QUEENSLAND AGRICULTURAL JOURNAL

VOL. XV. APRIL, 1921. PART 4.

Agriculture.

THE IMPORTANCE OF AGRICULTURAL SHOWS.

The importance of shows in an agricultural country cannot be over-estimated. They not only give the farmer an incentive to improve his stock, but they supply him with a standard to work for, and, in addition, teach him the best methods to use to attain that standard. One thing the farmer has to learn is: That, as far as the production of milk-producing and meat-bearing animals is concerned, to stand still is to retrograde. There must be a continual search for improvement and progress; and the main direction of improvement for production, as well as breeding, will be along lines of increased application of scientific methods. No *progressive* farmer blessed with the normal amount of common sense can shut eyes to the fact that without the aid of science, especially as applied to machines, he cannot hope to secure a safe position. Milking machines, butter churns, cream separators, ploughs, planters, flax-scutching machinery, &c., have all been brought to such a standard of perfection that their non-use is not only unreasonable but blameworthy. The show affords progressive farmers an excellent opportunity of seeing and judging for themselves the best breeds to aim for—the best machines to get to help in increased production or to lower the working costs on the farm. The opportunity presents itself of examining to his own satisfaction—learning the costs of using and up-keep without risking a cent in advance. But shows play their own part as well. They cultivate rivalry and emulation; they are a real means of education in stock breeding; for no farmer, no matter how lackadaisical he might be, could look at the parading of fine stock without registering a vow that he would go one better next time, at the same time getting a better and more accurate knowledge of how to go about it.—"Farmers' Journal," Vol. 2, No. 49.

THE COTTON INDUSTRY.

The Brisbane "Daily Mail" for 11th March published the following cablegram from London which will doubtless prove of interest to Queensland cotton growers *in esse* and *in posse*. "Replying, in the House of Commons, during the debate on international trade, to Mr. George Roberts, who emphasised the importance of strengthening the inter-imperial ties, and improving the cultivation of cotton in India and Africa, Sir Robert Horne pointed out that, in addition to manufacturers agreeing to pay 6d. per bale for cotton used in England, the Government had promised

£50,000 a year for five years to develop the cultivation of cotton in the Empire, and also proposed to improve the export credit scheme guaranteeing 85 per cent. of the merchants' selling price. He proposed to extend the scheme to the Dominions. He agreed that the Dominions should be placed first.'' This should open the eyes of Queensland farmers to the prospect of making this portion of the British Dominions a great cotton-growing country. The cultivation of cotton has, years ago, passed the experimental stage, for, during the American war, there were exported from Queensland to Great Britain 26,000,000 lb. of ginned cotton, worth £1,300,000, and had there been linting machines in use as there are to-day, this return would have been largely increased. For want of this machine, a vast quantity of short fibre remaining on the seed would have been removed, and could have been sold at that time for little less than the full price of cotton in the English market. The cleaned seed was thrown away as valueless, there being no oil mills in Australia, and 30,000,000 lb. of seed, valuable for its oil, then worth over £50,000, together with the oilcake, 2,600,000 lb., worth another £50,000—all went to the manure heap.

In those days the farmer obtained from 2½d. to 3d. per lb. for his cotton, and unless his crop was picked by the family, he paid ½d. per lb. for the work. The returns of a cotton crop are now greater than when any sort of seed was sown. The Department of Agriculture imported seed of the best and heaviest bearing varieties from America, with the result that one acre to-day produces half as much fibre again as the old varieties.

GROUND ALMOND—"CYPERUS ESCULENTUS."

G. B. BROOKS, Instructor in Agriculture.

In February, 1919, the writer was given a few nuts of the ground almond. This plant is a member of the Cyperus family, which also embraces the notorious weed nut grass (which is really a sedge and not a grass).

As the ground almond has a habit of growth similar to nut grass, it was decided to raise a number of plants, thereby ascertaining whether it was likely to become a pest under cultivation. Half a dozen tubers were, therefore, planted out in March. As this is a summer-growing crop, the season was really too far advanced for planting; consequently, the yield was light, each plant producing some two dozen small tubers or nuts. The best of those were selected for a further trial, planting in this instance being carried out in September, 1920; the soil being a brown friable loam. A quick germination resulted; the subsequent growth being also rapid, the plants stooling out in a remarkable manner and attaining a height of 2 ft. 6 in.

During the first week in February a stool was dug up and photographed, the soil first being carefully washed away, leaving only the tubers and fine fibrous roots. (See illustration.)

It will be noted from the photograph that the plant is a very prolific one. From the stool illustrated—which was grown from a single tuber—730 tubers or nuts were removed. Those are shown in illustration, Plate 17.

The tubers are attached to the plant by runners 2 to 3 inches long. When harvesting, a number of nuts are likely to be left in the soil, and, being small, are difficult to locate. Therefore, unless great care is taken in digging, the plant is likely to become a troublesome pest in cultivation.

The labour entailed in harvesting the crop, if raised for market purposes, would be both tedious and expensive.

The nuts, when dry, have a very agreeable flavour, but being somewhat fibrous cannot be masticated like the peanut.

The following extracts dealing with this plant, taken from the works of various authorities, are of interest:—

F. v. Mueller (in ''Select Extra Tropical Plants''):—''*Cyperus esculentus.* Habitat: Southern Europe, Western Asia, various parts of Africa. Produces the 'chufa' or ground almond, an edible root which contains about 27 per cent. starch, 17 per cent. oil, and 12 per cent. saccharine substance. Other (French) analyses give 28 per cent. oil, 29 per cent. starch, 14 per cent. sugar, 7 per cent. gum, and 14 per cent. cellulose. The plant does not spread injuriously like the *C. rotundus* (nut grass), and can be reared on sand land, though in rich soil the harvest is more plentiful. The tubers, of which as many as 100 to 150 may be obtained from each plant, are consumed either raw or cooked. Hogs root them up for food. The oil surpasses, in excellence of taste, all other oils used for culinary purposes. The tubers

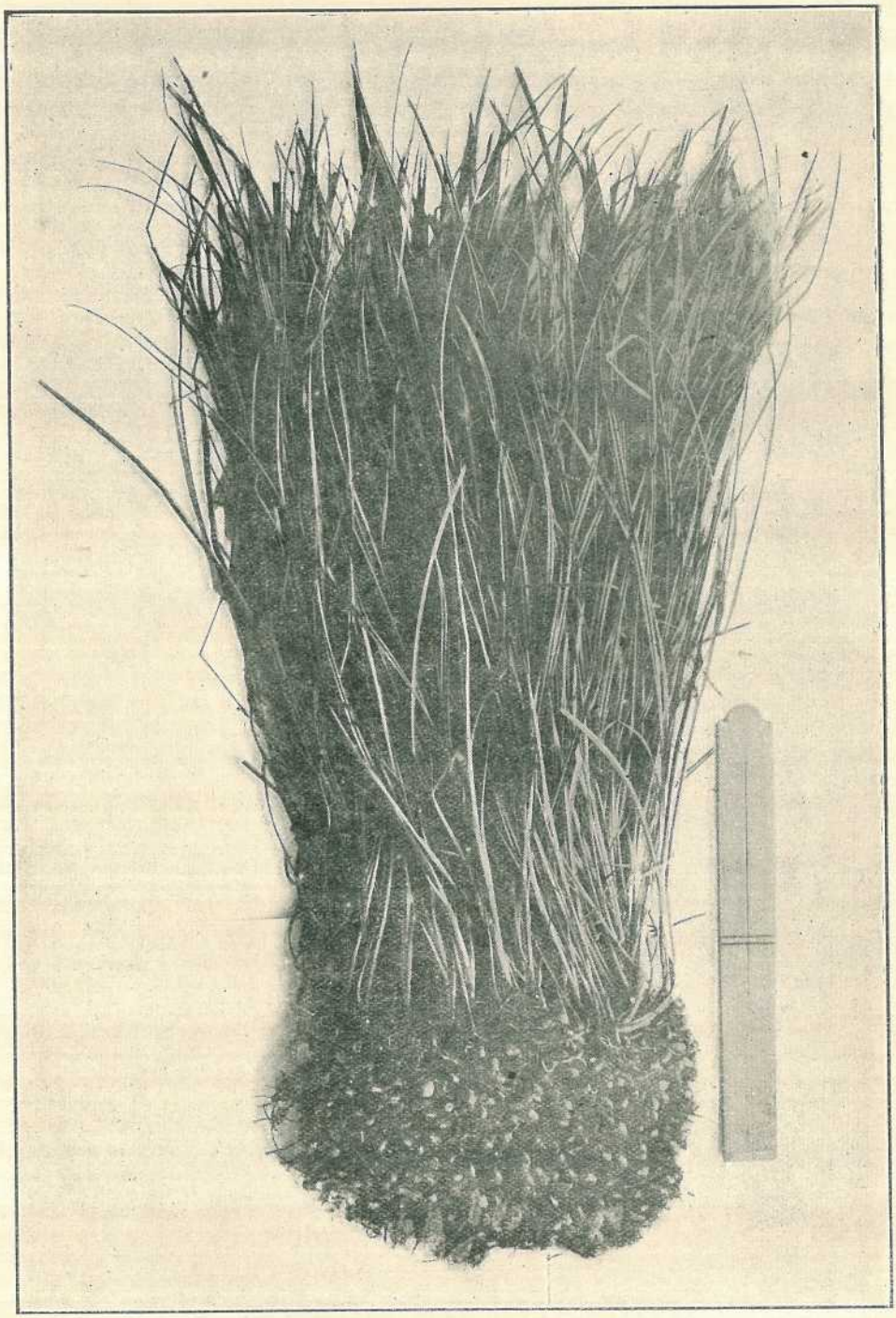


Plate 16.—Ground Almond (*Cyperus Esculentus*).
Showing Crop of Tubes or Nuts.

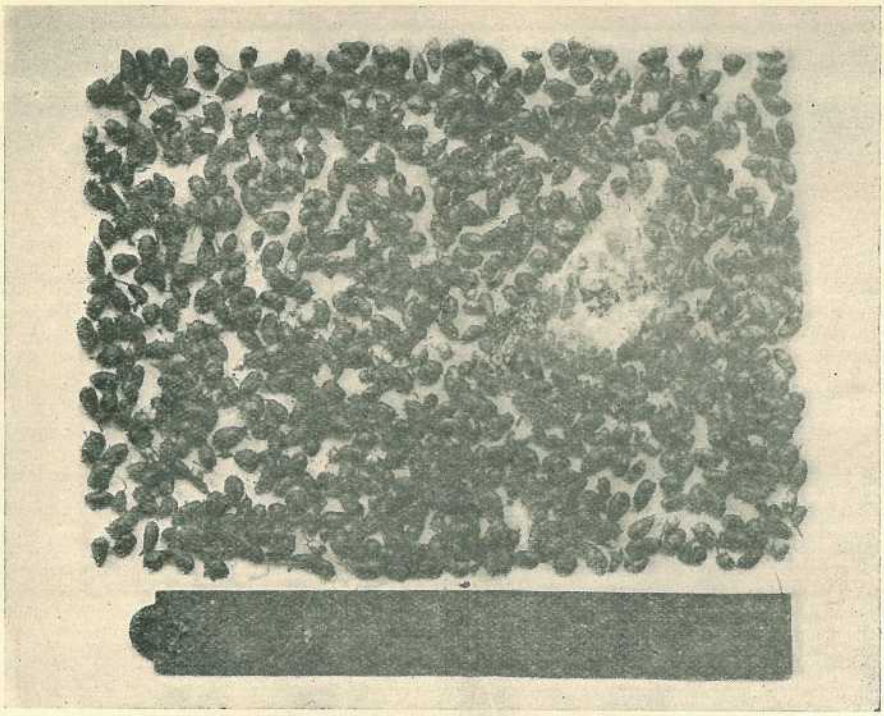


PLATE 17.—GROUND ALMONDS (*Cyperus Esculentus*).
Returns from one Stool or Plant.

are a fair substitute for coffee when properly roasted. The root crop is available in from four to six months. The plant may become important in the most dreary and arid desert countries through naturalisation. *C. esculentus* and *C. exaltatus* are used for mats.''

