is to plant lucerne in rows 18 inches to 2 feet

apart. Inter-row cultivation may then be practised when necessary after rain. Established in this way, the plant has exceptional drought resistance and an area of green feed for emergency use is assured.

All settlers in the reclaimed prickly-pear country might well turn their attention to lucerne as a grazing crop. With light seedings, it is not expensive to establish and is well worth a trial.

GIANT SETARIA (GIANT PANICUM).

In the past more or less confusion has arisen in connection with the sale for sowing of so-called panicum seed—*Setaria italica*. Botanically the seed in question is not a panicum, but belongs to the genus Setaria, a common collective name for which is "foxtail millet."

At the present time, *Setaria italica* (so-called panicum) may be divided into three main types, viz.:—giant, dwarf, and an admixture of both. The so-called giant panicum offered for sale in Queensland is frequently a mixture of the giant and dwarf varieties. In order to clarify the position, it has been decided that the giant and dwarf varieties shall be respectively called giant setaria and dwarf setaria. To ensure that these products will not lose their identity so far as farmers and others are concerned, they should be referred to in catalogues and other publications as follows:—

Giant Setaria (Giant Panicum), and

Dwarf Setaria (Hungarian Millet).

It may be mentioned that the identification of the giant or dwarf varieties is comparatively simple, and is carried out by the Seed Testing Station, Department of Agriculture and Stock, Brisbane, a period of about fourteen days being required for the purpose.

A CHEAP SILO.

Among recent experiments carried out at the Cambridge University Farm, England, is that of a new and cheap method of making silage from surplus grass. For the walls of a small circular silo, sisalkraft paper and woven fencing wire are used, based on a ring of concrete 18 inches wide, on which the wire stands.

Before building the silo it is necessary to provide for drainage (unless the soil is light, when drainage is not required), and, if a drain is put in, care must be taken that no air gets into contact with the ensilage. The paper is in four sections held by wooden grips, and here again it is essential that no air should be allowed to penetrate through the walls. When one section of wire and paper wall, about three feet high, is completed, a second section is built above, the wire fencing being one square narrower in this second ring. The silo, now six feet high and filled, is topped up, first with a layer of sisalkraft paper, then with bags, and then with eighteen inches to two feet of soil. The 6 feet temporary silo constructed in this way at Cambridge holds about 20 tons of material from five acres, and its total cost is £15 (English currency). The paper has to be renewed each year.

ALL FLESH IS GRASS.

It is remarkable how important grass is to us all. When we come to think of it, grass is the foundation of both human and animal life. The meat-eating animals certainly don't feed on grass, but without grass to fatten other animals they would die. Grass is the basis of all life on the land. It is the basis of all agriculture. Without grass man would soon perish from the earth. Looked at in that light, pasture renovation and management becomes really an expression of a natural instinct of self-preservation.

French Beans.

A CONSIDERABLE variety of beans is grown in Queensland but certain varieties are outstandingly more popular than others. The Canadian Wonder is an all round favourite on the market, but owing to its susceptibility to disease is not grown to the same extent now as previously. Brown Beauty is very popular in North Coast districts where it is known as a hardy and prolific variety. Stayley's Surprise also is grown extensively and is usually planted two or three weeks earlier than Brown Beauty. Other varieties grown to a lesser extent are Feltham's Prolific and Burnley Selection, the latter being a new variety supposedly blight-resistant.

Plantings may be made at almost any time of the year, depending on local conditions in each district. On the North Coast on areas free from frost June and July are the two main months for planting. Other districts prefer spring or summer planting.

In some parts of the State in the past great difficulty has been experienced in raising a crop during the hot months due to the ravages of the bean fly, but experiments have shown that it is possible to obtain at least partial control of this pest by spraying. Information on this and other pests and diseases of beans can be obtained on application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

In preparing land for general market garden crops, along with cultivation they generally require the free use of well-rotted stable or other manure, but in the case of beans the application of heavy dressings of such manures often results in the production of an over-abundance of foliage and poor setting of pods. Beans grow best in a well-cultivated soil and preferably one that has been manured for a preceding crop. Well drained, clayey loams yield the best result.

Fertilizers should be freely used. There are on the market several commercial complete fertilizers for beans sold by well-known and reputable firms which can be purchased with confidence. The customary

dressing is 6 cwt. to 8 cwt. per acre. It should be applied in the bottom of the drills covered with about an inch of soil before planting the seed.

Planting is usually done by striking out drills about six inches deep, and after applying the fertilizer and lightly covering this with soil, dropping the seed by hand and again raking in a light covering of soil. During subsequent cultivation the drills will gradually fill up. The rows may be 2 feet 6 inches to 3 feet apart and the seeds spaced 6 inches to 8 inches in the rows. Thirty-five lb. of small and 52 lb. of large seed is sufficient to plant an acre.

Horse cultivation is usually carried out, but it is not advisable that this work should be commenced in the early morning or at any time when the plants are wet, as the spores of certain diseases are more easily carried under these conditions.

Weeds should be kept in check as they will seriously affect the growth of the crop.

The maximum output of beans can only be gained by picking thoroughly as they become fit, that is, when young and tender; otherwise they will begin to form seed, and the plants will cease to bear marketable beans.

BANANA RUST CONTROL.

Banana growers in the area in which rust usually occurs, particularly those on first cut plantations, will be well advised to look out for the first of the new season's rust, which already has been noticed in some localities. In order to ensure clean fruit at maturity it also would be advisable to commence bagging and dusting with a nicotine dust once a fortnight. Full particulars of control methods are available in pamphlet form from the Department of Agriculture and Stock.

In the earliest stages of rust damage, a black smudge will be noticed in between and where two fruits touch, the top hand usually being the one affected most. Numbers of thrips, which are responsible for the damage, will also be observed on the bunch.

Three very important things must be observed if growers expect good results from the control treatment.

1. The bag must be of good quality hessian with a very close weave, similar to that of a sugar bag. Chaff bags and bags with a similar mesh are too open in the weave for use where rust is bad. On the other hand, potato bags are too coarse and have a tendency to damage the fruit at the tips, through rubbing.

2. The bunch must be bagged as soon as possible after being thrown, preferably before the bracts are shed.

3. The first dusting particularly, and subsequent dustings, must be thorough.

In places where rust is only slight, good quality chaff bags will reduce the damage and otherwise improve the quality of the fruit, but if the damage is severe the good quality hessian bags, plus a fortnightly dusting for from 8 to 12 weeks, are essential.

To ensure treating the bunches as soon as possible after they are thrown, it is necessary to go through the plantation at least once a week to make the fortnightly dusting programme much easier if each week's baggings are distinctively marked. For instance, the bags which are placed in February should be marked with a "2" to denote the second month of the year. Underneath the "2" should be marked "1," "2," "3" or "4" to indicate in which week of the month the first dusting was given. When subsequent dustings are given the bunches marked "1" and "3" will be dusted one week and the bunches "2" and "4" in the following week. By marking the bags in this way with the month and week of bagging, the grower also will be greatly assisted in determining the approximate time when a bunch is ready to cut.

REPLACEMENT OF CITRUS TREES IN ESTABLISHED ORCHARDS.

Citrus growers who desire to replace unprofitable or decadent trees in established orchards should haul them out and remove all old roots from the soil.

Occasionally replaced trees do not make satisfactory growth. The poor development of the young trees, however, is usually due to faulty soil preparation. After removing and burning all the old roots the hole should be left open for some time before the new tree is planted. A few weeks before replanting, the soil should be thoroughly cultivated and levelled off. A generous dressing of rotten stable or farmyard manure or some other well-decayed humus-forming material is then mixed with the soil. In frost-free areas, replanting may be done in autumn, but where the frost risk exists, July or August planting is preferable.

Before planting, the roots of the young tree should be trimmed and all broken ends cut off cleanly. The soil should be firmly tramped around the roots. The tree should be set at precisely the same height at which it was growing in the nursery—i.e., with the bud above soil level. After the tree has been set and the soil around it well tramped, but before the hole is completely filled, apply a bucket of water, and when this has soaked in the hole should be filled with loose soil without further trampling.

When the rooting system is established, apply $\frac{3}{4}$ lb. to 1 lb. of sulphate of ammonia to each tree. The fertilizer should be scattered in a circle from 9 inches to 18 inches from the base of the young tree and then raked or chipped into the soil.

LABELLING THE EXPORT APPLE CASE.

With fruit for export, close attention should be given to details in the general "get-up" of fruit labelling.

It is often found when inspecting fruit at the ship's side that labels have not been carefully pasted on the ends of the cases. If the labels have become detached or torn, there is no means of identifying the owner or the trade description of the contents of the case.

Care in applying the labels is therefore necessary. A good paste is made as follows:—

Take 1 lb. flour, $\frac{1}{2}$ oz. alum, and 1 pint water. Mix with a little cold water, then add boiling water until the paste thickens. If the resultant

paste is too thin, it should be boiled slowly and a little more flour added with vigorous stirring until the consistency is right.

When applying the labels, they should first be soaked for a short time in clean water. The paste is then applied by using a broad brush first to the case end and then to the label. The pasted surfaces are applied to each other, the label and the case being pressed into close contact by rubbing the surface of the label with a damp rag.

The following points should be observed:—

Place the label squarely on the end of the case.

Use rubber stamps for filling in particulars of varieties, &c. Pencil or writing of any description is not permitted.

Apply the rubber stamp squarely in the spaces on the label.

It must not be forgotten that Queensland's overseas consignments compete with the world's best fruit on the United Kingdom and European markets. Quality fruit should not be handicapped by a faulty finish to the case.

REWORKING DRONE CITRUS TREES.