L. H. Bailey (''Cyclopedia of American Agriculture''):—''Chufa (*Cyperus esculentus*), sometimes known as earth almond. A perennial sedge that is frequently a noxious weed in low, damp places on Southern farms. It produces an abundance of small, cylindrical, underground tubers. The tubers or nuts are much relished by hogs. The hogs are generally turned on the field and allowed to harvest the crop. When cultivated, the nut has a fine flavour if properly dried. The crop does best on sandy soil that has been well fertilised. Heavy soils should be avoided. The rows are 2 ft. to 4 ft. apart, and the tubers set 12 in. to 15 in. apart in the row. The crop is recommended for fattening hogs.''

Dr. Lindley, in one of his botanical works, states that ''the roots of these plants (*Cyperus*) are succulent and filled with an agreeable and nutritive mucilage. The English species (*C. longus*) contains a bitter principle which gives its roots a tonic and stomachic quality. The tubers of *C. Hexastachys* are said to be successfully used in cases of cholera by Hindoo practitioners, who call the plant 'mootha.' Those of *C. Pertunnuis* are, when dried and pulverised, used by Indian ladies for scouring and perfuming their hair. The root of *C. odoratus* has a warm aromatic taste, and is given, in India, in infusions as a stomachic. The roots of some of the species are also used as an article of diet. *C. esculentus* yields tubers which are called by the French 'souchet comestible' or 'Amande de terre,' and are used as food in the South of Europe. According to Dr. Royle, they have been proposed as a substitute for coffee and cocoa when roasted.''

COTTON FROM NEW CALEDONIA.

In a letter from the Cotton Company of Havre on the subject of two shipments of cotton totalling 92 bales from Noumea, New Caledonia, for sale at the former port, published in the ''Revue Agricole'' (a publication issued by the New Caledonian

Chamber of Agriculture) last year, the following remarks on the classification of the shipments occur:—

"This lot is neither superior nor inferior to other arrivals of cotton from Noumea, but it shows a marked decrease in quality relatively to the lowest quality of that of preceding years. We attribute this falling off in quality—

(1) To the exhaustion of the soil, which is noted in all countries where cotton has been grown year after year in the same land.

(2) To the careless selection of the seed for resowing.

(3) To the fact that your planters allow the plants to remain too long without eradication and resowing. In Egypt cotton is resown every year. Your planters might, perhaps, leave their plants for two or three years in the same place; but they make a mistake, to the detriment of an average crop, when they allow the plants to occupy the ground for too long a period.

(4) To the increase in production in New Caledonia, and that, as a consequence, the means of ginning have not been sufficiently developed. The result is that the seed cotton awaits its turn at the ginnery for too long a time, and that, consequently, the oil from broken seeds discolours the fibre and gives rise to fermentation.

"We earnestly ask cotton planters to take serious note of the above observations. Our Caledonian type of cotton rightly is much appreciated by the buyers in the North of France, which is owing entirely to the specific qualities of its fibre, which are:— Length, strength, and elasticity. These are the qualities which must be maintained to ensure the high prices paid for it:—

(1) The cotton plant is an exhausting one, which especially requires potash. In the New Hebrides it is premature to talk of worn-out soils; but for New Caledonia the application of manure is absolutely necessary.

(2) All planters should be careful in their selection of seed. The wisest plan is to have some plants especially grown for seed purposes, and to choose the finest bolls, eliminating all badly-shaped capsules or any that show any defect.

(3) Our tree cottons should certainly not be retained indefinitely. They should be replaced in a very few years—as soon as they fail to yield abundantly.

(4) Our two ginning establishments are well equipped with machinery, and the reason for the cotton being often oil-stained appears to be that the farmers usually pack their crop in immense sacks placed under severe pressure, and the transport is charged at per sack instead of by weight.

"Many of these sacks sent to the gin-houses at Noumea contain up to 100 kilos (220 lb.) of cotton; and, to get that quantity into a sack, such forcible pressure is needed that the seed is crushed and the oil exudes.

"The best remedy for this would be to charge the freight on the actual weight of the consignment, and not on the number of sacks."

[The above is a translation of the French article, and contains some points of information which may well apply to the operations of Queensland cotton growers.—Ed. "Q.A.J."]

YIELD OF COTTON IN INDIA.

A considerable reduction is estimated in the yield of cotton of India for the 1920-21 season. The Department of Statistics, India, in its third forecast places the outturn at 3,621,000 bales of 400 lb. each, as compared with the revised estimate of 5,645,000 bales at the corresponding period a year earlier, or a decrease of 36 per cent. As compared with the final forecast of 1919-20, the present estimate shows a decrease of 38 per cent. The area sown to cotton for the current season is 19,704,000 acres, as against 22,179,000 acres for 1919-20, or a decrease of 11 per cent. The reduced yield is due to the prolonged drought which characterised the season in cotton-growing districts in 1920. The December estimate of the 1920-21 crop of the United States of America was 16,234,000 bales of 400 lb. As regards Egypt, the Ministry of Agriculture, Cairo, states that the weather, on the whole, has been favourable for the cotton crop. The first picking is finished, and the second had been taken in in most places at the time the report was issued. The average yield of the crop is below normal.

Seed Wheat for Disposal.

AT HERMITAGE STATE FARM.

This Department has been experimenting for a number of years with several varieties of wheat as a result of crossbreeding and selection work at Roma State Farm; some have consistently given satisfactory results, very often under adverse conditions. These are now being offered to wheatgrowers, in order that they may have the opportunity of acquiring seed of varieties which have been tested and found suitable to soil and climatic conditions in the wheatgrowing districts of the State.

Orders for the undermentioned varieties (which are illustrated and described elsewhere) should be directed to the Under Secretary, Department of Agriculture and Stock, Brisbane.

Remittance must accompany order, and, in the case of cheques, should have exchange added.

The price quoted for any of the varieties offered is 11s. per bushel, f.o.b. Hermitage.

VARIETIES.—"Inglewood," "Patriot," "The Prince," "Gundi."
(*See* accompanying illustration of three of the varieties.)

In addition to the above a limited quantity of "Amby" is also available at the same price.

Inglewood.—Mid-season variety. This is derived from a cross between Bunge and Federation Wheat, and has given consistent results in the South-Western wheat areas. The plant is of medium height, and on strong soils is inclined to carry a fair amount of flag. It stools well and possesses a straw of medium strength. Heads are of medium length, slightly tapering; non-bearded. The chaff is smooth and light-brown in colour. Grain of medium size, somewhat elongated in appearance; semi-translucent.

Patriot.—Derived from a selection made after crossing Bunge and a Durum wheat. A mid-season variety, of moderate stooling habit. Straw is of medium height and somewhat tough. Flag scanty. Head tapering, non-bearded, open appearance, and of medium length. Chaff smooth and of a pale-golden colour. Grain somewhat short; full-blosomed; semi-translucent.

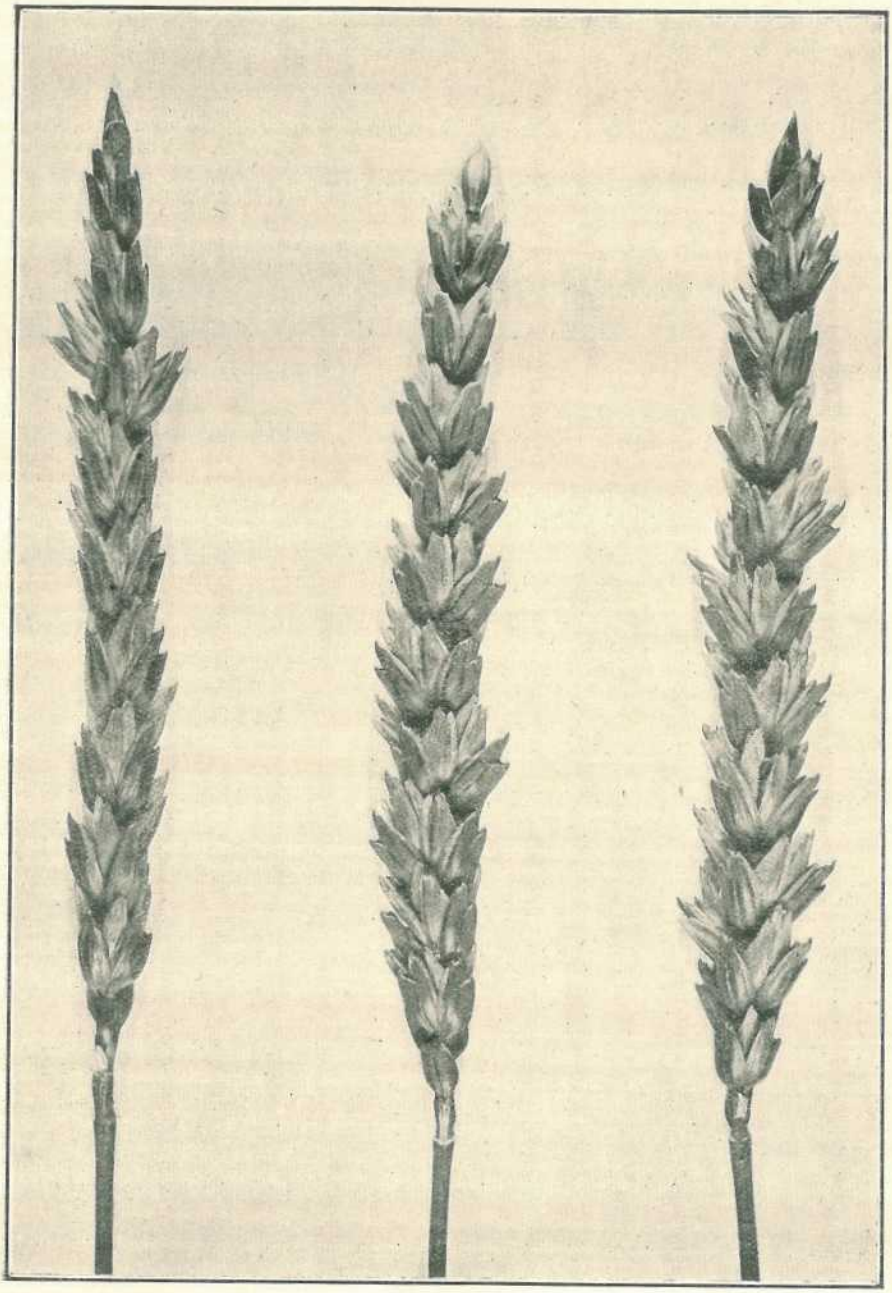


Plate 18.—Seed Wheat for Disposal.

The Prince.—A selected crossbred wheat; early mid-season variety, of fairly tall-growing habit, suitable for main-crop sowing. A good stooler, and carries very little flag. Head of medium length, open appearance, slightly tapering; non-bearded. Chaff smooth and of a pale-golden colour and somewhat closely attached to the grain, which is plump, full-bosomed, semi-translucent, and of medium hardness. Fairly resistant to rust.

Gundi.—A selection from a Bunge-Federation cross. A mid-season variety suitable for early sowing, of moderate stooling habit. It carries a medium amount of flag. Straw moderately stout and slightly under medium height. Head long and compact. Chaff smooth and light-brown in colour. Grain medium-sized; somewhat rough skinned; white in colour. This variety has given a yield of 37.2 bushels at Roma State Farm. More suited for Western and South-Western conditions than for the Downs.

Amby.—A popular variety suitable for main-crop sowing. It is a hardy mid-season variety and a good stooler, carrying a moderate amount of flag. Ears compact, non-bearded; chaff white and smooth. Grain plump and rather shotty in appearance; semi-translucent. Is an excellent milling wheat and has given good results in the principal wheat-growing districts.

AT STATE FARM, ROMA.

The following varieties of Seed Wheat are available for distribution from Roma State Farm. Price 11s. per bushel; free on trucks, Bungeworgorai:—

"Amby." **"Bunge No. 1."** **"Soutter's Early."**

Limited quantities of the following new wheats are also available at the same price:—

"Cedric." **"Inglewood."**

In the event of farmers desiring to have small quantities not exceeding 1 bushel of new varieties of Roma Crossbreds for trial this season, arrangements for their purchase may be made with the Manager at the same rate—*i.e.*, 11s. per bushel, free on trucks, Bungeworgorai.