In orchards where undesirable types of citrus trees have been cut back for reworking, the final thinning of shoots not required for budding into may be done. Where necessary, the trunks and limbs should be re-whitewashed to continue protection from sunburn. In districts where the growth of new shoots is sufficiently advanced (they should have attained a diameter of some $\frac{3}{8}$ inch at the base), and providing that the sap is flowing freely, they may be budded.

When the shoots are ready to receive the bud, a perpendicular cut is made in the bark at or near the base. The cut should be from 1 to $1\frac{1}{2}$ inches in length, and in depth through to the cambium layer. Another cut is then made horizontally across the top of the perpendicular one, so that the two together form a T.

Budwood should be taken only from selected trees which are healthy and vigorous and noted for consistent production of heavy crops of quality fruit. Budwood should be well rounded, mature wood about the thickness of an ordinary lead pencil or slightly less and not more than one year old. Before the buds are cut from the budstick, the leaves are trimmed off so that a piece of the leaf stalk or petiole is left in each case. By this means the bud can be more easily handled after cutting.

The bud may be cut off the stick either from above or below, but the general practice is to cut from below the bud upwards, commencing about half an inch below and ending about half an inch above. The cut must be made with a sharp, thin-bladed knife, and be just deep enough to remove a very thin layer of wood. In the absence of thorns, the wood may be carefully removed from behind the bud, care being taken not to damage the bud.

The bud is then inserted down and under the bark of the stock by raising the latter with the budding knife. In order to bring the bud and stock in close contact, they are bound tightly together with a raffia

tie. In from two to three weeks the bud, if it remains green, will have taken—that is to say, united with the stock. The tie may then be cut and the head shortened back to force the sap into the bud. The stub may be utilised to support the shoot from the bud during its early growth, but when the shoot has made good growth and is strong enough to support itself the stub should be removed altogether.

LETTUCE GROWING.

Lettuce is one of the most popular vegetables, and with regular sowing, and care in cultivation it may be grown the whole year round. In Queensland, the best times for planting are the late summer, autumn, and winter.

Lettuce is a vegetable that must be grown quickly to ensure crisp leaves. If a check is received during growth the leaves acquire a slightly bitter taste, which tends to decrease the market value of the plants. This defect is more prevalent during the late spring, early summer, and autumn plantings.

The soil should be well cultivated, and it is desirable that, where possible, large quantities of well-rotted farmyard manure be incorporated with the soil. Should fresh manure be used some time should elapse before planting.

Lettuce may be grown in a seed-bed and transplanted into rows, allowing 12 inches between the plants. The seed may also be sown directly into the row and the plants later thinned out to the required distance.

Sow the seed thinly and cover lightly with fine soil, and then firm the ground gently.

During the growing period the soil around the plants must be kept cultivated, but care must be taken not to allow any soil to get on or into the hearts of the plants. Constant watering is essential and the soil should never be allowed to dry out. Should the plants appear to be growing slowly an application of liquid manure would be beneficial, or, failing this, a top-dressing of nitrate of soda or sulphate of ammonia at the rate of 1 to 2 cwt. per acre. These fertilizers should be spread lightly over the ground, but under no circumstances on the plants.

Lettuce should be marketed as soon as possible after cutting, as they deteriorate in quality very quickly.

The cabbage type of lettuce is the popular one in Queensland, and should be cut for market as soon as possible after hearting. For home use lettuce may be used earlier.

Popular varieties for planting are:—

New York or Neapolitan.—A very large variety, best suited for planting in the cooler months.

Iceberg.—A large, good-hearting variety, with crinkled leaves and pink tips, suitable for planting in warm weather.

A pamphlet on packing of lettuce for market is obtainable free on application to the Department of Agriculture and Stock.

The Fruit Market.

J. H. GREGORY, Instructor in Fruit Packing.

AS these notes are being written, good rains are falling throughout Australia, breaking a prolonged dry spell. This should help to maintain sound trading conditions for an extended period.

Stone fruits are now nearing the end of their season. Because of the dry weather, brown rot has not been a source of heavy loss this season.

New season's apples are in good supply, and prices have been satisfactory.

Bananas have risen to payable prices, which should continue for some months to come.

The marketing of green pineapples on southern markets still gives cause for complaint, and should be discontinued. A scheme has been inaugurated for the supply of case lots direct to country homes, and is meeting with considerable success. There is no doubt that schemes of this kind can be of great assistance in relieving the market during periods of over-production.

TROPICAL FRUITS.

Bananas.

Sydney.—Cavendish: Sixes, 12s. to 15s.; sevens, 15s. to 17s.; eights and nines, 17s. to 19s.

Melbourne.—Cavendish: Sixes, 12s. to 14s.; sevens, 14s. to 16s.; eights and nines, 16s. to 18s.

Pineapples.

Brisbane.—Smooth leaf, 2s. 6d. to 5s. per case; Ripley, 3s. to 6s. case; Loose—Smooth leaf, 1s. to 3s. per dozen; Ripley, 6d. to 2s. 6d. dozen.

Sydney.—Smooth leaf, 6s. to 8s. per case.

Melbourne.—Smooth leaf, 7s. to 9s. per case.

Papaws.

Brisbane.—Yarwun, 9s. to 11s. bushel half; Locals, 2s. to 5s. bushel. Few special to 6s.

Sydney.—10s. to 18s. tropical case.

Melbourne.—16s. to 18s. Specials higher.

Mangoes.

Brisbane.—The mango season is now finished. Prices have been very satisfactory for good fruit throughout the season.

Avocados.

Brisbane.—Small lines of this fruit have appeared on the market. The warning about sending immature fruit to the market applies just the same to avocados as to other fruits.

CITRUS FRUITS.

Oranges.

Brisbane.—American navel oranges have been appearing on the Brisbane market. "Sunkist" brand, the quality is good, and sold at 32s. to 34s. per export case. New South Wales Valencias, 12s. to 17s. bushel.

Grapefruit.

Brisbane.—Palestine grapefruit, 26s. to 29s. per export case (1⅓ bushels).

Lemons.

Brisbane.—Gayndah, 16s. to 22s.; Locals, 8s. to 15s.; Benyenda, 20s. to 24s.; Victorian, 17s. to 20s.; Queensland, 20s. to 26s.

DECIDUOUS FRUITS.

Apples.

Brisbane.—Cookers, 5s. to 7s.; Jonathan 8s. to 12s.; Granny Smith, 7s. to 10s.; Delicious, 7s. to 13s. Many lines of Granny Smith are immature, as prices show.

Sydney.—Granny Smith, 7s. to 9s.; McIntosh Red, 6s. to 8s.; Jonathan, 8s. to 11s.; Delicious, 8s. to 12s.

Pears.

Brisbane.—Victorian W.B.C., 9s. to 12s.; Gansell's Bergomot, 6s. to 11s.; N.S.W. W.B.C., 10s. to 13s.; Beaure Cap, 7s. to 11s.; Packham's Triumph, 8s. to 12s.

Peaches.

Brisbane.—Stanthorpe, 5s. to 6s. half-bushel.

Nectarines.

Brisbane.—4s. to 7s. half-bushel.

Plums.

Brisbane.—Ponds, 6s. to 8s.; President, 6s. to 7s. 6d.; Grand Duke, 5s. to 7s.

Quinces.

Brisbane.—To 6s. per case.

OTHER FRUITS.

Grapes.

Brisbane.—Waltham Cross, 7s. to 9s.; Muscats, 5s. to 7s. 6d.

Tomatoes.

Brisbane.—Ripe, 2s. to 5s.; Green, 3s. to 5s.; Coloured, 4s. to 6s..
Sydney.—4s. to 7s. half-bushel.

Passion Fruit.

Brisbane.—8s. to 14s.
Sydney.—14s. to 20s.

MISCELLANEOUS, VEGETABLES, &c.

Carrots.—3d. to 1s. 3d. bundle.

Rockmelons.—3s. to 7s. dozen; 5s. to 6s. per case.

Cucumbers.—3s. to 5s. bushel case.

Pumpkins.—*Brisbane*—9s. to 14s. bag; *Sydney*—£12 to £16 per ton.

Marrows.—2s. to 6s. dozen.

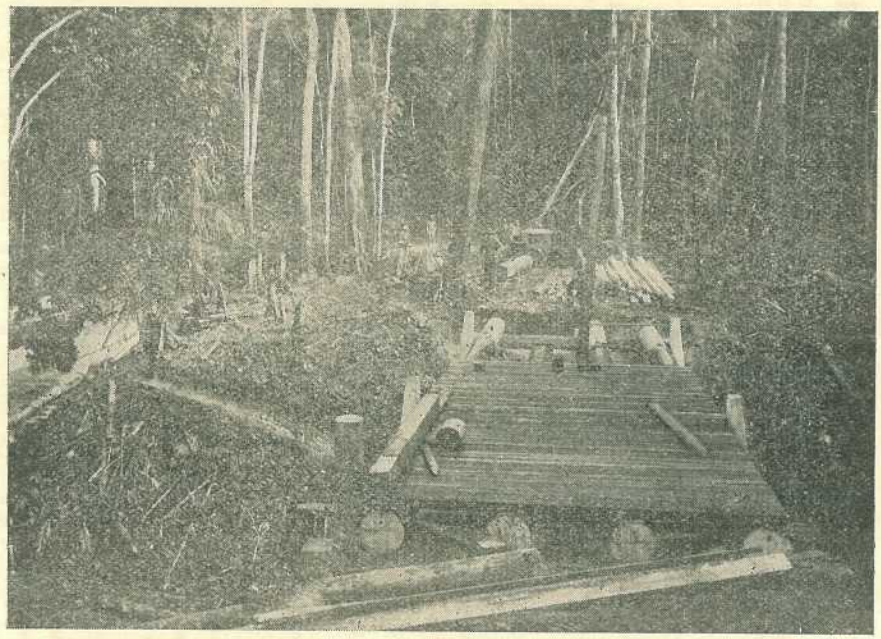
Lettuce.—6d. to 2s. 6d. dozen.