Remittance, with exchange added, should accompany order, and be sent direct to the Manager, State Farm.

A NEGLECTED INDUSTRY.

Practically all members of the Capsicum family flourish in Queensland, and in many districts certain varieties are to be found growing wild, being looked upon in the light of mere weed growths. More particularly so is this the case in the smaller variety known as Bird's Eye (*C. minimum*), which is common to the scrub lands of the North, where its growth is phenomenally rapid.

A limited demand exists for this particular variety of the Capsicum family amongst bird seed merchants and cordial and condiment manufacturers; and it is thought that a profitable source of income could be derived from the systematic handling of a crop which flourishes in a wild state, and one which, if given cultivation on up-to-date lines, would well repay the amount of labour expended upon it.

At the present moment supplies of this class of Capsicum are being obtained from Zanzibar and Japan; and it is understood that the former product leaves much to be desired from the point of quality. Whilst we are content to import products of other lands and neglect those of our own which can be produced under the most favourable of conditions, so long will our progress be retarded; but, at the same time, it must be clearly understood that any product which is put on the market to oust that which is being imported must of necessity be equal to and, if possible, superior to it. This is the rock on which, unfortunately, too many are apt to go to pieces; and it is to the consistent producer of a good and reliable article that business will revert, and accounts for the fact that merchants prefer to buy oversea products which can be and are produced here of equal if not superior quality, but lack care and attention and, it might be added, common honesty in packing and placing on the market.

In connection with placing chillies on the market, the necessity of proper drying is emphasised; and with the moist climate of the North, sun-drying cannot be relied upon to produce a perfectly dry berry; consequently, some form of artificial evaporation would be necessary. The erection of a suitable evaporator need present no grave difficulties to the average man on the land who is at all conversant with the use of tools.

Emphasis must also be placed on the manner of harvesting the berries, which ripen somewhat unevenly and must of necessity be picked as they are ready. This necessitates going over the bushes at various intervals, as the inclusion of only partially ripe berries reflects on the bulk, resulting in unevenness of sample, the main source of complaint amongst buyers.

For those who are interested in the production of chillies, the following information may be of interest:—

A rich sandy loam is the most suitable for chillies, although satisfactory crops can be grown on a much heavier class of soil.

The plants are raised in seed beds, and, to produce plants which are hardy, robust, and even in growth, the seeds should be sown in drills spaced 8 in. or 9 in. apart. The bed must be kept watered, using a watering can with a fine "rose," and the plants protected from frost. The land should be ploughed deeply and reduced to a fine tilth; and when all danger from frosts is over, and sufficient moisture is present in the soil, plant out the seedlings when 5 in. to 6 in. in height in rows 3 ft. 6 in. apart, allowing 2 ft. 9 in. between the plants in the rows. Choose a cloudy day and, if possible, showery weather for transplanting.

Frequent cultivation is necessary until the plants become too advanced in height to permit the passage of horse and cultivator between the rows. Keep down all weed growths, and encourage a soil mulch as much as possible.

Picking.—The whole of the plants should be gone over about once a week as soon as the peppers begin to ripen, and all ripe fruit taken off. Care should be taken to pick portion of the stem with the berry. After picking they should be allowed to lie in the sun for a day, in order to toughen the stem and prevent damage to the base of the fruit whilst drying.

Where it is possible, the fruit may be dried effectively on gently sloping iron roofs, but must be carefully removed in the event of weather becoming showery, and must at all times be covered from dampness arising from dew.

Dampness in any form, once the berry has become partly dried, is fatal to the ultimate curing; and for this reason, in the humid climate of the North, evaporators are advocated.

Yields vary with soils and climatic conditions; but when these are favourable 1,100 lb. to 1,300 lb. per acre may be regarded as an average crop.

Present quotations for imported chillies are in the region of 1s. per lb.

For those interested, the following list of bird seed merchants and cordial manufacturers of Victoria may be of service:—

CORDIAL MANUFACTURERS.

Barret Bros., 43-5 Holden street, Fitzroy.
G. M. Brooke and Sons, Whiteman street, South Melbourne.
J. Dickson and Co. Pty., Ltd., 16 Abinger street, Richmond.
P. G. Dixon and Co. Pty. Ltd., 193 High street, Prahran.
G. H. Elliott, 45 Rathdown street, Carlton.
Frankston Springs Co., 34 Drummond street, Carlton.
H. J. Gabble, 179 Clausen street, Fitzroy.
John Gow, Ballarat road, Footscray.
Mrs. E. Gray, Cromwell street, Caulfield.
Richard Gray and Sons, Davison street, Richmond.
R. Harrison, 8 Spring street, Fitzroy.
Harrison San Miguel, 405 Elizabeth street, Melbourne.
Hepburn Spa Pty. Ltd., 314 Collins street, Melbourne.
Mrs. M. A. Jacobson, Geelong road, Footscray.
Marchant and Co., 34 York street, Richmond.
Moonee Valley Cordial Co., Miller street, North Fitzroy.
Robert Moseley, 183 Boundary street, North Melbourne.
O'Neill Bros., 11 Woodside street, North Fitzroy.
O.T. Ltd., 193 High street, Prahran.
F. Rogers, 19 Malmsbury street. Hawthorn.
E. Rowlands Pty. Ltd., 266 King street, Melbourne.
Schweppes Ltd., 39 Lithgow street, Abbotsford.
Sharpe Bros., 31 Garden street, South Yarra.
H. Taylor, 430 Rae street, North Fitzroy.
Wilcox Bros., Dandenong.

BIRD SEED MERCHANTS.

White and Hancock, 296 City road, South Melbourne.
W. J. Purves, 268 Swanston street, Melbourne.
Jas. Railton, 273 Swanston street, Melbourne.
Walters and Sons, 251 Swanston street, Melbourne.
F. H. Brunning Pty. Ltd., 64 Elizabeth street, Melbourne.
Farmer and Co., 474 Collins street, Melbourne.
Moran and Cato, 277 Brunswick street, Fitzroy.
Radcliffe Bros., 42 Victoria street, Brunswick.
Crook's National Store Pty. Ltd.., 217 Commercial road, South Yarra.
C. W. Mitchell, 524 Elizabeth street, Melbourne.
J. D. Howie and Co., 194 Smith street, Collingwood.
Jas. Jones, 204 Chapel street, Prahran.
Law Somner and Co., 139 Swanston street, Melbourne.
Evans Rees, 58 Bourke street, Melbourne.
J. G. Cooke and Co., 182 Commercial road, Prahran.
W. E. Ruttledge, 405 Bourke street, Melbourne.

Messrs. Henry Berry and Co., of Melbourne, are also buyers of bird's-eye chillies for the manufacture of cayenne pepper. Inquiries have also been directed to this Office by Mr. V. A. Wawn, manufacturing chemist, 44 Elizabeth street, Sydney, who is anxious to obtain reliable supplies.

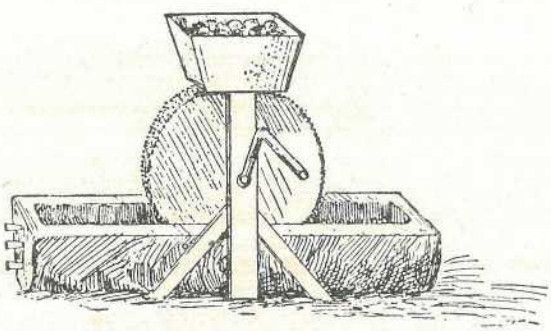
THE CULTIVATION AND MANUFACTURE OF ARROWROOT ON THE FARM.

In the dim past, arrowroot was grown on a small scale for home consumption, and it is surprising that while there are many farm products largely made use of for household purposes, and which do not require the aid of expensive machinery, arrowroot, the safest of semi-tropical crops and the least expensive to manipulate, should be neglected. There are two varieties of arrowroot which are grown in this State—viz., *Maranta arundinacæ* and *Canna edulis*, known to growers as White and Purple Arrowroot. Both are bulbous plants, but the purple sort is a far heavier bean than the white. It is from the bulbs that the arrowroot of commerce is obtained. The bulbs of the purple variety vary in size from 6 in. to 12 in. in circumference.

The smaller bulbs are used for plants. Wide furrows, about 6 in. deep, are run out about 4 ft. apart, and the bulbs are dropped in from 2 ft. to 3 ft. apart and covered by the plough or hoe. Planting time is about the months of September and

October. The plants grow rapidly, and in about three months attain a height of 5 to 6 ft. Meanwhile the bulbs are growing in a cluster around the base of the stem, to which they are firmly attached. From six to eight months bring the crop to maturity. A touch of frost aids it by shrivelling up the tops and concentrating the starch in the bulbs. When the tops wilt without frost the crop is ripe. The mass of bulbs to be dug up is so heavy that strong forks are needed for the purpose.

The only preparation for extracting the starch is to first thoroughly wash the bulbs, after which they are grated into pulp under water. The grater is a primitive affair made of a side of a kerosene tin, or a stronger one is made out of galvanised iron into which holes have been punched, with the rough grating side outward. The operator then grates the bulb against this, allowing pulp and starch to go into the water. The bulb is then quickly reduced to a dark brown mass of fibry-looking pulp. The starch being heaviest sinks to the bottom. The pulp, being lighter than the starch, floats almost to the surface of the water, and is easily removed. A good plan is to cover the tub or tin with porous linen and to grate the bulbs over this. The pulp remains on the linen, whilst the starch passes through it. When a certain quantity of bulbs have been grated (always into the water), one or more tubs are made ready to receive the starch from the first. This is worked by hand until the starch, further cleansed, has passed through the linen. If then not sufficiently cleansed, it is worked through another receptacle until no more feculencies are seen. When the starch, which always keeps at the bottom, is perfectly clean it is spread out in the sun or in a dry room upon cloth, and thus freed of the last remnant of moisture. When perfectly dry, it may be put into bags or boxes, and will keep even for years in good condition. For production on a large scale as to-day practised by arrowroot growers, special ingenious machinery is employed, reducing the expense of the cost of production, while the quality is improved, as it is scarcely handled from the time of leaving the field.



The yield of bulbs of the purple variety varies from 10 to 15 tons per acre, and 1 ton of bulbs gives rather more than 1 cwt. of manufactured arrowroot. The white variety (Bermuda arrowroot) is grown and manufactured in the same way as the purple, but the yield is much less. All this is very simple. Enough arrowroot can be produced on a very small plot of land to supply a family for a year or more, and the manufacture can be carried out doing wet weather when rainy weather prohibits work on the farm. A simple machine was made by the writer some years ago, which accelerated the process of grating.

The primitive machine which we used for arrowroot production was home-made, and answered the purpose admirably. First, a log of about 2 ft. in diameter and 8 ft. long was hollowed out by axe and adze into the form of a trough. At the head of this trough was fixed a framework much like the wooden stand of a grindstone, only, of course, much taller. A large wheel was then cut from a perfectly sound gum log, 3 ft. in diameter and 1 ft. wide. Tin plates, turned into graters (requiring frequent renewal), by punching holes in them with a flat, wrought-iron shingle nail, were nailed on to the edge of the wheel, to which a stout wooden axle and windlass handle were attached. The wheel was fixed so as to revolve in the water with which the trough was filled.

On top of the framework was a wooden hopper, in which the washed bulbs were placed, falling on the grating wheel. One man turned this with ease, and the bulbs, thus rapidly grated, fell into the trough in the shape of pulp and starch. The former was removed by a scoop, and the latter subsided to the bottom. The water was then gradually drawn off by removing successive pegs inserted into the lower end of the trough. The starch was then dug out and washed in the usual way. Such a machine is quite good enough for making arrowroot for home use. A consignment of arrowroot thus produced we sent to London and sold it at 2s. per lb.

Such a machine would answer equally well for grinding cassava.

Pastoral.

SHEEP BLOW-FLY DEMONSTRATION.

A demonstration in connection with the blowfly pest will be given at Dalmally Station during the second week in April. Many Queensland pastoralists, and also some from New South Wales, are expected to attend. The object of the demonstration is to illustrate the methods adopted at Dalmally to combat the ravages of the sheep fly.

The Horse.

THE PERCHERON: A BRITISH HORSE.

The Percheron horse became only known when the omnibuses of Paris began to use a grey horse bred in the Perche, Picardy, Flanders, and Poitou; and this horse became one with a real good reputation around 1848. Those who wrote about him from that time were Charles de Sourdeval, Ephrim Houel, Charles du Hays, Napoleon de Saint Albin, Eugene Gayot, and Andre Sanson.

Charles de Sourdeval says that the Percheron breed has had all its good qualities from a bay stallion coming from the Cotes du Nord. This stallion was Young Rattler by Old Rattler and a Snap mare. He had been imported in 1820 to France by M. Wollaston, who had a stud farm at the Chateau de Crenan, ner Quintin, Cotes du Nord. This horse was born in 1811, and lived till 1836.

This Young Rattler had a great many sons, all dapple greys, who were standing in Normandy and Perche, among them Regrette, Antenor, Malplaquet, Meriadec, Pegase, Young Antenor, Eminence, Mortagne, Oxigene, Envie, Francois I., Heliotrope, Oscar, Birmingham, Gorlitz, Herbouville, Ulysse, Flibustier, Opicrinus.

According to Ephrim Houel, the importation of Sandy in the Perche made a noted improvement to the breed. This Sandy was a grey stallion coming from England, and he was the sire of two extra good stallions—Conquerant and Sandy.

Another English stallion, Pretender (1829-1842), had a grey son, Omar, who was standing in the Perche. And then another Pretender, born also in England, in 1859, and standing in France from 1865 to 1881, sired the greys Grison, Ardoise, and Coquelicot, who were also used in the Perche country.

The Norfolk Phenomenon, born in England in 1845, and used in France from 1851 to 1872, has a grey son, Obligeant, who also was used in the Perche district.

The Percheron horse owes, then, most of his qualities to the Hackney breed of England. This is absolutely sure, as the proofs are given here.

Charles du Hays did not say that the Percheron horse was descended from the Arabian horse. He wrote: "He has that beautiful grey robe of the Oriental horse," but nothing else.

Eugene Gayot, who has been the most prolific writer on French horses during the nineteenth century, does not give an Arabian origin to the Percheron horse. His opinion is that the Perche country was the sole factor able to make a Percheron horse, even if the colts were imported from the Cotentin, the Vendee, and the Poitou:—"Britons, Boulonneses, Bourbourians, Flemish, Cauchois, Piccards, &c., are becoming Percherons under the climate and conditions of the Perche."

If England wants now to make a cart horse that is able to trot, the foundation stock should be the English Hackney sire crossed on draught mares. By selection and feeding, the Hackney horse could be turned into a light draught horse. In Belgium around 1885-1890 the best light draught horses, named Ardennese, were made by using a Belgian horse on a Hackney mare. The Belgian horse himself is only an overgrown Hackney; he has the same points, the same action, but he weighs 700 lb. more. This is proof that the Hackney must have been used in the creation of the Belgian horse, and if he can make such a heavy horse he must be able to make a lighter one—*i.e.*, a cart horse that is able to trot.—"Farmer and Stockbreeder."

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, FEBRUARY, 1921.

There was a remarkable decrease in the output during the month, due to the number of birds in moult. The laying of the groups was satisfactory, and, if anything, there is not so much moulting taking place in this section as amongst the single hen pens. Among the latter it is noticeable that the birds that have been troublesome through broodiness are the ones that are moulting, and also, at the same time, taking a longer period to come into lay again. There were two deaths during the month. Mrs. Anderson lost her E. bird from ovarian trouble, and E. A. Walters his through snakebite. The following are the individual records:—

Competitors.	Breed.	Feb.	Total.
	LIGHT BREEDS.		
*Geo. Trapp	White Leghorns	116	1,418
*O. W. J. Whitman	Do.	104	1,388
*Haden Poultry Farm	Do.	87	1,372
*J. M. Manson	Do.	117	1,363
*J. Newton	Do.	107	1,352
*Quinn's Post Poultry Farm	Do.	94	1,337
*L. G. Innes	Do.	114	1,332
Mrs. R. Hodge	Do.	119	1,323
*W. Becker	Do.	93	1,322
*J. J. Davies	Do.	84	1,319
Geo. Lawson	Do.	86	1,319
*Dr. E. C. Jennings	Do.	87	1,319
*N. A. Singer	Do.	78	1,314
*E. A. Smith	Do.	106	1,301
*T. Fanning	Do.	111	1,296
*W. and W. G. Hindes	Do.	112	1,268
*G. Williams	Do.	92	1,259
*J. H. Jones	Do.	88	1,259
*H. Fraser	Do.	95	1,253
*Thos. Taylor	Do.	109	1,243
*Mrs. L. Anderson	Do.	86	1,233
*B. Chester	Do.	79	1,219
*Mrs. L. Henderson	Do.	100	1,217
S. L. Grenier	Do.	100	1,215
*S. McPherson	Do.	84	1,195
Thos. Eyre	Do.	94	1,186
*Range Poultry Farm	Do.	75	1,158
E. Chester	Do.	96	1,147
Avondale Poultry Farm	Do.	113	1,139
H. P. Clarke	Do.	112	1,130
*S. W. Rooney	Do.	86	1,127
S. Chapman	Do.	110	1,118
R. C. J. Turner	Do.	92	1,097
C. Langbecker	Do.	83	1,095
H. A. Mason	Do.	112	1,092
W. Morrissey	Do.	88	1,091
C. M. Pickering	Do.	82	1,063
C. A. Goos	Do.	113	1,039
W. D. Evans	Do.	102	1,021
C. H. Towers	Do.	70	1,015
A. J. Andersson	Do.	77	977
Miss E. M. Ellis	Do.	Withdrawn	583

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Feb.	Total.
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	90	1,354
*A. Shanks	Do.	98	1,352
*E. F. Dennis	Do.	84	1,325
*R. Holmes	Do.	65	1,283
*E. Morris	Do.	97	1,277
*A. Gaydon	Do.	60	1,247
*D. Fulton	Do.	78	1,237
*J. Cornwell	Do.	100	1,227
H. M. Chaille	Do.	94	1,207
*W. Smith	Do.	83	1,192
*A. E. Walters	Do.	64	1,164
Mrs. G. H. Kettle	Do.	112	1,161
*E. Oakes	Do.	62	1,156
Parisian Poultry Farm	Do.	95	1,148
*R. B. Sparrow	Do.	84	1,142
J. E. Smith	Do.	80	1,129
*T. Hindley	Do.	67	1,128
G. Muir	Do.	98	1,110
R. C. Cole	Do.	71	1,086
*J. E. Ferguson	Chinese Langshans ...	79	1,026
*E. Stephenson	Black Orpingtons ...	70	1,021
*Nobby Poultry Farm	Do.	49	976
G. Flugge	Do.	103	943
Total	...	5,836	77,405

* Indicates that the pen is being single tested.

RESULTS OF SINGLE PEN TESTS.

Competitors.	A.	B.	C	D.	E.	F.	Total.
LIGHT BREEDS.							
G. Trapp	245	239	257	214	243	220	1,418
O. W. J. Whitman	224	219	255	233	206	251	1,388
Haden Poultry Farm	250	190	236	248	220	228	1,372
J. M. Manson	203	236	245	238	227	214	1,363
J. Newton	249	219	236	165	242	241	1,352
Quinn's Post Poultry Farm ..	248	232	233	195	202	227	1,337
L. G. Innes	174	212	233	250	249	214	1,332
W. Becker	234	225	235	219	193	216	1,322
J. J. Davies	238	226	227	190	232	206	1,319
Dr. Jennings	165	258	201	207	230	258	1,319
N. A. Singer	238	186	225	259	211	200	1,314
E. A. Smith	220	176	239	218	218	230	1,301
T. Fanning	118	233	220	238	249	238	1,296
W. and W. G. Hindes	197	221	186	231	218	215	1,268
J. H. Jones	213	208	218	228	212	180	1,259
G. Williams	191	217	222	213	233	183	1,259
H. Fraser	150	218	230	227	224	204	1,253
Thos. Taylor	237	209	178	227	201	191	1,243
Mrs. L. Anderson	245	227	220	190	162	189	1,233
B. Chester	218	187	225	187	212	190	1,219
Mrs. Henderson	182	205	215	192	222	201	1,217
S. McPherson	243	246	91D	138	252	225	1,195
Range Poultry Farm	143	182	215	255	177	206	1,158
S. W. Rooney	168	176	220	168	190	205	1,127

RESULTS OF SINGLE PEN TESTS—*continued.*

——	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	231	215	262	197	225	224	1,354
A. Shanks	191	243	215	270	187	246	1,352
E. F. Dennis	240	216	184	253	213	219	1,325
R. Holmes	202	206	211	222	238	204	1,283
E. Morris	222	217	219	177	226	216	1,277
A. Gaydon	195	263	206	174	170	239	1,247
D. Fulton	218	219	198	233	92	277	1,237
J. Cornwell	209	227	214	141	201	235	1,227
W. Smith	110	241	217	225	204	195	1,192
A. E. Walters	187	194	175	214	164	230	1,164
E. Oakes	174	242	178	102	220	239	1,156
R. B. Sparrow	209	137	210	183	176	227	1,142
T. Hindley	203	236	198	174	146	176	1,128
J. E. Ferguson	144	169	129	180	218	186	1,026
E. Stephenson	192	158	200	183	149	139	1,021
Nobby Poultry Farm	190	258	86	262	160	20	976

CUTHBERT POTTS,
Principal.

POULTRY CONFERENCE AT THE QUEENSLAND AGRICULTURAL COLLEGE, 19TH MARCH, 1921.

In compliance with the request expressed at the last Poultry Conference, held in September, 1920, the date of meeting was altered to March. Unfortunately, there were several conflicting appointments in the poultry world last Saturday; further, the weather was threatening; in consequence, there was not as large an attendance as might have been expected. However, as so often happens in these cases, the matter for discussion and the result arrived at are likely to be of exceptional value to all poultrymen.

On arrival the visitors were received by the Principal of the College, Mr. Cuthbert Potts, B.A., and the College Poultry Instructor, Mr. Harwood.

The morning was devoted to an examination of the competition birds and a general discussion on type, period for hatching, feeding, and general poultry management. It is impossible to give a report of this section of the conference; but it cannot be stressed too strongly that the mutual interchange of ideas and experience is of vast importance to those poultrymen who attend these conferences. This value of the meeting is certainly greatly amplified because of Mr. Harwood, a keen enthusiast, who has under his control each year the birds of some seventy different breeders. When Mr. Harwood talks on the various characteristics of these competing pens, it is an education.

After lunch, all present assembled in the lecture hall; and the Principal, as chairman, placed before the conference a suggestion for the inclusion of a cockerel test. In the course of his remarks Mr. Cuthbert Potts pointed out that the idea of this test was not altogether new. It had been strongly advocated at the last conference in September, 1920. As illustrating that others had arrived at the same conclusion—viz., that a cockerel test was essential if we were to obtain a permanent improvement in our poultry—Mr. Potts read a paragraph from the "Feathered World," stating that the Harper-Adams Agricultural College was about to institute a male bird test. It was claimed that the Harper-Adams College was the first to move in this direction; but he thought that this claim might not be entirely correct, as the date of the "Feathered World" was 10th December, 1920; whereas a possible cockerel test had been outlined at our September conference.

The scheme was then briefly outlined, and was subjected to keen criticism. Finally, it was unanimously agreed that the competitors present would support the scheme; and the details of the contest were left for the College to draft out.

In effect, the test will be somewhat as follows:—

Several leading competitors in the current competition, whose birds conform to type, weight of egg, &c., will be offered the opportunity to have a cockerel tested.

The breeding of any such cockerel must be known and stated.

The bird will be mated with three of the competitors' best pullets, as determined in the current test, and also with three approved indiferent layers.

During the mating season each pullet will be trap-nested until a sufficient number of eggs has been obtained to ensure that, on incubation, at least six pullets will result from each individual mating.

These pullets will be trap-nested for the full next year, commencing from 1st April.