Cabbages.—8s. to 18s. per bag; Specials to 22s.; Locals, 2s. 6d. to 14s. dozen.

Beans.—4s. to 6s. sugar bag.

Peas.—6s. to 11s. sugar bag.

Beetroot.—3d. to 1s. 6d. bundle.



[*Photo.: Lands Department.*

Plate 145.

A bridge under construction on an access road to a North Queensland jungle.

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, and Ayrshire Cattle Society, production charts for which were compiled during the month of January, 1939 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
Mature Cow (Standard 350 lb.)				
Burradale Daisy 15th	W. F. Kajewski, Glenroy, Glencoe	10,451·9	421·51	Lovely's Earl of Glenthorn
Junior, 4 Years (Standard 310 lb.).				
Kyabram Marie 2nd	A. H. E. Black, Kumbia	10,280·33	452·862	Springlands Brigadier
Senior 3 Years (Standard 290 lb.).				
Willow Farm May Queen 11th	A. H. E. Black, Kumbia	7,736·4	327·987	Willow Vale Hinkler
Navillus Daisy 4th	C. O'Sullivan, Navillus, Ascot, via Greenmount	7,541	298·889	Alfa Vale Re Nell
Junior 3 Years (Standard 270 lb.).				
Kyabram Betty	A. H. E. Black, Kumbia	9,755·68	480·25	Springlands Brigadier
Kyabram Marie 3rd	A. H. E. Black, Kumbia	9,611·7	434·111	Springlands Brigadier
Senior 2 Years (Standard 250 lb. .				
Folkestone Lemon	N. Bidstrup, Ehlma Warra	11,644·93	383·369	Glenore Monarch
Junior 2 Years (Standard 230 lb.).				
Alfa Vale Model 11th	W. H. Thompson, Alfa Vale Nanango	11,545·4	538·288	Reward of Fairfield
Jamberoo Glory 3rd	A. H. E. Black, Kumbia	7,011·72	274·839	Banker of Brooklyn Terrace
Laguna Handsome 2nd	F. G. Lamkin, Kainkillenbun	6 328·59	269·903	Morden Marcus
Alfa Vale Dandy 6th	F. G. Lamkin, Kainkillenbun	6,576·26	247·499	Reward of Fairfield
JERSEY.				
Mature Cow Standard 350 lb.).				
Calton Cream Lass	J. L. Comiskey, Warra	7,853·58	481·219	Retford Meteor
Inverlaw Mariposa's Duchess	R. J. Crawford, Inverlaw	7,732·83	406·885	Yuruga Mariposa's Duke

	JUNIOR 2 YEARS (STANDARD 230 LB.).			
Glenview Rosalyn	F. P. Fowler and Sons, Coalstoun Lakes ..	5,999·6	337·07	Trinity Governors Hope
Grange Vale Music	T. R. Gillespie, Ravenshoe	5,414	322·325	Banyule Supremacy
Oxford Buttercup 12th	Farm Home for Boys, Westbrook	5,670·1	300·373	Oxford Peer
Lermont Sweetlips	J. Schull, Oakey	6,079·3	281·818	Woodside Golden Volunteer
Lermont Viola	J. Schull, Oakey	5,220·3	267·91	Woodside Golden Volunteer
	AYRSHIRE.			
	SENIOR 3 YEARS (STANDARD 290 LB.).			
Myola Ode 2nd	R. M. Anderson, Southbrook	8,425·4	341·364	Fairview Combination

General Notes

Staff Changes and Appointments.

Mr. E. R. Behne, Assistant Technologist, Bureau of Sugar Experiment Stations, has been appointed Chief Assistant Mill Technologist, Bureau of Sugar Experiment Stations.

Mr. H. Jarvis, Research Officer, and Mr. D. O. Atherton, Assistant Research Officer, Department of Agriculture and Stock, have been transferred from Toowoomba to Brisbane, and from Atherton to Toowoomba, respectively.

Mr. J. Shilkin, B.V.Sc., has been appointed Veterinary Surgeon (Milk Investigation), Department of Agriculture and Stock.

Mr. F. A. Manning has been appointed acting inspector of stock during the absence on leave of Mr. L. H. Roles, Clerk of Petty Sessions, Boonah.

Mr. R. J. C. Drew (Rochdale) has been appointed an honorary protector under the Fauna Protection Act.

Mr. N. C. E. Barr, Inspector of Stock, Slaughterhouses, and Dairies, has been transferred from Toowoomba to Jandowae.

Mr. R. P. M. Short, Chief Clerk of the Department of Agriculture and Stock, has been appointed Acting Under Secretary during the absence on sick leave of Mr. R. Wilson.

Mr. Short has also been appointed Deputy for Mr. Wilson as a member of the Rural Development Board for the period of the latter's absence.

Mr. H. S. Hunter, Senior Clerk (Marketing), has been temporarily appointed to the position of Acting Director of Marketing during Mr. Wilson's absence from office.

Mr. Bulcock's Records.

When Mr. Bulcock crosses the seas to study the cattle industry in Argentine and South Africa he will take with him two enviable records. He has been Minister for Agriculture longer than any predecessor; and the other day he was re-elected for the seventh time President of the Council of Agriculture and chairman of the executive committee.

No previous Minister in the department has held such a long period record. In appearance he is more like a student than a farmer, but agriculture runs in his blood. He was born on an irrigation farm in Victoria, and studied agriculture at the Wagga Agricultural Farm, getting a first-class general knowledge of agriculture and stock-breeding.

In 1919 he followed the late Mr. T. J. Ryan as member for Barcoo, becoming the youngest member at that time in the Queensland Parliament. Seven years ago he became Minister for Agriculture, and so far as I know he is so satisfied with the department in William street that he is not likely to ask for a change of portfolio—"Queenslander" in *The Courier-Mail.*

Mulgrave Local Cane Prices Board.

An Order in Council has been issued under "*The Regulation of Sugar Cane Prices Acts,* 1915 *to* 1938," constituting a local sugar cane prices board in respect of the Mulgrave Central mill and in respect of the lands of canegrowers set out in such Order in Council. The board shall consist of four members and a chairman.

Incubation of Eggs at Hatcheries.

The Regulations under the Diseases in Poultry Acts have been amended to provide that the owner of every registered hatchery shall comply at all times with the following conditions:—

He shall not permit the incubation at such hatchery of any egg other than an egg produced thereat or at some other registered hatchery, or that is the product of poultry the owner of which has been issued with a certificate by the Department of Agriculture and Stock to the effect that such poultry have been blood tested, unless at such registered hatchery provision is made for hatching by the use of a separate incubator eggs not so produced.

Further, he shall not allow any egg produced at his hatchery to be placed in any incubator except an incubator at a registered hatchery.

Road Accidents due to Carelessness.

Of the eighty-one motor accidents in Brisbane streets in the week ended 4th February at least forty-eight are ascribed by the police to preventable causes.

Issuing a recent weekly return the Commissioner of Police (Mr. Carroll) said that a deplorably large number of collisions could have been averted. Common among the causes of accidents were—

Failure to keep clear sight of the road.

Pulling out suddenly from the kerb.

Failure to take reasonable precautions.

Driving on wrong side.

Crossing intersections without due care.

Speeding.

Two straying cows, a scooter, and a steam roller helped to make up the total of 111 accidents. None was fatal, but twenty-nine persons were injured, three seriously.

Folly of Over-fattening Pigs.

Referring to reports received at his Department of the quality of meat exported to the United Kingdom from Queensland and other Australian States, the Hon. the Minister for Agriculture and Stock, Mr. F. W. Bulcock, remarked that to pig raisers it will be of special interest to note that in the Commerce Department, Chief Veterinary Officer's monthly report containing extracts from reports of the Veterinary Officer in London, special mention is made of the quality and condition of Australian frozen pork arriving on the London markets.

In the January, 1939, report the following references appear:—

Frozen Pork.

Over the past two years, Australian baconers have built up an increasingly good reputation with United Kingdom curers, but in recent weeks many complaints have been received from curers and agents regarding the number of overfat carcases shipped, more particularly from Queensland but also from Western Australia.

One curer who anticipated, on previous experience, that a consignment he bought would produce 50 per cent. No. 1 and 50 per cent. No. 2 Selections stated that the results gave him the same proportion of No. 2's and No. 3's.

Another leading curer reported obtaining only 53 first Selection out of a line of 600. Inquiries among agents, etc., show that complaints are widespread, and cannot be attributed wholly to the lower bacon prices ruling during the middle of the month. The position will be made the subject of a separate report, but it is urged that producers who customarily breed for the porker trade be advised not to fatten such carcases to the baconer class if such cannot be done without producing an over-fat carcase.

In this regard, it is interesting to note that the general impression here is that home baconer production for next year will be encouraged by the lower world prices for feeding stuffs, and the possibilities are that bacon will be cheaper than for some time past.

For the first quarter of 1939, the Board of Trade announces that the following quantities of frozen pork may be admitted from the countries named:—

United States of America	59,630
Argentina	32,948
Brazil	2,755

It will be seen from this report that there is no profitable demand on the overseas market for overfat pork or bacon pig carcases, and that the continuance of supply of such must inevitably result in the weakening of values and loss of reputation of Dominion pork products.

The report also indicates the necessity of stricter grading of all pork products and of payment entirely on a basis of grade.

Trans-Border Fruit and Vegetable Trade.

The Assistant Minister for Agriculture and Stock (Hon. D. A. Gledson) referred recently to an announcement by his colleague, Mr. Bulcock, that he had communicated with the Minister for Agriculture in New South Wales protesting against the enforcement by that State of a new regulation which prohibited the transport of fruit and vegetables from Queensland over the Border, and which was operating with undue harshness in western border towns.