Should all the female progeny of any cockerel prove to be high producers, such cockerel will receive a certificate by seal ring, and all his male progeny out of the proved high producing mothers will also be retained. One or more of them may be carried on for further test or they may be sold for the owner under the College supervision.

By the above test it is hoped to demonstrate whether high fecundity is transmitted by the male bird, and, if so, to establish a strain whose male birds will have a hearted support.

It is to be hoped that all poultrymen will give this proposed test their whole-hearted support.

PUBLIC CURATOR OFFICE.

A BUSINESS PROPOSITION FOR THE FUTURE.

All over Queensland there are families whose happiness is the result of foresight of men who while still living have made wise provision for the future. There are over 12,000 of these men who have made wise provision for the future of their families by making Wills, appointing the Public Curator their Executor and Trustee.

One of these men, who is typical of many others, looked into the face of his loved ones and thought:—"They are happy now; but how can I ensure their happiness in the years to come?"

He made a Will. For his wife, inexperienced in business matters, he placed a trust fund to protect her against the tragedy of ill-advised investments. For his children's education, he set aside a special fund. For his boys, he provided that their whole share of the estate should be paid to them at a matured age. For his daughters, he provided that their shares should be kept in trust during their lives, so that, married or single, they would be financially independent.

Then came the question: Who was to carry out these trusts? He decided that it would be unfair to his wife to ask her to manage property, which it had taken his utmost labour and efforts to accumulate; nor did he think it a fair thing to appoint any of his friends, no matter how trustworthy they might be, Executors under his Will, for they might die at any time, and throw the administration of his estate into hopeless confusion.

This prudent man appointed the Public Curator of Queensland Executor and Trustee, because he had attributes and powers which no private person had, such as State guarantee, continuous existence, accumulated experience, financial responsibility, perfected machinery of administration, and an experienced legal staff to carry out all the legal work of administration without extra cost to the estate.

Therefore, to-day, long after this man's death, the Public Curator is serving his family from year to year, his officers acting with understanding of each individual's needs, while observing a strict impartiality.

As this man made provision, so any man can provide, in proportion to his desires and means, for his family's future.

A pamphlet giving full information concerning the Public Curator Office may be had on application, either to the Public Curator in Brisbane, to his Local Deputies at Rockhampton and Townsville, or to any Clerk of Petty Sessions in the State.

Elizabeth street, Brisbane,
25th February, 1921.

Dairying.

WHAT THE BULL MEANS TO THE HERD.

"South Downer" contributes the following advice to dairy farmers in England (in the "Live Stock Journal"), which should also be considered by Queensland owners of dairy herds:—

With the lesson "Pedigree Pays" so constantly before his eyes in 1920, we must hope that the ordinary tenant-farmer—the man who, although anxious that his cows should yield well, yet rather turns up his nose at pedigree—will learn the obvious lesson and endeavour to build up a herd of pure-bred cattle.

To the man with a real love for well-bred stock the type of bull used in the past in such herds has been somewhat appalling, the axiom "anything will do so long as he gets a calf" having been carried to the extreme limit; but, luckily for the good of the breeds in this country, this pernicious notion is fast dying out, and there seems to be a real desire on the part of the small man to grade up his stock to a higher level.

The influence of a good bull on a herd can hardly be over-estimated, for he has it in his power to make or mar its future progress in the world.

Authorities on breeding are in agreement that a breeder will never advance his herd on the upward path unless he employs bulls of better class than his own females, and this, therefore, should be the aim of the farmer.

Where milk is desired only pedigree bulls of proved milk-yielding strain should be used, and preferably a bull whose heavy milk-yielding ancestors go back as far as the third dam on each side. "Breed both ways for milk," say some of the older farmers, and experience has proved them right.

That great judge of Dairy Shorthorns, Mr. R. W. Hobbs (now, unhappily, deceased), in speaking of the selection of a bull, said: "My advice is in every case to secure the best, and before making a purchase see his dam if possible. One should not be satisfied with the milk record only, but should also be assured that the bull comes from a good cow with a shapely udder. . . . . The purchaser must be most particular that the sire of his bull likewise comes from a good milking family, and it will be much in the bull's favour if heifers by his sire can be seen showing good udders and milking well." Advice from such a source is worth its weight in gold to the ordinary man.

The unrestricted slaughter of calves has seriously depleted our stock of milch cattle, and now it behoves our farmers when building up the stock to breed only the best. The whole world is in keen competition for our pedigree stock. Never has there been such a world-wide demand, and it is up to us to satisfy it, and maintain our proud position as the "stud farm of the world."

It is being done, and can continue to be accomplished, certainly without the aid of imported stock, which would prove to be but the "thin end of the wedge." That is an innovation British farmers must sturdily set their faces against.

But in speaking of the bull as "half the herd" we must bear in mind that it is well-nigh useless to expect improvement in the herd unless it is found out which cows are of no use in the herd, and this can easily be done by means of carefully kept milk records.

By the careful weighing of each cow's milk morning and evening, in a little while it can be discovered which cows should be disposed of as quickly as possible. It is waste of time to feed the unprofitable cow; moreover, there is no place for her in this workaday world of utility cattle. She should be fatted out and sold.

Once more, may we say that while so much depends upon the wise choice of a bull, yet we must not forget that we owe it to the sire to give him a decent foundation stock on which to build. It is only by such means that we can hope to form a really successful herd.

HOW DAIRYING PAYS.

A correspondent at Dorrigo (New South Wales), who owns a herd of twenty-one cows, states that his butter returns from these cows averaged 9 lb. per cow per week. At 2s. 2½d. per lb., he received £85 from the factory in the month of December, 1920. Thus each cow was worth £4 odd. With reference to this, Mr. Graham, Chief Dairy Expert, Department of Agriculture, Queensland, states that several herds within this State have yielded an average of butter-fat quite equal to and, in some cases, slightly higher than that mentioned by the Dorrigo dairy farmer.

PIG FEEDING WITH JUDGMENT.

A light and sparing diet should be given after farrowing, as many sows are feverish. Gruel, oatmeal porridge, whey, and such like should be the diet until the sow regains some of her strength. In a case of being debilitated and requiring strength, strong soup, bread steeped in wine or in a mixture of brandy and sweet spirits of nitre, administered in small quantities, will often prove beneficial. Gradually the rations must be increased and given more frequently. They may consist of all kinds of roots, carrots, turnips, potatoes, and beetroot, well steamed or boiled, and never given raw. Bran, barley, oatmeal and bean flour, Indian corn, whey, sour milk and butter milk are all perfectly adapted for this period.

Should the animal appear to require it grain, well bruised and macerated, may also be added. Bean flour is considered by many to create an abundance of milk, and there are some who think barley meal is too stimulating, and they advise that it should never be used alone, but always one-third oatmeal to two-thirds of the barley meal. Whenever it is possible the sow should be turned out for an hour each day to graze in a meadow or clover field, as the fresh air and exercise and herbage will do her an infinity of good. The young pigs should be weaned when they are from eight to ten weeks old. Some are weaned as early as six weeks. The weaning should be done gradually, being allowed to suck six times a day, then four times, and at last only once.

There is little doubt that many cases of sickness occur among pigs through their being fed upon food which, in regard both to quantity and quality, would be better suited to the late autumn or winter season than to the present time. At those seasons demands are made upon the system which call for a good supply of rich food to keep up the bodily heat of the animals and enable them to withstand the effects of cold and inclement weather. In summer the conditions are changed, the animal heat being kept up with little effort, and thus it is that a lighter diet should be fed to the pigs during hot weather. Instead of giving them their food in a thick porridge-like mass, as is the case in winter time, thin it down well with some good sweet whey, kitchen slops, or waste milk. The animals will drink this with a relish, and it will be better for them in every way than thick, heavy food.

It makes all the difference in the profits whether the sow produces good strong pigs and then feeds them well, or produces a litter of weaklings and then has nothing for them to eat; whether her system is nice and cool, or feverish and hot. In the one case she will be good-natured and let the pigs suck, and will furnish plenty of milk; in the other, fretful and peevish, and the chances are that she will eat her pigs as soon as born. These conditions depend very largely, if not entirely, upon the way the sow is treated and fed during pregnancy. It is an almost unheard of occurrence for a brood sow running out on good pastures ever to eat a pig. Sows are not cannibals by nature, and are only made so by the ignorance or foolishness of the owner. The best food for a sow is coarse wheat middlings or reground bran, or bran and middlings may be mixed half-and-half, which should be made into a stiff mass with skim milk if possible; if not, with the house slops or water.—''Live Stock Journal.''

DRYING TOMATOES.

There are many ways of drying that perfect esculent, and thus preserve it under a condensed form, easy to keep, easy to carry, and most handy to use.

The best known is the following, given us some time ago by Mr. H. A. Tardent when manager of Westbrook State Farm:—Take good, fleshy tomatoes and place them in a tinned copper boiler. Boil over a moderate fire until the skins separate from the flesh; then pass through a sieve to strain off the skins and seeds. Then boil again to evaporate as much moisture as possible without burning. Then pour out on to plates, saucers, or shallow dishes (for commercial purposes, square, specially-made moulds are better, as the dried tablets thus pack well in cases). The pulp should not be thicker than in half-inch layers. Then expose to sun and wind, taking care to cover the moulds with sheets of butter-cloth, as flies are apt to deposit eggs in the pulp.

Stir, also, occasionally, the crust which forms on the surface, as otherwise the moisture cannot escape, and this would engender mouldiness under the crust. The process is greatly hastened by finishing the drying in a cool oven, or, if available, in an evaporator. When the tablets are thoroughly dry, let them cool, and pack in airtight boxes.

The Orchard.

INTERSTATE CONFERENCE OF FRUITGROWERS AND GOVERNMENT FRUIT EXPERTS.

An Interstate Conference of fruitgrowers and Government fruit experts, convened by the Commonwealth Government, was recently held in Melbourne. There were present:—Messrs. W. J. Hannaford (representing South Australian growers); G. Quinn (South Australian Government); R. W. Peacock (New South Wales growers); Allen (New South Wales Government); Wayman (Queensland growers); Lang (Victorian growers); Carmody (Victorian Government); Scott (Tasmanian growers); Ward (Tasmanian Government); Boardman (Australian Fruitgrowers' Conference), Meeking (Commonwealth Government); Wickens (Western Australian Government); and Ramage (representing Western Australian growers).

After consideration the following resolutions were carried and forwarded to the Minister for Trade and Customs:—(1) That this conference affirms the desirability of adopting standardised methods of grading and packing apples and pears for export for overseas markets. (2) That the standards for packing and grading apples, and also for sizes and measurements of apple and pear packages, be in accordance with the following:—

APPLES.