Mr. Gledson stated that a reply had now been received from the New South Wales Minister intimating that he had given the matter very careful consideration, and had since issued instructions that in future fruit and vegetables are to be permitted to cross the Border without inspection and without payment of inspection fees at Bonshaw, Texas, Smithfield, Keetah, Boggabilla, Goondiwindi, Bonanga, and Mungindi. The privilege, however, has been granted only on the distinct understanding that the fruit and vegetables are to be supplied solely for the consumption of local residents.

Banana Industry Ballot.

A Regulation has been issued under the Fruit Marketing Organisation Acts, empowering the Committee of Direction of Fruit Marketing to conduct a poll on the question of the issue of a direction relating to all bananas grown for market in the part of the State between the degree of latitude 25 degrees south (which runs just north of Maryborough) and the New South Wales border. Notice of intention to issue the direction has already been published by the Committee of Direction, and the regulation approved prescribes the conditions under which the poll shall be held, the ballot paper to be used, and other requirements.

Electric Shocks.

In cases of electric shock, the Director General of Health and Medical Services advises:—

(1) Do not go for the doctor. The patient may die while you are away. Let the next person who comes go for him.

(2) Switch off the current, taking hold of the switch with hands wrapped in several thicknesses of dry cloth.

(3) Do not touch the patient or the live wire with bare hands; e.g., use a folded coat with empty pockets.

(4) If you have long-handled shears, insulate them with several thicknesses of dry cloth, and cut the wire.

(5) If you have rubber gloves, snatch the patient from the wire by a single quick movement, not letting his body or the wire touch your feet.

(6) If none of these things are available, move the patient away from the live wire with a dry wooden stick, if possible with one movement only. A dry loop of garden hose may be used to drag the patient clear.

(7) Immediately he is released, commence artificial respiration and on no account should this wait until the doctor has arrived. The best method is the Schaefer, or Prone Pressure method, done twelve times a minute, not more. Remember to keep cool and keep counting.

(8) Artificial respiration should be continued until the body begins to stiffen, which commences in about five hours.

Cases have been known to recover after artificial respiration for three hours and more.

Cases where artificial respiration was only carried out for half an hour or so might in many instances have recovered if continued for an adequate period. No patient should be believed dead, in spite of anyone's opinion, until death-stiffening begins.

Wild Life Preservation.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937," declaring the timber reserves at Paluma and Mount Spec to be a sanctuary under and for the purposes of such Act.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937" declaring an area embracing Upper Numinbah and Springbrook to be a sanctuary under and for the purposes of such Act.

Answers to Correspondents

BOTANY.

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

Chicory. Paterson's Curse. Blanket Leaf.

S.C. (Warwick)—

1. The very much branched twiggy plant is chicory *Cichorum Intybus*. Chicory has become naturalised in many parts of Australia, and is somewhat of a pest in the southern parts of New South Wales and in Victoria and South Australia. It has been established in Queensland for many years, and is moderately abundant on the Darling Downs. It does not seem to have spread here to the extent as it has done in the Southern States. When chicory runs wild it loses the large tap-root for which it is mostly cultivated in Europe as an adulterant of coffee.
2. The plant with blue flowers is *Echium plantagineum*, Paterson's curse or blue weed. This plant is a very serious pest in the wheat areas of New South Wales, Victoria, and South Australia. In the last State it is most generally known as "Salvation Jane." It has been established in Queensland for a number of years, but does not seem to have spread here to the same extent as in the Southern States.
3. The third specimen is the blanket leaf, *Verbascum Blattaria*. We have received this specimen at odd times, but so far as we know it has never established itself as a serious weed. We would like to know if it is spreading in your locality, and later on to receive specimens with more advanced flowers.

A Paspalum. Para Grass. Grandiflora.

T.G.G. (Ayr)—

1. *Paspalum orbiculare*, one of the paspalum grasses, but decidedly inferior to the cultivated *Paspalum dilatatum*.
2. *Brachiaria mutica* (?), Para grass, better known in Queensland, perhaps, as giant couch or *Panicum muticum*. If this grass is correctly determined, it is a very palatable and nutritious grass which is an important constituent of the sown pastures of North Queensland, where it has received considerable publicity of late because of its use as a fattening grass. It has been successfully grown in South Queensland, particularly in small areas, for periodical cutting or feeding off. It does well under cultivated conditions, but prefers a rather moist climate, and in dry areas is confined to the edges of creeks and billabongs. It is very frost-tender.
3. *Brachiaria ramosa* var. *grandiflora*. This is an occasional constituent of the native pastures and has a fair reputation as a fodder grass.

Creeping Knapweed.

A.H. (Laidley)—

Your specimen is the Creeping Knapweed, *Centaurea repens*, a native of the east Mediterranean regions which has been established in Queensland for some time. In recent years, it seems to have been very much on the increase, but this is the first time we remember receiving it from outside the Darling Downs.

It is certainly a very serious weed pest, and difficult to get rid of. Frequent cutting to prevent seed formation, and, more especially, to starve the underground stems by depriving them of the food-obtaining green leaves, is the best method of eradication. Where practicable, this is best done by repeatedly cutting it off below the surface of the ground. Where that is not practicable, arsenic pentoxide might me sprayed on it, but it would probably have to be done several times. Ploughing probably only helps to spread the plant, because every underground portion cut with the plough or spade is capable of forming a new growth. In eradication the best thing to do is to try to prevent the formation of green leaves as much as possible, until the underground parts are starved.

Report on Sections of Stems of Trees from Barcarolle, Longreach.

F.L.B. (Gracemere, Rockhampton)—

The specimens of sections of trees from Barcarolle are very valuable additions to our museum collections. An attempt at estimating the age of the sections has been made. It is quite evident from the results set out hereunder that finality is not claimed by any means. We would like to have some particulars about the sections mentioned in the report—especially as to whether they were from living trees—and the year and the time of the year the trees were felled.

1. Cross-section of Mulga tree (*Acacia aneura*) without bark, No. 137, Barcarolle, Jundah, via Longreach. The tree appears to have been dead for some time when the section was cut. The section appears to have been cut from the stem. It measures 18.7 cm. (7.3 inches) average diameter, and is excentric. Growth rings are prominent in the section except near the original centre. These growth rings appear to be very irregular. In places, wide rings are present. In other places, very fine rings are present. If the fine rings were counted, they would probably amount to more than 100. It is most improbable that each of these fine rings represents a year's growth. In other words, it appears to the writer as unlikely that these fine rings are annual rings. If there are annual rings in the stem, they are to be sought for on the basis of regularity and rhythm. In a few places, regular and rhythmic rings in small groups of two or three are found. Each of these regular rings measures approximately 2 mm. (1/12 inch in width). The radius of the woody cylinder of the tree is 9.35 cm. 3.6 inches). When this radius is divided by the width of the regular rings (2 mm. or 1/12th inch), the figure 47 is obtained. This figure represents the estimated age of the tree in years. It is quite likely that this method gives the minimum age of the tree, as the regular rings probably represent the growth of a normal season. We know on the other hand that many of the seasons are characterised by a shortage of rain, when growth would be suppressed.

The rings in the cross-section are composed of alternating bands of wood tissue. Usually a light-coloured band alternates with a dark-coloured band. The light-coloured band derives its colour from the fact that in it, vessels (pores) with their surrounding wood parenchyma (soft tissue) are very frequent. These vessels with their surrounding parenchyma are pale in colour. The dark band is made up principally of wood fibres which are dark-brown in colour. Vessels and their surrounding parenchyma are scattered in the dark band, but they are so few in number, that they do not impart their light colour to the band. Wood fibres are also present in the light band, but they are decidedly fewer in number than in the dark band. Occasionally a very fine pale ring is seen, which is composed mostly of wood parenchyma. The normal growth ring is composed of a light band and a dark band. The light band represents the spring or early summer wood. The dark band represents the late summer or autumn wood.

2. Cross-section of stem of Gidgee (*Acacia Cambagei*), No. 136, Barcarolle, Jundah, via Longreach. The average diameter of the woody cylinder of the section was cut. The section appears to have been cut from the stem. The woody cylinder has an average diameter of 24 cm. (9.4 inches). The rings are perhaps a little less prominent than in the Mulga section. There are very numerous fine rings almost throughout the section. These fine rings measure from less than .5 mm. to 1 mm. in breadth. It seems unlikely to the writer that each of these very fine rings is laid down in a single year. In other words, it is not considered probable that these fine rings are annual rings. In some parts of the section, there are wider rings, which on account of their regularity, present an appearance of rhythm associated with annual rings. These wider rings occur together in groups of two up to five rings. These wider rings are presumed to be annual. They average 2.35 mm. (about 1/11 inch). The radius of the woody cylinder, 12 cm. (4.7 inches), when divided by the average width of the presumed annual rings, gives the figure 51. Accordingly, 51 is the estimated age of the tree in years. As in the case of the section of the Mulga, this figure may represent the minimum estimated age of the tree. Presumably the rings which we measured as annual were laid down in a normal or good season. In dry seasons, the growth of wood tissue would be lessened. From this it would appear that the actual age of the tree may be considerably more than the figure given here.

The anatomical constitution of the growth rings in the Gidgee is essentially similar to that in the Mulga. See description in the report on the section of Mulga.

3. Section of Gidgee (*Acacia Cambagei*), No. 135, Barcarolle, Jundah, via Longreach. The woody cylinder of this section has an average diameter of 21 cm.