(1) They shall be packed in three grades; (2) they shall be packed in packages of prescribed sizes; (3) the packages shall be legibly and durably branded with the following:—(*a*) The initials of the christian name and full surname and address of the grower or exporter or his registered brand, or, in the case of a firm or corporation, with the firm or corporate name and address or registered brand, on one end of the package in letters of not less than one-half an inch in length; (*b*) the designation of the grade (''Extra Fancy,'' ''Fancy'' or ''Choice,'' as the case may be) in letters of not less than one-quarter of an inch in length on printed paper labels, and not less than three-quarters of an inch if stencilled on cases. (4) Apples for export must be graded into one of three grades—viz., ''Extra Fancy,'' ''Fancy,'' and ''Choice'' —specific details of which are set out hereunder. The fruit in all grades shall be so packed that the outer layers or shown surfaces shall be a true indication of the average grade of the fruit throughout the package. Apples of only one size and one variety shall be packed in any one case of any grade. (5) ''Extra Fancy'' apples shall consist of sound, clean, well-formed apples. They must be free from all insect, fungus, visible bitter pit, and other blemishes. Full coloured varieties of this brand shall have each apple coloured to the extent of not less than one-half (50 per cent.) of its skin with good red colouring. Striped varieties must not have less than one-third (33⅓ per cent.) of their surfaces coloured with distinct red stripes or streaks. Yellow and green varieties shall be even in colour, but may show flushes of another colour where such are natural to their respective kinds. ''Fancy'' apples shall consist of sound, well-formed apples, free from visible bitter pit and serious blemishes (excepting blemishes caused by rubbing, black spot, or caterpillars). A maximum of 10 per cent. of the whole of such apples in a case shall be allowed black spot markings not exceeding in extent upon each such apple the area contained in a circle of which the diameter is one-quarter of an inch. Full coloured varieties of this kind shall have each apple coloured up to the extent of at least one-third (33⅓ per cent.) of its skin with good red colour. Striped varieties shall be distinctly striped or streaked over not less than one-tenth (10 per cent.) of their skin surfaces. Yellow or green varieties shall be even in colour, but may show flushes of another colour where such are natural to their respective kinds. Not more than one-tenth (10 per cent.) of the fruit in a case may carry blemishes. ''Choice'' apples shall consist of apples true to name, skin unbroken, reasonably free from visible bitter pit. Slightly blemished apples may be packed, but such blemishes shall not exceed 20 per cent. in a case. A maximum of 10 per cent. of the whole of such apples in a case may be allowed black spot markings not exceeding in extent upon each apple the area contained in a circle of which the diameter is three-eighths of an inch. Russeting of the apple not to be considered a blemish. (6) The apples in each grade shall be in size as follows:—''Extra Fancy,'' not less than 2½ in. in diameter, excepting that normally small varieties may consist of specimens of not less than 2¼ in. in diameter. ''Fancy,'' not less than 2¼ in. in diameter. ''Choice,'' not less than 2 in. in diameter. The size of the fruit contained shall be marked on the package in figures of not less than one-quarter of an inch on

printed labels, and not less than three-quarters of an inch if stencilled on the case. A variation in size to the extent of one-quarter of an inch, that is one-eighth of an inch above or below the marked size, may be allowed, except in the case of minimum sizes.

PEARS.

(7) Pears must be graded in similar grades to apples, and each package shall only contain pears of a uniform size, without restriction as to size of any variety in the "Choice" grade. Provided that a variation of not more than one-quarter of an inch—that is, one-eighth of an inch above or below the marked size, may be allowed. Colour requirements need not be considered as are required for apples. Other requirements as to blemishes and black spot shall apply equally to pears and apples in the respective grades.

SIZE OF PACKAGES.

(8) In all bushel cases a variation of 6 per cent—that is, 3 per cent. under or 3 per cent. above—of the total cubic capacity of the case may be allowed.

(9) Apples and pears for export shall be packed in one of the following packages:—

Australian bushel—18 in. long by 14¼ in. deep by 8⅜ in. wide.

Canadian bushel—20 in. long by 10 in. deep by 11½ in. wide.

Flat bushel—26 in. long by 14¼ in. deep by 6 in. wide—clear of divisions.

Three-quarter flat bushel—24 in. long by 11¾ in. deep by 6 in. wide—clear of divisions.

Australian half bushel—18 in. long by 8⅜ in. deep by 7⅛ in. wide.

Half flat bushel—26 in. long by 7⅛ in. deep by 6 in. wide—clear of divisions.

Pear tray—18 in. long by 3¼ in. deep by 14¼ in. wide.

Pear tray—18 in. long by 2⅜ in. deep by 14¼ in. wide.

The measurements given are to be the inside dimensions of the cases.

FERTILISERS FOR FRUIT.

When it is considered that the yearly production of fruit in an orchard is a continuous system of cropping, and is even more exhaustive than ordinary mixed farming, the need for fertilisers can be easily understood. Artificial manures are necessary to restore fertility, and it must also be borne in mind that the stimulus given to growth by judicious manuring enables fruit plants to withstand disease and adverse conditions.

With the extension of fruitgrowing within recent years, more attention has now to be given to the production of a larger proportion of first-grade fruit. On soils which are naturally suited for fruit cultures, normal crops of average quality may be grown without fertilisers, but consistent yields of fruit of superior quality can only be got by liberal manuring.

To get the best results the application of fertilisers must be co-ordinated with thorough cultivation. Land intended for fruit growing ought to be deeply cultivated previous to planting; and to ensure good drainage it is advisable to have the subsoil broken up. The trees and bushes should not be crowded closely together. If well set apart there will be a better distribution of air and light around each plant when the orchard reaches maturity. During the growing season the surface under the trees and bushes should be frequently stirred to prevent evaporation, and the intervening space ought to be dug or cultivated at least twice a year.

The fruitgrower must find out for himself the fertilisers which give the best returns under his own particular set of conditions. The essential constituents—nitrogen, potash, phosphoric acid, and lime—have to be applied in amounts suitable for the special requirements of the different fruit crops, and in accordance with the variations of soil and climate. Without an adequate supply of each of these elements of fertility, the best results cannot be expected.

NITROGEN.

Nitrogen promotes a healthy growth of foliage, and this in turn gives rise to a stronger and more extended root system. It induces an early and vigorous development of the buds and young wood. Nitrogenous fertilisers should be used in conjunction with potash and phosphates to ensure a full crop. Stable manure and nitrogenous fertilisers supplying organic matter are very beneficial for young orchards on light soils.

POTASH.

Potash is pre-eminently the fertiliser which produces quality. It forms a large part of the ash of fruit trees, and is really the dominant plant food for the production of fruit crops. It plays an important part in the ripening of the wood and in the setting of the buds and blossoms, and is most essential for the formation of sugar in the fruit. Where potash manures are regularly applied to fruit crops, they grow a stronger and healthier foliage and give a heavier yield of large-sized fruit of exceptionally fine taste, colour, and aroma. It is frequently observed that wine from vineyards manured with potash is of a superior quality.

The different grades of potash salts produced by the Alsatian mines, now under French control, can be relied upon to give good results on all fruit crops. Muriate of potash and French manure salts, 20 per cent. and 30 per cent., are the grades of potash principally used by the viticulturists in France. Applied in this form in the autumn or winter, along with phosphates and organic manures, potash gives a very profitable return.

PHOSPHORIC ACID.

Phosphates exert a considerable influence on the formation of the seed, and subsequently on the ripening of the fruit. They prevent exuberant growth of wood and foliage, and promote development of the buds and flowers.

LIME.

Lime counteracts acidity in the soil and helps to break down organic manures. As a base it sets free plant food and furthers the action of the fertilisers. It improves the texture of the soil and thereby gives better drainage. Lime is required in considerable quantities by all fruit plants, and more especially by stone fruits. Good results will be got by applying a heavy dressing of lime (12 cwt. to 15 cwt. per acre) every few years.

The productiveness of an orchard depends on so many factors that no hard-and-fast rules can be laid down with regard to manuring and other treatment. Under average conditions, however, the following quantities of fertilisers have given consistently good returns:—

Potash.—1½ cwt. muriate of potash or 3-4 cwt. French manure salts, 20 per cent., per acre.

Phosphates.—2 cwt. superphosphate or 3-4 cwt. basic slag per acre.

Nitrogen.—1-2 cwt. sulphate of ammonia per acre.

FERTILISERS FOR APPLES AND PEARS.

Both apples and pears may be grown successfully on any average soil if it is well drained, but generally the better the soil the heavier the yields. They readily exhaust the available plant food in the soil, and consequently often deteriorate into bearing a crop only every other year. To obtain successive crops of apples and pears it is necessary to apply complete well-balanced manures. Green manuring, or an application of well-rotted dung, 10 to 15 tons per acre, along with a dressing of phosphates and potash in the autumn after pruning, will prove very beneficial.

The following proportions of artificial manures are recommended:—

Per acre (distributed broadcast).—2 cwt. of superphosphates, 4 cwt. French manure salts, 20 per cent.

Per tree, for young orchards (distributed round the trees).—1½ lb. of bone meal, 1 lb. muriate of potash, 1 lb. sulphate of ammonia.

STONE FRUITS (PLUMS, PEACHES, CHERRIES, DAMSONS, APRICOTS, ETC.)

These fruits do best on rich, deep loam, overlying calcareous sandstone. They require a soil which is neither too wet nor too dry. Stone fruits are readily damaged by dry conditions. To prevent this, the surface soil should be kept loose by constant hoeing. As a good deal of lime is required for the formation of the stone, regular dressings of lime should be given if the soil is not naturally calcareous.

The following manures give good results on stone fruits:—

Per acre.—3 cwt. of bone meal, 3-4 cwt. French manure salts, 30 per cent.

Per tree, for young orchards (distributed round the trees).—2 lb. bone meal, 1 lb. muriate of potash.

Stable manure at the rate of 15 tons to the acre should be given in the autumn in addition to the above fertilisers.

BUSH FRUITS (CURRANTS, GOOSEBERRIES, RASPBERRIES, ETC.).

These bush fruits flourish best on good fertile land. They are gross feeders and require an abundance of nitrogenous manure. The application of farmyard manure at the rate of 20 tons to the acre, and liquid manure at the rate of 3 gallons to the square yard, will give excellent results. A liberal dressing of potash and phosphates at the following rates is also necessary:—

Per acre (applied in the autumn on early winter).—4 cwt. of French kainit, 14 per cent., or 3 cwt. French manure salts, 20 per cent., 4 cwt. superphosphate, 30 per cent., or 5 cwt. basic slag.

STRAWBERRIES.

The best soils for strawberries is a rich, sandy loam, provided it does not dry up too readily. In spring they should receive a dressing of lime between the rows to check insect pests, and afterwards a heavy mulch of cow dung. The fertilisers advised for bush fruits give good results on strawberries.

CITRUS FRUITS (ORANGES, LEMONS, GRAPEFRUIT, ETC.).

The ideal soil for citrus fruits is a light retentive loam with good natural drainage. A very sandy soil is unsuitable because it does not retain moisture very well, and fertilisers become washed out of it too readily. As citrus trees are deep-rooted, it is necessary that the soil should be free and open so that the roots can penetrate downwards.

In order to prevent the too rapid evaporation of moisture, every effort should be made to keep the surface soil round the trees in a loose, pulverised condition. It is also advisable to plough in cover crops to maintain the humus content of the soil, as the wastage of organic matter is very rapid in the warm districts where citrus fruits are grown.

Of the fertilisers required for citrus fruits, potash is by far the most important. It is of the highest value for the proper growth and health of the trees and for the formation and ripening of the fruit. Light soils are generally deficient in potash, and heavy soils do not as a rule contain it in a very suitable form.

Young trees on light soils should receive a complete manure containing the following percentages:—

3 per cent. nitrogen, 5 per cent. phosphoric acid, 5 per cent. potash. At the rate of 1 to 3 lb. per tree.

For trees over six years.—1½ cwt. sulphate of ammonia, 1½ cwt. superphosphate, 2 cwt. muriate of potash, per acre.

VINES.

The grape vine requires a good deal of moisture under ground, but it does not do well on cold, water-logged soils. The best vineyards are on well-drained slopes where the soil is rich in lime. A deep, free loamy soil is most desirable for grape vines.

Vines respond well to good treatment, but require complete, well-balanced manures. The excessive use of nitrogenous manures without a sufficiency of phosphates and potash will readily produce insipid fruit, which will not keep well. Grapes are rich in sugar, and as potash is essentially the element required for the production of sugar, it is of prime importance as a fertiliser for vines.

Farmyard manure has a very beneficial effect on vines, and it can be applied at the rate of 10 tons per acre along with the following fertilisers:—

½ cwt. sulphate of ammonia, 3 cwt. basic slag, 4 cwt. French potash salts 30 per cent., per acre.

Insufficient manuring is a common cause of unfruitfulness in orchards and plantations. To make fruitgrowing a paying concern, it is most essential to have regular and early crops of good marketable fruit. These requirements can only be met by applying liberal dressings of organic manure supplemented by artificials.

NOTES ON LEMON-CURING.

We have lately received inquiries from various sources with reference to the preservation of lemons for market, and we cannot do better than republish some notes on this subject by Mr. Daniel Jones, who obtained the information from the late Mr. W. S. Williams, of Doncaster, Victoria. Mr. Williams was the most successful grower of lemons in that State, handling about 6,000 cases annually. He explained

that to carry out the process of lemon-curing as here outlined, does not require the expenditure of much capital; an intelligent orchardist by use of a little native ingenuity can very easily devise for himself a cheap if rude construction as well adapted for the storage of citrus fruit equally as well as may be possible in the more pretentious and costly constructions. The chief thing to keep in view is that thorough ventilation, by means of as constant a current of cool air as it is possible to obtain, is the prime desideratum. Probably more depends on this item in the process than on any other, while it is very necessary that in cutting your fruit from the trees all possible precautions must be observed to handle without bruising: be the care ever so great in the field, in the event of imperfect ventilation taking place in the storage cellar the presence of the carbonic acid gas which generates, as is usual when fresh fruit is stored, will inevitably destroy the product, by reason of defective arrangement for the ventilation of the cellar. An extract from the "Melbourne Leader" will convey more tersely than I can describe them the points I wish to emphasise and which I fully endorse.