(8.2 inches). In many parts of the section there are fine rings varying from 1-2 mm. in width. In places there are series of regular rings of 2-3, which average 2 mm. (1/12 inch) in width. It is assumed that these regular rings occurring in series are annual. When the radius of the section, 10.5 cm. (4.1 inches) is divided by the average width of the assumed annual rings, the figure 52 is obtained. This figure represents the estimated age of the tree in years. For the reasons given in the previous reports, on the sections of Mulga and Gidgee, this figure is to be regarded as the minimum estimated age of the tree.

4. Section of stem of Budda (*Eremophila Mitchellii*), No. 139, Barcarolle, Jundah, via Longreach. The average diameter of the woody cylinder of the section measures 12.8 cm. (5 inches). The section appears to have been cut from a dead tree and a considerable portion of it had decayed. Numerous rings are evident in the section. The smaller rings measured .5 mm. in width. A few regular rings were found in series of two to four rings. These regular rings averaged 1.7 mm. in width. These regular rings may represent annual rings. When the radius of the section, 6.4 cm. (2.5 inches) is divided by the average width of the regular rings, the figure 38 is obtained. This figure represents the estimated age of the tree in years. As in the other sections, this figure is to be regarded as the minimum estimated age.

Section of Corkwood (*Erythrina vespertilio*), Barcarolle, Jundah, via Longreach, No. 138. Section apparently cut through stem. Woody cylinder measures 16.9 cm. (6¾ inches) average diameter. A characteristic of this species is its thick, corky bark from which it derives its common name, Corkwood. The bark in this section measured 5 cm. (2 inches) in thickness. At first sight growth rings are not apparent in this section. But upon closer examination, a number of widely spaced rings are faintly visible. These rings average 5.5 mm. (nearly ¼ inch) in width. These rings are fairly regular and rhythmical, and have the appearance of annual rings. The radius of the woody cylinder, 8.4 cm. (3⅜ inches), when divided by the average width of the presumed annual rings, gives the figure 15. This would represent the minimum estimated age of the tree in years. As the rings are so indistinct, it is quite possible that some of the intervening rings were missed. The estimated age is therefore very questionable.

The growth rings are so faint in this section that their anatomy could not be described accurately. One can assume, however, that the visibility of the rings, however faint, is conditioned by alternating zones of coarse and fine tissue.

"Native Sarsaparilla."

L.A.K. (Nanango)—

The specimen is *Hardenbergia monophylla*, sometimes called native sarsaparilla. It is a legume. The plant is a twiner with deep-blue or purple flowers. When in flower it is attractive in appearance.

Italian Millet.

S. (Townsville)—

The specimen is Italian millett (*Setaria italica*), an annual grass (both palatable and nutritious. As the plant is naturalised, it could be regarded as a weed in cultivation.

Twin Leaf or Gall Weed.

W.P. (Roma)—

The specimen is twin leaf or gall weed, *Zygophyllum apiculatum*. This species is fairly common in Western Queensland. Usually it is avoided by stock, which suggests that it is unpalatable. However, it is not known to be definitely poisonous.

Sword Bean.

S.G.W. (Mulgeldie)—

The specimen of the bean you send is from the sword bean, *Canavalia ensiformis*. This bean is regarded as edible in Java and other places. The young pods are used as a vegetable, and the seeds of the mature pods are removed and boiled in the same way as bean seeds. When in doubt, it is always as well to eat only a small quantity at first, to avoid any risk of poisoning. There are two varieties of this bean, the edible one has rose coloured or light red flowers, turning violet. The poisonous one has a white flower which turns pink and has a larger pod than the non-poisonous one. Your specimen, however, leaves little doubt that this particular pod is from the edible variety.

Rural Topics

Checking Erosion.

Last year almost a million acres of farm land in the United States were planted with an eye to protecting fields from soil erosion by strip-cropping, that is, planting with alternate strips of open-cultivated and close-growing crops. This method of nailing down soil is now being used in almost every State in the Union.

Strips of legumes or other close-growing crops between strips of corn, cotton, tobacco, and other open-cultivated crops on sloping fields slow down the run-off of surface water, filter out soil particles, and cause large quantities of water to soak into the soil. The most effective kind of strip-cropping has rows running round hillsides instead of straight up and down. Each horizontal furrow and harrow drag acts as a tiny dam to retard the run-off of rain water.

A Farmer's View of Taxation.

It is human nature to growl at every tax imposition, but here is a leading farmer's viewpoint expressed in the course of a recent talk on things in general:—"You know," he said, "we are all inclined to moan about the taxes we have to pay, but there is a good side to the tax question, when all is said and done. Under a democratic form of government like ours and in a country in which every man and woman has a vote, we could easily vote all taxes out of existence, provided we were fully united. But if we abolished taxation altogether, where would we be then? Taxes, after all, represent good roads, modern schools, soil and water conservation, reaforestation, electric power, police protection, the assistance of the Agricultural and other Government Departments, and a hundred other services. These things—all essentials in our civilisation—can't be had for nothing. Look what lack of modern facilities meant to the old people—loss of time, hard living, no schooling, bad roads and all sorts of inconveniences, the lack of which made life very difficult. The joke of it is that to-day commodities and services are charged to taxation to which everyone contributes, while in the old days those things were listed under the head of individual living expenses. So long as the money is spent on service to the community in general, I don't see what there is to whinge about."

How it is done in England.

A news item from England:—

"A farmer was convicted at Weymouth for so neglecting a ewe that she died from maggots. He was bound over for three years not to own, keep or tend cattle, sheep or pigs during that period. In his appeal against the conviction, the sentence was commuted to a fine of £25—the maximum penalty—together with a warning that if he again appeared before the court on a similar offence he ran a serious risk of being sent to prison."

Mechanisation of Farming.

The January tractor school for farmers, at the Queensland Agricultural College, showed an extraordinary interest of the young man on the land in the mechanical side of farming. The attendance at the school was remarkable for numbers and keenness. Tractors and other farm machinery of the latest types were provided for their instruction. There is no dobut about the popularity of these summer and winter schools for farmers at the College.

It is remarkable how far we have progressed in the use of mechanical aids in cultivation and harvesting in recent years.

There are, of course, many obvious limitations to the modernising of farm equipment. Some holdings are too small for the economical use of modern implements. Then there is the old bugbear of capital cost, from which very few of us are free. We have reached the stage, however, at which most farmers—on new country especially—have in mind the possibilities of mechanical power and equipment.

Machinery progress is typical of the present age, and the farmer of the future will, no doubt, become more and more dependent on engineering knowledge.

The Nutritional Value of Pasteurised Milk.

Through experiments conducted at three centres in the United Kingdom, it has been found there is no significant difference in the nutritive value of pasteurised and raw milk. This is what the committee of the Privy Council for the organisation and development of agricultural research has reported:—

"It is reassuring to know from impartial inquiry that the process of pasteurisation as an added safeguard against unpreventable sources of infection and post-milking contamination on the farm is unobjectionable from the nutritional point of view. At the same time, it must not be forgotten that careless handling of pasteurising plant may re-contaminate the milk. . . . . The ideal is to supply milk from healthy herds, and the freeing of other dairy herds from disease. That should be the primary policy of the clean milk campaign."

Milking to Music.

Professor Mackintosh of the Dairy Research Department at Reading University, England, has stated that "a pleasant atmosphere that brings contentment is always more conducive to milk production than noise and disturbance." An English dairy farmer who has tried it out says that " cows milked to music close their eyes dreamily, twitch their ears, and keep time with their tails. Their yield is always more generous when they are given selections from the radio or gramophone." Not a few farmers, it is reported, have lately installed loud speakers in their cowsheds, and their cows are given selections of music during milking time.

When you come to think of it, the basis of this notion is probably the old idea of the dairymaid who sang as she milked the cows.

Original Australian Research.

Some of the most interesting sessions of the Science Congress were those at which were revealed the results of exclusive Australian research. No other country has made greater progress in the study of electrical conditions in the higher atmosphere—researches of vital importance to all modern short-wave wireless communication.

Another bit of original Australian research described was the experimental work on the treatment of blue mould in tobacco. An account was given of the success achieved in the treating of the soil and roots of the tobacco plant with benzol, and it can be only a matter of time before the advantages of this treatment become known in every country where tobacco is grown.

Taken all in all, the Congress was an unqualified success. It stimulated fresh thought and created new and valuable friendships. And, more than anything else, it splendidly achieved the most important object of giving a stronger impulse and a more systematic direction to scientific inquiry and, in some measure, the beneficial application of its results.

Empire Marketing.

A proposal to extend the functions of the Empire Beef Council to include the orderly marketing of mutton and lamb in Great Britain is regarded as the first practical step towards giving effect to resolutions of the Empire Producers' Conference in Sydney last year. A bold scheme to link Empire agricultural markets and interests is now in prospect, and it is possible, if not probable, that the resolutions will be endorsed by the British authorities concerned. As the chief resolution of the conference affirmed the principle of commodity councils on the lines of the Empire Beef Council, it would appear that a definite move to apply the principle generally may soon be made. The whole outlook has changed since the conference last year, and the opinion now is that the international situation has strengthened the Sydney decisions.

It is believed that the establishment of commodity councils, as proposed, for our exportable primary products, will strengthen rather than prejudice the position of the producers in the several exporting countries of the Empire. Through such councils they will be able to place their views before the British Government should that Government deem it necessary to regulate imports of primary products other than meat.

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.

Farm Notes

APRIL.

SUMMER fallowed wheat lands will now be in good condition, and can be maintained in good tilth by a light surface working after all rains in excess of 30 points, or sufficient to cake the surface soil.

Seed wheat can be prepared and held ready for immediate sowing by grading, and treating with an approved bunticidal dust for the prevention of boll smut.

Copper carbonate or the mercury dusts Agrosan and Ceresan will be found effective for this purpose, using from 1 to 2 oz. per bushel, according to the efficiency of the mixing apparatus utilised.