A good deal of attention is being paid this year to experience in lemon-preserving. All sorts of theories about dipping in all sorts of solutions are being promulgated, and some of them may contain the germ of successful methods. It ought to be borne in mind, however, that the most successful lemons, as regards quality and distant trade, are those of Sicily, and these are not dipped or "preserved" at all. The method consists of cutting the fruit while yet green and allowing it to ripen in darkness, with an equal temperature and perfect ventilation. The Sicilian lemons carry round the world, and preserve their delicate appearance without any dipping or other external application of chemicals. That ours will do the same has been abundantly proved even in Parramatta, where, writes a Sydney exchange, the greatest lemon-preserving failure of last year took place. But in that case the untoward result was occasioned by neglect of the simplest principles of ventilation. The lower portion of the storeroom was airtight, and there were gratings, &c., overhead. The gas generated by the fruit, being much heavier than atmosphere air, persisted obstinately in lying on the floor, and gradually rising as it increased in quantity, so that presently the lemons were soaking in a bath of carbonic acid gas. The same course ruined many shipments of citrus fruit on the way to England. But lemons laid on the floor of cellars with due provision for a current of air from below have kept for many months, and preserved all the freshness of appearance, while acquiring that peculiar shade of colour which connoisseurs insist on. Probably some processes will claim to be successful simply because the other surroundings have been suitable. In any case, the grower who provides himself with a storeroom which can be kept dark and well ventilated, while the temperature is consistently low, may feel quite sure that he can keep his lemons all right, and be ready for a good market when it offers.

THE CELLAR.

The building used for curing the fruit is a combination of a cool cellar and packing-house. It is built on an elevation where good drainage is possible, as this is a factor that must not be overlooked in constructing a curing-house. Damp floors, damp walls, and such conditions will adversely affect the curing processes.

The cellar in this instance is excavated to a depth of 9 ft., and is 18 ft. wide and 35 ft. in length. The walls of the whole structure are 20 ft. in height, which permits of the occupation of the above-ground portion for ordinary purposes. The walls are built of brick and are double, with a 2-in. space between, which provides the needful ventilation, gratings being let into the wall near the floor at every few feet, through which a constant current of air is passing. The floor is of single brick, with effective provision for drainage beneath—a matter of importance. The roof is of galvanised iron. There is nothing in the structure but what any ordinary tradesman or handy man can easily and cheaply construct; an ingenious man may vary the method of construction to suit his local circumstances either in material used or expenditure. The principal object in view is the construction of a cellar by which the temperature can be lowered to about 53 to 57 degrees Fahr., the range of heat Mr. Williams finds favourable in Victoria for successful curing of both lemons and oranges.

The method adopted in gathering the fruit is to clip the lemon carefully as near to the fruit as possible, pack into ordinary cases, which are conveyed to the packing-house and remain for a couple of days in the cases before being transferred to trays in the cellar. The lemons are cut when just turning yellow, and when cured the short piece of stalk left on will drop off the fruit if just touched by the finger, which is one way in which Mr. Williams determines the curing stage. The usual time taken to cure is from seven to eight weeks, sometimes longer, and is dependent somewhat upon the character of the season and the crop. Lemons thus cured will keep for twelve months, a sufficient time to meet all commercial demands. The lemons after a couple of days are removed and laid, without any packing, in shallow trays that

hold but one layer of fruit. The form of tray most favoured is one constructed from the Maryborough orange case cut in half; this, in Mr. Williams' opinion, is the ideal curing-tray. These are now packed one on top of the other in the cellar, and, save for an occasional overhaul to remove any faulty fruit, are left in this state until required for market.

TINNED PINES.

The recent cabled criticisms of carelessly canned Australian pineapples have had a stimulating effect in the direction of improving the trade. In a letter published early this week, one English buyer of Queensland pines acknowledged that the last consignment he received was vastly superior to those which he handled a year or so ago. The Queensland State cannery also has made some wonderful improvements in its plant and processes. The result of these reforms was lately demonstrated, when the Trade Commissioner, in the presence of a few enthusiasts, opened for comparison various tins of pineapples. Some of these samples were from the State cannery and others were from Hawaii. It was found that the Queensland article was quite equal to the famous Hawaiian, not only with regard to flavour, but also in its general get-up. That this high standard of locally tinned pines is a recent accomplishment is shown by comparing a tin taken from this season's lot with a tin taken from an old pack. The improvement is largely due to the fact that the obsolete machines which produced the old unsatisfactory results have been scrapped, and the new Ginaca machines, similar to those used in Hawaii, installed in their place. New, smartly labelled tins also add to the appearance of the goods turned out. Tinned fruit of indifferent quality, badly graded and carelessly packed, has had in the past a bad effect on the English market, and Queensland pines, in common with other lines, have suffered in the United Kingdom. But these defects are being speedily eliminated, and, according to Mr. W. H. Austin, there is now "nothing on the English market to beat the present product of the State cannery."—"Daily Mail."

PACKING FRUIT FOR EXPORT.

It was lately reported from Murwillumbah (N.S.W.) that a consignment of bananas from Queensland arrived by sea in a "boiled" condition. As some that were sent by train were similarly affected, the blame could not attach to the shippers. About 120 cases sent from Woombye and 63 from Currumbin arrived in this condition. The consignment from Woombye was all dumped at the growers' expense, and 28 cases of the Currumbin consignment realised a total of £7, and the balance 12s. per case, when the market rate for good fruit was 21s. per case.

It is evident (the report adds) that in some instances neither train nor boat is responsible for the damage, but a lack of care by the growers. Recently a consignment of bananas was dumped at Murwillumbah Station three days before the departure of the boat from Byron Bay, and these were "boiled" before they were placed in the truck. Care is necessary to ensure that the fruit is carefully picked in a proper condition and is given every protection during transit.

A SPLENDID MANGO.

Mr. Edwin Allen, of Merton street, South Brisbane, brought to this Office, on 7th March, a very fine mango weighing 2 lb. 5 oz. Another one from the same tree weighed 2 lb. 9 oz. The lighter one was 9 in. long, and measured 11½ in. in circumference. Unfortunately, nearly all the fruit was destroyed by the hailstorm. The stone was 6½ in. in length. The tree is supposed by Mr. Allen to be a sport, but this will be decided later on, as some of the seed (or stone) has been planted. There is very little fibre in the fruit, but the full flavour of the ripe mango is not pronounced.

LEMON GROWING.

Mr. W. H. Lambert, Paddington, is a successful lemon-grower. Last June his trees bore a crop of rough lemons in clusters of six, as depicted in the issue of this Journal for June, 1920. This year the trees have borne exceptionally well, many of the branches carrying a cluster of eleven marketable fruits. It was intended to give an illustration of them, but they, unfortunately, all fell off before they could be photographed. With the exception of numbers, the fruit was of the same quality as those of last year.

Horticulture.

SEEDS WHICH SHOULD NOT BE SOWN FRESH.

There are flower and vegetable seeds which quickly lose their germinative power, and must be sown fresh. On the other hand, seeds of the Cucurbitaceæ—such as melons, cucumbers, &c.—are recommended to be sown when several years old. For early sowings of turnips it is necessary to sow old seeds. The influence of time on the germinating value of seeds is a well-established fact; and it is hardly possible to account for this influence otherwise than by the theories put forward by Jules Rudolph in a paper published in the "Revue Horticole" in 1903, in which he stated that in a book, published anonymously in 1765, he found the following passage about stocks:—

"Many amateurs and professional gardeners are certain that stock (Giroflée) seed kept for five (5) or more years give a larger percentage of doubles than fresher seed. Taking for granted that this is really a fact, the reason is that the seeds which can only produce single stocks decay, losing their germinating power sooner than the others. So old seed will, in fact, produce fewer plants, but of the plants produced there will be a greater percentage of doubles."

How far can we now believe this statement, made as long ago as 1765? According to traditional belief, it is better to use for some vegetables and flowers seeds from two to five years old. Why? Old gardeners say that new seeds produce plants less shapely, running more quickly to seed, and of such vigour that they do not preserve all their true characteristics, while seed two or three years old give more shapely plants, with less tendency to run to seed. I believe in this, and will try, if possible, to explain it.

All plants, or, I should say, most of them, have the power of reproducing themselves from seed, with their own characteristics, but at the same time they are influenced by atavism, which tries to make them revert to the specific types from which they came. Thus in the seed of some varieties two forces struggle—the one tending to make them revert to the primitive type, the other tending to reproduce certain acquired characters more or less fixed by selection. It is possible that this atavistic force weakens with the age of the seed, as also that abnormal vigour which makes certain plants run to seed if grown from seeds too fresh when sown. This is not the case with stocks. If we admit that double flowering of these plants is a weakness of degeneration, it is easily believed that seeds some years old no longer possess their pristine vigour, and can produce a double flower instead of a single. We have here a real transformation of the seed—a transformation which can be allowed if we remember that the less stocks are let run wild the more chance one has of obtaining double flowers. It is for this reason that stocks are grown in pots in Germany. In this way a much larger percentage of double flowers is obtained than in the case of plants grown in the open. Many growers prefer to use China aster seed one or two years old, saying that by so doing they get more double flowers. But, above all, it is in the kitchen garden that it is necessary to know whether to choose young or old seed according to the species or variety. Thus, for beetroot and carrots, seed two years old should be used to let the root form better and keep the plants from running; for chicory and cabbages three-year-old seed, as then the plants shoot and ripen better. If we do not wish to let spinach, lettuce, or radish run to seed, or differ from the type, we must use two-year-old seed. For corn salad it is necessary to use seed at least a year old, as seed gathered in June will scarcely grow if sown in the following September or October.

DISTRIBUTION OF CANE PLANTS.

We are informed by the General Superintendent of the Bureau of Sugar Experiment Stations that a highly successful free distribution of approved cane varieties was carried out at the Sugar Experiment Station, Bundaberg, on 18th February. The Chemist in Charge (Mr. Pringle) reports that upwards of 160 growers called at the station, and were supplied with new varieties, including Queensland 813, 970, 1098, Java, E.K.1, H.Q. 77, Shahjahanpur No. 10, and others. In addition to this, about 80 growers outside Bundaberg are being supplied by rail.

Tropical Industries.

THE SOUTHERN SUGAR DISTRICTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Southern Field Assistant (Mr. J. C. Murray):—

Throughout the month of February the cane-growing districts of Childers, Pialba, Maryborough, and Yerra have been visited.

CHILDERS.—This district has every prospect of a good harvest. The cane, both plant and ratoon, is still growing rapidly; and the farmers are paying careful attention to cultivating and the checking of weed growth. There is a general feeling of satisfaction in the district, the people considering the difficulties caused by the drought about at an end. Live stock and pasture land also look well, and unemployment is not so rife as in other centres. The returned soldiers are actively engaged in the question of getting Hapsburg and Lynwood Plantations resumed, which, if done, means that numbers of service men would have homes on some of the finest sugar-growing land in Queensland.

Speaking generally on cane varieties and methods associated with cane culture, there is nothing outstanding to comment upon. The 1900 Seedling and D.1135 are still the staple varieties, although Q.813 is beginning to find considerable favour amongst the growers. A row of this cane planted by Mr. F. Perske, in a field of 1900 Seedling, has made good growth, outstripping the Mauritius variety, notwithstanding they were both planted at the same time in the autumn of 1920.

Cane pests are not troubling the growers much, although large numbers of beetles have been observed flying at different periods during November and December. In the case of possible grub attack in the late autumn, the growers have been recommended to use arsenic.