Seed barley and oats should be treated with a mercury dust, or with formalin in preference to copper carbonate.

The main sowings of winter cereals and legumes required for winter and spring feed will be made during the month; and growers are advised to include field peas or tares at the rate of 20 lb. seed per acre, thereby increasing the nutritive value of the fodder secured. Algerian oats predominate in present sowings, but the barleys, Cape and Skinless, in addition to the slower maturing varieties of wheat are also of value.

April and May are favoured months for the sowing of lucerne, the area under which valuable crop should be extended whenever possible. By sowing when weed growth is at a minimum, the young plants have a better chance to become thoroughly established, and there is less likelihood of the surface soil drying out and affecting germination, than if early summer sowings are made.

From 10 to 12 lb. seed per acre is ample on the best lucerne lands, but where sown largely for grazing purposes in the drier districts 3 to 4 lb. per acre will be found sufficient.

Root crops sown during March will be making fair growth, and should be thinned out to permit of full development. Further sowings of mangolds, swede turnips, sugar beet, field carrots, kahl rabi, and rape may be made where soil moisture is favourable. With the drier conditions anticipated, maize harvesting will become general in the southern districts, as once the cobs are mature, it is preferable to harvest and store away from weathering influences and weevils, which are often prevalent in the field at this season.

Full particulars regarding the fumigation of maize with carbon bisulphide can be obtained from the Department of Agrictulture and Stock, Brisbane.

Sorghums, together with other summer fodder crops, which are approaching maturity, and are not required for green fodder, should be conserved as silage wherever possible, as it is certainly better to have too much fodder rather than too many livestock.

Pumpkins required for storage should be allowed to ripen in the field, gathering with the short stalk attached, and storing in a dry airy shed, preferably on slatted shelves to permit of rapid inspection for possible decay.

Winter grasses and clovers may be sown during April in districts suitable for their growth, but such sowings must be made on thoroughly prepared cultivation.

We have received a number of Order Forms for this Journal from which the names of the senders have been omitted. Until the senders supply their names the Journel cannot, of course, be despatched.

Orchard Notes

APRIL.

FOR overseas or interstate markets only perfect fruit should be selected, and it should be graded for size, colour, and quality, and properly packed, only one grade of fruit being packed in a case.

All orchards, vineyards, and plantations not thoroughly clean should receive early attention, for from now until the next rainy season the ground must be kept in a thorough state of tilth and free from weeds in order, firstly, to retain moisture in the soil; and, secondly, to enable birds, ants, and predacious insects to get at and destroy the pupæ of fruit flies and other pests harbouring in the soil.

Banana and pineapple plantations should be put into good order, and kept free from weed growth.

Land to be planted with trees should be prepared now, and it is always advisable to allow newly-cleared land time to sweeten before planting.

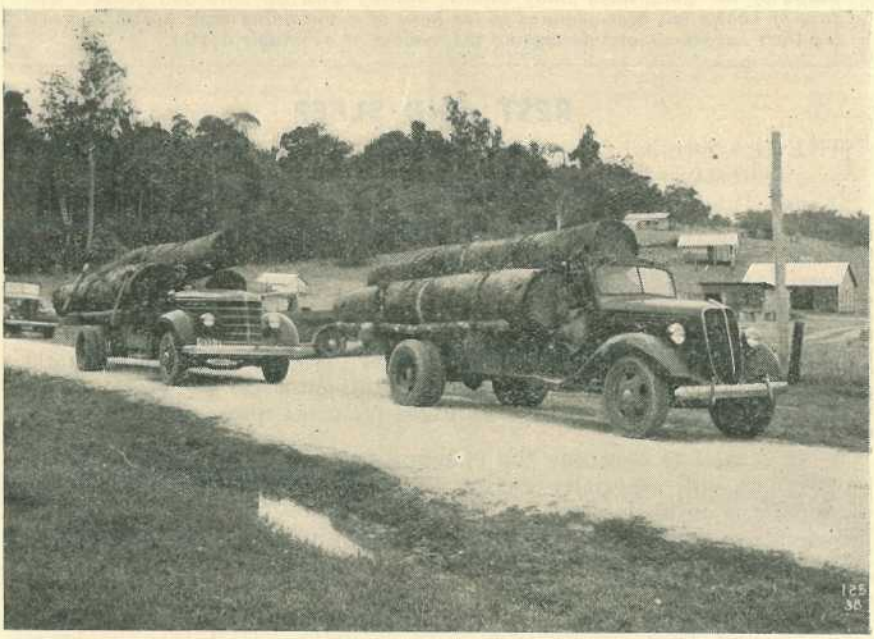


Plate 146.

WEALTH IN WOOD.—Logs from the Rain Forest at Danbulla, 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.

REST AND SLEEP

THE new-born baby normally sleeps nine-tenths of its time, and at six months two-thirds of its time. Baby should be trained to sleep at the same time every day and all night. The habit of sleeping peacefully is one of the clearest evidences of sound health. Normal healthy babies should be trained from the beginning to have no night feeding. This ensures an undisturbed night's rest to the mother, and establishes baby in his proper rhythm from the start, saving him from the period of irritability, disturbed rest, and slackening of growth incidental to the breaking of a bad habit a few months later. Why break in on the night's rest? Why impart any tendency to insomnia at the start of life? Happy is the baby who sleeps all night from the dawn of existence.

It is well to continue the morning rest until the child is three or four years old, especially during summer, when children wake early. Even if the child does not sleep, the habit of resting is of great value. A short rest or sleep restores a child wonderfully, and the result is that there is no crossness or fatigue at the end of the day.

In forming good habits of rest and sleep, regularity is necessary. Do not pick baby up when he cries at night. However, the mother should make sure that baby is dry, that he is snug and comfortable. It is possible to change baby's napkin without waking him.

The baby should be trained as soon as possible to sleep during the hours when the mother is busiest with her household duties, he will

take a long sleep during the morning. As baby grows older he should not be encouraged to have a long sleep in the late afternoon as he will then not be ready to go to sleep after the evening meal at 5.30-6 p.m. A late afternoon sleep also interferes with the early afternoon outing. It would be a great advantage to the entire household, apart from the health and benefit accruing to the child, if young mothers would contrive to have the baby and younger children asleep in bed before the father arrives home for the evening meal. Never play with and excite a baby just before bedtime. While natural mothering and moderate handling is beneficial, injudicious or excessive handling or stimulation is highly injurious.

Over Strained Babies Sleep Badly.

Children are fond of babies and never tire of stimulating their funny performances. This should not be permitted. Unfortunately, some parents and friends are just as foolish in amusing themselves at the expense of the baby. A little gentle stimulation by the mother may be harmless and even beneficial to some babies. Continual stimulation especially before bedtime spoils their sleep, upsets their nutrition, and makes them nervous and irritable. This is giving them a very bad start in life, and may produce a state of restlessness, irritability, and bad temper which may be a serious handicap.

Some parents are in the habit of taking their children, and even their babies out with them in the evening shopping or visiting. In some instances there is no one with whom they can be left, but baby's welfare should always be considered first. It is worse still to take them to the cinemas, where they become over-tired or over-excited, and are exposed to great risks of infection with colds, influenza, and other diseases which may have serious consequences in a young child.

COCKROACH CONTROL.

Cockroaches are nocturnal, hiding during the day in dark corners and crevices, where they congregate in large numbers. In the house, they usually hide near the sink and drainboard, behind the kitchen cabinet, and in similar places. If disturbed when foraging at night, they run rapidly for shelter, and a knowledge of where they conceal themselves is usually the key to their control.

In Queensland, houses are constantly being reinfested by adults crawling and flying in from outside, and no control measures can keep a building continuously free from the pest, if reinfestation is possible. Therefore it is first necessary to clean up all outbuildings and burn accumulated rubbish of any kind. All cockroaches found hiding in packages of food and merchandise being brought into the house should be destroyed. They may be killed mechanically or by spraying with a proprietary fly spray. Crack fillers, such as putty or plaster of paris, can be used effectively to close many openings used by cockroaches as avenues of escape to hiding places. This is particularly important if cockroaches are coming in from adjacent apartments, through wall spaces, or along the plumbing fittings.

Sodium fluoride is the best cockroach remedy for use in homes which have already become infested. If the powder is not readily available in pure form, suitable commercial preparations, generally known as insect

powders, containing up to 80 per cent. sodium fluoride, can be obtained from any grocer. Sodium fluoride is poisonous to man if taken internally in sufficient amounts, and it should be kept out of food and away from children and pets. If used with reasonable care in cockroach control, however, no harm will follow. It may be sprinkled by hand along the back of shelving, draining boards, and other places frequented by the pests. When so placed in the run ways the powder adheres to the limbs and is subsequently taken in through the mouth as the insect cleans itself. Sodium fluoride therefore acts as a stomach poison. The powder remains effective indefinitely in dry situations, but in very damp places it may cake and become useless.

Sodium fluoride is best applied with a small duster or bellows and blown into the hiding places. In this way more cockroaches are directly affected, for they die rapidly when the powder is blown directly on them. The application should be made in the evening and the powder left for two or three days. Frequent treatments are usually necessary at intervals of one or two weeks if the pest is to be kept under control.

—D. O. Atherton.

A BLAZE OF COLOUR.

[*Following are extracts from an interesting and suggestive article by* REDVERS J. BLATT *in the Summer Number of "South African Gardening."* The author describes the effect of colour in street beautification in many of the cities of the world which he has visited. His mention of Cairo when the poinciana is in bloom will awaken memories of its charm in the minds of Journal readers who were in Egypt in the course of the war years. The extension of the cult of colour in Queensland cities and towns would be well worth while. The coloured plate on the cover of the Journal for December suggests the possibilities of poinciana regia as a subject for street tree planting. Other tropical and sub-tropical countries provide excellent examples of colourful street avenues. Much has been done, but much more could be done towards building "the city beautiful." Cairns, Townsville, Mackay, Rockhampton, Maryborough, and Toowoomba have all given a good lead. Grafton (New South Wales), like Pretoria, has its "jacaranda time," and the fame of its annual festival has spread far and wide. In Brisbane there is plenty of scope for the planting of more flowering trees in every suburb. The southern cities, especially Melbourne and Canberra, are fully awake to the possibilities of this form of expression of civic pride. In Perth, scarlet avenues of flowering gums are living memorials to the men of vision who planted them. Inland towns like Bathurst, Bendigo, and Ballarat have a tree sense fully developed.*

Apart from the beauty aspect, a blaze of colour in the streets of cities and towns has a tourist value which, in frank phrase, would be sheer stupidity to ignore.—ED.].

GARDEN-LOVERS the world over strive to get as much colour in their gardens as possible, and, in general, they have the advantage in this respect in tropical and semi-tropical countries.

Pretoria is rightly becoming famous for its jacaranda trees, and a special festival is contemplated in future during jacaranda week. Pretoria is well worth a visit during jacaranda time, because from the Union Buildings a remarkable view is obtained of Pretoria's tree-lined streets, which give the appearance of mauve-bordered avenues.

The mauve of jacaranda flowers seems to blend well with the different shades of bougainvilleas, poinsettia, and hibiscus, and many

*"S. A. G." for Dec.-Jan.-Feb., 1938-39 (Wynberg, Cape, South Africa).

gardens in Pretoria can truly be said to present a blaze of colour. Bauhinias bloom earlier than the jacaranda, otherwise they could add to the riot of colour.

Many claim that the Pretoria jacarandas present the finest floral sight in the world, and while it must be admitted that the jacarandas take a lot of beating, there are some wonderful floral sights in different parts of the world that merit consideration.

Poinciana.—I happened to be in Cairo when the poinciana was in bloom, and was immediately captivated by this beautiful street tree. The tree-lined streets presented a blaze of red, and I came to the conclusion that comparisons are odious and that the streets of red are as beautiful as the streets of mauve. Pretoria in jacaranda time was no more beautiful than Cairo when the poinciana was in bloom.

Then picture the incomparable Rio de Janeiro—the city of dreams—in its magnificent setting, with its yellow flowering acacias—the predominant street tree in Rio—and one is presented with a sight fit for the gods. The yellow inflorescence of flowers of the acacia—resembling a wisteria very much—might not be so vivid as the mauve of the jacaranda or the red of the poinciana, but nevertheless presents an unforgettable sight.

The beautiful avenue of stately royal palms in Rio de Janeiro, while lacking colour, enhance the beauty of this enchanting city.

Old World Gardens.—No one can have the faintest conception of colour if he has not seen the flowering trees just mentioned, and yet there are many other places in the world where colour plays a predominant part. In the bulb country, around Leyden, in Holland, the landscape resembles a patch-work quilt during the flowering season. Kew Gardens and Hampton Court in spring will long live in my memory as a riot of colour, with the tulips and rhododendrons outstanding.

Gardeners in Florida, U.S.A., make great use of azaleas, bougainvilleas, poinsettias, and hibiscus to improve the colour scheme of their gardens, and obtain wonderful effects in this way.

Flowering Trees in the South Sea Islands.—However, in my humble opinion, the finest blaze of colour I have ever seen was in Papeete, Tahiti—one of the most beautiful of the South Sea Islands, if not the most beautiful. I was almost spellbound when I saw the blaze of colour—made up of many different coloured flowers of hibiscus, flamboyants (among the most beautiful of street trees), jacarandas, bauhinias, poinsettias, and bougainvilleas. The magnificent flowers of the hibiscus alone would place this scene among the most colourful anywhere, but when you add the flamboyant and jacaranda, you have a combination hard to beat.

Roses.—The famous Tournament of Roses held at Pasadena every New Year's Day gives one an idea of the magnificent effects which can be created by means of roses. It is doubtful whether more beautiful floats—unique in their beauty and originality—can be seen anywhere in the world. This is one of the premier attractions in California—a State that has so much to show—and apart from the aesthetic value has put Pasadena on the map, and is of tremendous publicity value to the city.

CIVIC PAGEANTRY IN FLOWERS.

All over the world we find an increasing tendency to beautify parks, streets, and traffic circles, and the rock gardens at the Empire Exhibition in Johannesburg were so admired that something similar is to be established in the Kloof, near Killarney, as a permanent attraction.

In America much use is made of "civic centres," where the uniformity of architecture and public gardens add a pleasing touch to the city.

The Lilac.—Since 1892 Rochester, New York State, has developed, through purchase and exchange, the largest collection of lilacs in the world—over 1,000 shrubs, representing 384 species. Who would have thought there were so many different species? At the height of their beauty every year, a week is set apart by the city to celebrate the lilac festival, a fete which draws nearly 100,000 visitors from all over the country.

The Iris.—What Rochester has done for the lilac, Nashville, Tennesee, has done for the iris. Nashville has become the "iris city," and every May, when the city is ablaze with colour, an iris festival is held, during which thousands of visitors see, at no charge, lovely blooms that have won for Nashville hybridizers more prizes from English and American isis societies than have gone to any other city in the world.

In one park in Nashville you can see 20 acres of iris, and some iris parkways are 2 and 3 miles long—and one will be 12 miles long when finished. At the city airport is the largest single planting of iris in the world—a mile long and 15 feet wide.

Tulip Festival.—In Holland, Michigan, U.S.A., the annual tulip festival in May attracts half-a-million visitors. Four million brilliant tulips greet them in public and private gardens, and along every approach to the city. Here is a city—far removed from Holland in Europe, yet putting up a festival that would do the Hollanders credit.

Dogwood.—Greenfield Hill, in Connecticut, U.S.A., is a town with scarcely 100 inhabitants—well off the main road and hard to find—yet every week-end during the late spring the roads from all directions carry capacity traffic to see its glory of pink and white dogwood blossoms. The blaze of colour had its beginning in the dozen trees planted by Dr. Isaac Brousen. Since 1895 the Village Improvement Society has increased the number of trees, until to-day there are more than a thousand.

The California Poppy.—The California poppy—the national flower of California—is known almost all over the world, but to be fully appreciated must be seen in its native habitat, where huge splashes of yellow can be seen all over the fields, affording a blaze of colour not easily forgotten.

The Texas Bluebell.—The Texas bluebell—a lupin—is to Texas what the California poppy is to California, the fields being splashed with blue instead of yellow, as in California. No wonder the Texans have adopted the Texas bluebell as their national flower, because fields of this flower truly make a unique sight. Although lupins grow almost all over the world, it is only in Texas where one gets the massed effect.

IN THE FARM KITCHEN.

ICES AND ICED PUDDINGS.

The use of domestic refrigerators is extending rapidly in country districts, and so the following suggestions may be put to the freezing test before the warm weather ends:—

Rich custard is the basis of nearly all ices, and the following is an excellent mixture which can be flavoured with coffee, chocolate, strawberry, raspberry, pine-apple, passion fruit, or any other fruit or fruit syrup. Milk can be substituted for the cream, but the ice will not be as smooth and rich, although it will be sufficiently good to use in a fruit sundae or melba.

Vanilla Ice Cream.

Take ½ pint milk, ½ pint cream, 3 oz. sugar, 2 egg-yolks, 1 egg-white, vanilla essence.

Heat the milk and sugar in a saucepan, and when almost boiling pour it over the well-whipped egg-yolks and allow it to cool. Flavour rather strongly with vanilla, slightly whip the cream, and add it to the mixture and freeze. If milk is substituted for cream, 1 oz. of cornflour should be used mixed to a smooth paste with a little of the milk, and then cooked (stirring all the time) in the remainder of the milk before it is added to the eggs.

A Fruit Melba.

Place a tablespoonful of the ice cream at the bottom of a champagne glass, then place on it half a pear or peach or whatever fruit is available; on this put a few teaspoonfuls of strawberry jam, and on this some stiffly-whipped cream. Top with a glace cherry.

Melon Ice.

Take 1 large honey-dew melon, 1 cupful sugar, 3 tablespoonfuls lemon juice, 2 cupfuls water, ⅛ teaspoonful salt, ¾ cupful dry sherry, ½ cupful whipped cream.

Cut melon, remove seeds, and scoop out pulp; place shell in refrigerator. Force pulp through a sieve and add lemon juice. Heat sugar and water to boiling point; add melon and salt, and when cold freeze until of mush-like consistency; add sherry and fold in whipped cream. Freeze until firm. Serve in melon shells and garnish with mint.

Lemon Water Ice.

Take 1 quart water, 2 cupfuls sugar, 1 tablespoonful grated lemon rind, ¾ cupful lemon juice.

Boil water and sugar for five minutes, add lemon rind and juice. Cool, strain, and freeze. Serve in chilled sherbet glasses. Serve with poultry or as a dessert.

A Fruit Sundae.

Put a tablespoonful of ice cream at the bottom of a champagne glass, pour over it two tablespoonfuls of any fruit syrup, cover with whipped cream, and over this sprinkle some chopped nuts.

Junket Ice Cream.

Take 1 junket tablet, 2 tablespoonfuls cold water, 3 cupfuls lukewarm milk, ¾ cupful sugar, ⅛ teaspoonful salt, 1 cupful thick cream, 2 teaspoonfuls vanilla essence.

Dissolve the junket tablet in cold water; add to milk, and mix well, add remaining ingredients. Let it stand in a warm place until slightly thick, then freeze in the usual way in the refrigerator or in the freezer.

Baked Alaska.

Take 1 thin sponge cake, 1 quart ice cream, 5 egg-whites, ¾ cupful sugar.

Place sponge-cake on several thicknesses of thick paper on a baking sheet. Cover cake with ice cream, allowing the cake to extend half an inch beyond edge of cream. Beat egg-whites until stiff, add half a cupful of sugar, gradually beating after each addition until sugar is dissolved. Spread over entire surface of ice cream and rim of cake and sprinkle surface with the remaining quarter-cupful of sugar. Bake in a hot oven for about five minutes or until lightly browned.

Iced Coffee Cream.

Take ½ oz. gelatine, ¾ pint milk, ¼ pint cream, 4 tablespoonfuls coffee extract, 2 oz. castor sugar, 6 drops vanilla essence, a little melted lemon jelly, angelica, glace cherries.

Soak the gelatine in a quarter of a pint of milk for half an hour and mix the coffee extract with another quarter-pint, which should be made hot, but not boiled. Mix the two together, then add the castor sugar and vanilla essence and stir over the fire till well dissolved; strain, add the cream and the rest of the milk. Rinse a mould in cold water, decorate it at the bottom with glace cherries and strips of angelica and set them with a little melted lemon jelly. Let it set quite firm, then pour in the cream carefully. Stand on ice or leave until next day before turning out.

Iced Pudding Deliceuse.

Take 3 eggs, 3 oz. castor sugar, ½ pint milk, ½ pint cream, ½ gill sherry, 2 oz. biscuit crumbs (lady fingers), dried cherries, vanilla essence.

Beat the eggs and castor sugar, boil the milk, and pour over them; return to the pan, and stir till it thickens, and when cool flavour with vanilla essence. Whip the cream, stir it in, together with the sherry and biscuit crumbs, freeze, but not quite so solid as for ices. Take an ice pudding mould with not too elaborate a pattern, as it will be difficult to press the frozen mixture into very small corners. Put some of the mixture into the bottom of the mould, then a layer of dried cherries or other fruits cut in small pieces, then more mixture and again more fruit in alternate layers until the mould is full. Press down with a wooden spoon, put on the lid, and place it in a pail surrounded with ice and salt. Leave until required. To turn out the pudding remove the lid from the mould; after wiping it dry turn it upside down on a glass dish, then hold a damp cloth round the mould for a few minutes. The pudding will then slip out in perfect shape. A little red fruit syrup should be poured round it in the dish.

American Iced Pudding.

Take 1 pint milk, 1 oz. sheet gelatine, 2 eggs, 1 oz. castor sugar.

Put the milk in a double saucepan with the gelatine. When dissolved add the well-beaten egg-yolks and stir until the consistency of thick cream. Beat egg-whites to a stiff froth with the castor sugar. Then add the hot custard, give one or two stirs, and pour into a well-wetted mould and stand on the ice for twelve hours. When turned out it should be a lovely sponge crowned with jelly.

"SCOTLAND'S SALVATION"—BACK TO OATMEAL.

In Scotland there is a movement back to oatmeal porridge. It comes as a surprise to learn that such a movement is necessary, but there it is, and, as reported in the *Farmer and Stockbreeder* (England), we have the word of Dr. Allan Fraser, a well-known dietitian, for it. Porridge is dead, he says, replaced in the modern home by the breakfast cereal, but—since oats build strong bone, smooth skin, good teeth, and is the most important crop in Scotland—why not oatmeal porridge?—the coarse, nutritious oatmeal porridge Scotch people brought to Queensland, and which we all had to eat when we were kiddies. We have known hefty scrub-fallers to do a full morning's work on a soup plate of porridge sweetened with golden syrup to keep it sticking to their ribs.

To popularise oats, Dr. Fraser says he wants to tell the public the plain facts about their health-giving and strengthening qualities. Oatmeal might well prove Scotland's salvation, and possibly Australia's, too—especially in the light of the present physical fitness campaign.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1939 AND 1938, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of years' records.	Jan., 1939.	Jan., 1938.		Jan.	No. of years' records.	Jan., 1939.	Jan., 1938.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	11·80	38	10·92	10·81	Gatton College ..	4·24	40	6·56	4·11
Cairns	16·55	57	26·25	15·77	Gayndah	4·57	68	5·13	4·30
Cardwell	17·02	67	19·94	25·94	Gympie	6·59	69	4·88	9·63
Cooktown ..	14·34	63	13·10	9·75	Kilkivan	5·43	60	6·73	3·79
Herberton ..	9·53	53	5·85	7·75	Maryborough ..	7·04	68	8·73	8·44
Ingham	15·96	47	8·80	34·51	Nambour	9·67	43	4·04	18·83
Innisfail	20 20	58	26·32	29·12	Nanango	4·61	57	4·35	6·89
Mossman Mill ..	17·84	26	24·98	20·96	Rockhampton ..	7·53	68	4·75	3·25
Townsville ..	10·96	68	3·77	15·19	Woodford ..	7·76	52	2·75	13·74
Central Coast.					*Central Highlands.*				
Ayr	10·95	52	2·88	12·82	Clermont ..	5·06	68	4·96	2·47
Bowen	9·77	68	1·24	2·83	Gindie	3·62	40	..	3·21
Charters Towers ..	5·41	57	2·C1	5·69	Springsure ..	4·16	70	6·82	3·01
Mackay P.O. ..	13·80	68	4·04	4·70	*Darling Downs.*				
Mackay Sugar Experiment Station	13·57	42	5·07	5·17	Dalby	3·33	69	7·97	4·69
Proserpine ..	15·28	36	6·09	6·89	Emu Vale ..	3 21	43	2·81	3·74
St. Lawrence ..	9·11	68	5·39	0·91	Hermitage ..	3·20	33	..	4·54
South Coast.					Jimbour	3·48	51	8·96	4·56
					Miles	3·62	54	6·90	3·55
Biggenden ..	5·14	40	9·94	7·11	Stanthorpe ..	3·63	66	4·23	3·06
Bundaberg ..	8·57	56	8·97	9·73	Toowoomba ..	5·06	67	6·73	9·40
Brisbane	6·39	87	1·93	7·70	Warwick	3·56	74	3·51	4·85
Caboolture ..	7·53	52	4·20	11·17	*Maranoa.*				
Childers	7·27	44	6·55	7·48					
Crohamhurst ..	12·21	46	4·24	19·95	Bungeworgorai ..	2·01	25	..	4·90
Esk	5·70	52	3·01	8·21	Roma	3·08	65	5·19	4·47

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—JANUARY, 1939.

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	29·76	87	76	96	27, 28	74	10, 14 to 19, 23	1,310	17
Herberton	..	80	65	93	1	60	1, 2	585	17
Rockhampton	29·82	92	74	101	23	68	29	475	15
Brisbane	29·88	86	71	98	21	65	30	193	10
Darling Downs.									
Dalby	29·86	93	68	104	15, 16	60	29 to 31	782	13
Stanthorpe	..	87	61	102	15	54	4, 31	423	13
Toowoomba	..	87	64	102	15	53	8	673	11
Mid-Interior.									
Georgetown	29·75	94	73	105	1	69	30	581	9
Longreach	29·76	101	75	111	1	65	1	157	7
Mitchell	29 79	97	72	108	15	61	29	605	10
Western.									
Burketown	29·72	90	77	101	2	72	13	1,748	14
Boulia	29·68	103	79	113	1	70	5, 29 to 31	92	6
Thargomindah ..	29·72	104	78	114	15	68	28, 29	414	6

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

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

Phases of the Moon, Occultations, &c.

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.

Half an hour after sunset on the 22nd, Mercury and the very finest crescent of the Moon, very near the western horizon, may not be visible to the unaided eye. Below the horizon, at 9 p.m., the Moon and planet will be separated by only 1 degree, Saturn will be higher up and set at 7.20 p.m. on that date.

The most important event for us is our Autumnal Equinox which will occur on 21st March. On this date (at 10 p.m. in Queensland) our planet Earth has reached a position in its orbit where each hemisphere receives the same amount of light, and as our globe rotates on its axis every 24 hours, each side being turned towards or away from the Sun alternately, day and night, are of equal length from Pole to Pole. The same is true of the Vernal Equinox, yet Spring is the time of sowing, and autumn of reaping, in spite of similar conditions.

Mercury rises at 6.13 a.m., 28 minutes after the Sun, and sets at 6.44 p.m., 20 minutes after it on the 1st; on the 15th it rises at 7.15 a.m., 1 hour 22 minutes after the Sun, and sets at 6.55 p.m., 46 minutes after it.

Venus rises at 2.22 a.m., 3 hours 23 minutes before the Sun, and sets at 3.51 p.m., 2 hours 23 minutes before it; on the 15th it rises at 2.40 a.m., 3 hours 13 minutes before the Sun and sets at 3.56 p.m., 3 hours 56 minutes before it.

Mars rises at 11.39 p.m. on the 1st, and sets at 1.20 p.m. on the 2nd; on the 15th it rises at 11.15 p.m., and sets at 1.3 p.m. on the 16th.

Jupiter rises at 6.3 a.m., and sets at 6.40 p.m. on the 1st; on the 15th it rises at 5.24 a.m., and sets at 5.54 p.m.

Saturn rises at 8.29 a.m., and sets at 8.16 p.m. on the 1st; on the 15th it rises at 7.42 a.m., and sets at 7.28 p.m.

Finally it is reported from Mount Wilson Observatory, U.S.A., that Jupiter has added two new satellites to its retinue of nine.

4th Apr.	○ Full Moon	2 18	p.m.
12th ,,	☾ Last Quarter	2 11	a.m.
20th ,,	● New Moon	2 35	a.m.
27th ,,	☽ First Quarter	4 25	a.m.

Perigee, 1st April, at 9.0 p.m.
Apogee, 13th April, at 7.0 p.m.
Perigee, 28th April, at 8.0 p.m.

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

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

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