A short visit was paid to Booyal. Very little cane is grown there now, the farmers following other pursuits. The soil, however, is good; and, with the exception that light frosts occur now and again, the district is suitable for cane-growing. Varieties that have been introduced to Booyal include Badila, Goru, D.1135, Rappoe, Black Innes, Mahona, H.Q. 426, Cheribon, Striped Singapore. Of these, Rappoe, Striped Singapore, and D.1135 did about the best. Heavy tonnages have been obtained at Booyal, and could be again grown if farmers took planting up again seriously.

Dallarnil was also gone over. A little cane is at present being grown, though more is now being planted. D.1135 is the principal variety, the farmers being satisfied that this is the best cane for the Dallarnil district. A drawback here is the distance from the mill.

PIALBA.—Judging by the general appearance of the cane, the harvest should be the best that has occurred for some years. Much of the ratoon cane is backward, but the plant crop looks well and should give a good return.

With regard to most of the cane that has been ratooned around Pialba, it would be as well, after the cutting, if the farmers were to plough out the old stools and give the soil a green manure crop before replanting; also, if possible, the soil should be limed. If measures are not soon taken, much of the land will not be worth planting.

A shortage of organic matter and, on acid soil, reaction are noticeable on many of the Pialba soils. The latter is sometimes due to bad drainage. The bulk of the spring water is charged with magnesia. Good rains have fallen at Pialba during this year, and live stock look well. Generally speaking, there is nothing outstanding to remark upon since last visiting Pialba. D.1135 is the staple variety. This cane is now showing considerable signs of deterioration, and requires careful selection and planting.

MARYBOROUGH.—This district has been benefited greatly by the recent rains and subsequent good growing weather. The plant cane is making rapid growth, and farmers who are still making a livelihood out of sugar production are looking forward to a fair harvest.

Of the many varieties that are growing in this district, which is one of the oldest in Queensland, D. 1135, 1900 Seedling, Rappoe, and Striped Singapore look about the best. The two latter canes are in some cases especially vigorous. They should be kept under observation for gumming, however. Green manuring, liming, and thorough cultivation would ensure more profitable returns on many of the farms in this area.

Tinana Creek and the Mary River are fine waterways. They are availed of to a certain extent by the cane-growers for transport to the mill. This method is cheap and effective, and better facilities for carrying out this work would bring about greater efficiency and more comfort for all concerned.

YERRA.—Although, with one or two exceptions, the areas planted here are very small, the farmers seem more encouraged to produce than they have done for a long time. The cane looks healthy, and tonnage returns per acre should be well up to the average of other districts. Some farmers have done a fair amount of clearing, either for the purpose of introducing grasses or cane-growing. Mr. N. Jacobsen has been doing something in this respect recently, and is now busy planting with the mattock. The land cleared was covered with dense scrub, and is a light porous loam, with a clayey loam subsoil. The variety to be planted is principally Q. 813. The chief drawback the farmers on the low-lying portions have to contend with is the likelihood of frosts. These occur between May and September, if they do strike the district at all. As remarked in previous reports on Yerra, the roads leave something to be desired, but still there has been a considerable improvement lately.

RUBBER.

The "Journal of the Jamaica Agricultural Society" writes:—

The future prosperity of rubber is obviously entirely a question of the relation between supply and demand.

During the last five years, the production and consumption of rubber have kept pace, both increasing at the rate of 50,000 tons per annum; but the forecast is that no such increase of rubber can be expected after this year.

During the war large stocks accumulated at the places of production, for want of freight to transport the rubber to the markets. Yet practically all these stocks have been already absorbed in addition to the 1919 output.

The output from the world's rubber trees of Amazon Valley has been largely decreased owing to the impossibility of marketing the rubber during the war, and the industry there is disorganised. But, of course, the trees are there; and whether this trade will ever resume its former importance depends upon the price, which would require to be high now to pay the very largely increased expense of gathering.

Then, again, the revolutionary wars in Mexico have destroyed many of the large plantations of Castilloa rubber there, and work on practically all has been stopped for half a dozen years. Meanwhile, the plantations in the East are highly organised and go on paying large dividends.

It seems that if the consumption of rubber goes on increasing as it is steadily doing, largely owing to motor transport, there will be a rubber shortage in the near future.

There were great hopes in Germany once of their chemists producing a synthetic or artificial rubber which would largely replace natural rubber. This hope is not now held. The Germans planted largely of rubber in their West and East African Colonies, more especially in the Cameroons, and they interplanted it with cocoa trees where conditions suited both. Sometimes they interplanted oil palm too; but this was overdoing it, and the cocoa did not stand two shade trees. But, as a rule, the cocoa and rubber have done well together. The rubber of West Africa is mostly Funtumia, native to West Africa, but there is also Hevea.

Whoever has rubber trees here should hold on to them. The latex is cumulative; that is, the ability of the tree to produce more and more increases with age, and some day many of the trees here will be tapped to great advantage if a big demand at a high price suddenly occurs, and will probably produce £2 or £3 value each, which, if it happens at a time when other products are low, will come as a boon to many. History repeats itself. Records show that there have been times here when estate-owners have chopped down cocoanut trees because of the low price of the nuts, and planted bananas; have chopped out large bearing cocoa trees in the same way, only to replant a few years later when the price of bananas was low over a few years. We remember when logwood trees were advocated to be cut out, as there was little demand and they interfered with the growth of grass for cattle. How different now!

At present practically everything is subordinated to sugar-cane; and we fear that there may be such a craze that cocoanuts, cocoa, rubber—every tree that stands in the way of cane—may be chopped down. But hold on to mixed cultivation; the history of our products show that every one has its ups and downs. Plant cane by all means where land is free, and even sacrifice part of pasture and bananas, which are quickly established again if necessary; but it is a sacrilege to chop down a good economic tree for the sake of sugar-cane.

RUBBER FINANCE PROBLEM IN INDIA.

Speaking at a rubber company's annual meeting, Mr. R. F. McNair Scott made an interesting contribution to the discussion on the rubber position. In the course of his speech he remarked:—

"The rapid and unexpected fall in the price of rubber during the last few months has forced us to recast our ideas as to cultivation, equipment, &c.; and, both by mail and cable, instructions to exercise the utmost economy, compatible with the safeguarding of the estates, have gone out with increasing emphasis as the price of rubber fell to, and then below, the cost of production. This fall is admittedly largely due to America's present inability to use rubber contracted for ahead. It is difficult to believe that the great American manufacturing organisations, who are now reselling rubber at less than half the price at which they were eager buyers a few months ago, can have completely misjudged consumption in its broad aspects; their and our troubles seem rather caused by a temporary dislocation in finance. The general malaise due to crushing taxation and disturbed exchanges found the rubber industry more vulnerable than most, as it is still in process of organisation to deal with a rapidly increasing mass of rubber, now some ten times the world's production of less than twenty years ago.

"Speaking broadly, we, the producers, finance rubber during its growth and transport to market—a period of years. The manufacturers have to finance the rubber during its manufacture and sale—a period of months. Between producer and manufacturer stands the dealer who has normally to finance for a period of days. If the financial arrangements of the manufacturer break down, whether this breakdown be brought about or aggravated by his money being locked up in factories planned to meet an anticipated increase in consumption; or by planting up large areas of rubber —an activity which incidentally he might have left to us, the growers; or through general depression by the temporary failure of consumers to take up their requirements, its effect on the dealer, with a normally revolving finance of short duration, is profound.

"The remedy seems to be for us growers to increase for a time the period for which we have to finance rubber. Unfortunately, as individual companies, we have not yet (harried as most of us have been by the tax collectors) been enabled to build up our reserves sufficiently to do this. Hence, although admittedly the difficulties are great, concerted action seems essential if we are to obtain the necessary financial assistance from outside. Such concerted action can only find stability on the tripod of cordial co-operation, reliable information, and adequate finance. The last would be forthcoming if growers provide the first two requisites. The obvious first step is to lessen the amount of the commodity to be financed, and this has been by a general agreement to reduce normal output by 25 per cent. But such agreement should be universal, and it may be desirable that the F.M.S. Government should take a hand in enforcing reduction. It is urgent that action should be prompt and decided, for so far you have nothing to persuade consumers that the turn has come. If their confidence were restored by the knowledge that reduction would be enforced, and, if necessary, increased, market conditions would change rapidly."—"The Planters' Chronicle," Madras.

SYNTHETIC RUBBER: ANOTHER FAILURE.

Germany during the war was practically without raw rubber, and it can be well understood that the urgent necessity for some substitute would command the attention of all the chemical science which that nation is known to possess. We have recently heard some remarkable stories about the invention of synthetic rubbers which would revolutionise the rubber trade. With the experience of so many similar projects in the past, we are always sceptical of the claims made by inventors of synthetic rubber, and we are not at all surprised to learn that at the annual meeting of Friedrich Bayer Farbenfabriken Co., it was stated that for the present all hopes which had been pinned to synthetic indiarubber had been abandoned, owing to the ever-increasing price of raw material required for its manufacture.

As already recorded, it is quite possible to make synthetic rubber which complies with the chemical analysis of the raw material, although the resulting material has never been satisfactorily proved to have the life of the natural article, while the cost of production of synthetic rubber has always so far been greatly in excess of Nature's product.

It is estimated that some 120 millions of British capital are invested in the plantation rubber industry. There are something like 3,000,000 acres under plantation rubber. The output of plantations last year was over 300,000 tons, and this year it is estimated to be some 360,000 tons. Compare this present rate of production with the output of 145 tons fifteen years ago!—"Journal of the Jamaica Agricultural Society."

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

No. 21.

GOOSEFOOT (Chenopodium triangulare, *R.Br.*)

Description.—A straggling herbaceous plant, leaves and stems light green, the older ones often reddish, the younger ones covered with a white meal. Leaves on a leaf stalk (petiole) as long as the blade; blade hastate or triangular usually under 1 in. long, and as broad or nearly as broad as long. Flowers very small, in distant clusters along terminal or short axillary spikes. Fruit (''seed'' in the popular sense) small (about ½ a line in diameter), black and slightly rough, perianth segments of the flower more or less persistent and appearing as five white raised lines on the lower half of the fruit; seed dark black.

Distribution.—A common weed in Southern Queensland and in New South Wales. It is not found outside of Australia.

Common Names.—''Goosefoot'' is an English name commonly applied to different species of Chenopodium. It also goes under the name of ''salt weed'' or ''salt herb'' —names applied to allied plants, principally to *Atriplex semibaccata.* Sometimes it is called ''fat hen''—a name, however, more often applied to taller growing plants of the genera *Chenopodium* and *Amarantus.*

Botanical Name.—Chenopodium from the Greek *chen, chenos,* a goose, and *pous, podos,* a foot, being simply a translation of the local name given on account of the shape of the leaf of many species; *triangulare,* Latin alluding to the triangular shape of the leaf blade.

Properties.—Some few years back specimens of this weed were forwarded by Mr. F. J. Watson, Dairy Inspector, Maryborough, as a plant eaten by dairy cows, tainting their milk and causing a ''fishy'' flavour in the butter subsequently made. Recently specimens were sent by Mr. A. R. Wilkin, Instructor in Cheesemaking, with the report that the plant grew profusely in parts of the Burnett district, and had the property of tainting the milk of cows consuming it.

Apart from this property the plant is evidently a valuable forage, as in March, 1919 (during the drought period), Mr. A. F. Kentish, of Tara, *viâ* Dalby, sent specimens taken from a two-year-old haystack, and stated that in the hay form his stock had been eating it in preference to other feed. A small sample of the hay was handed over to the Agricultural Chemist (Mr. J. C. Brünnich), who reported that the plant appeared to be a very valuable fodder, and gave the analysis as follows:—

Analysis.	Hay. Dry Material. Per cent.	Green Material. Per cent.
Moisture	8.29	50.00 (assumed)
Crude protein	16.62	9.06
True protein	10.25	5.59
Carbohydrates (by difference)	32.27	17.59
Fibre (crude)	22.63	12.34
Ether extract	2.19	1.19
Crude ash	18.00	9.81
Lime	1.18	0.64
Phosphoric acid	0.39	0.21
Nutritive ratio	5.1	5.1
Starch value	46.1	25.2
Starch equivalent	23.9	43.7
Protein equivalent	24.7	45.3

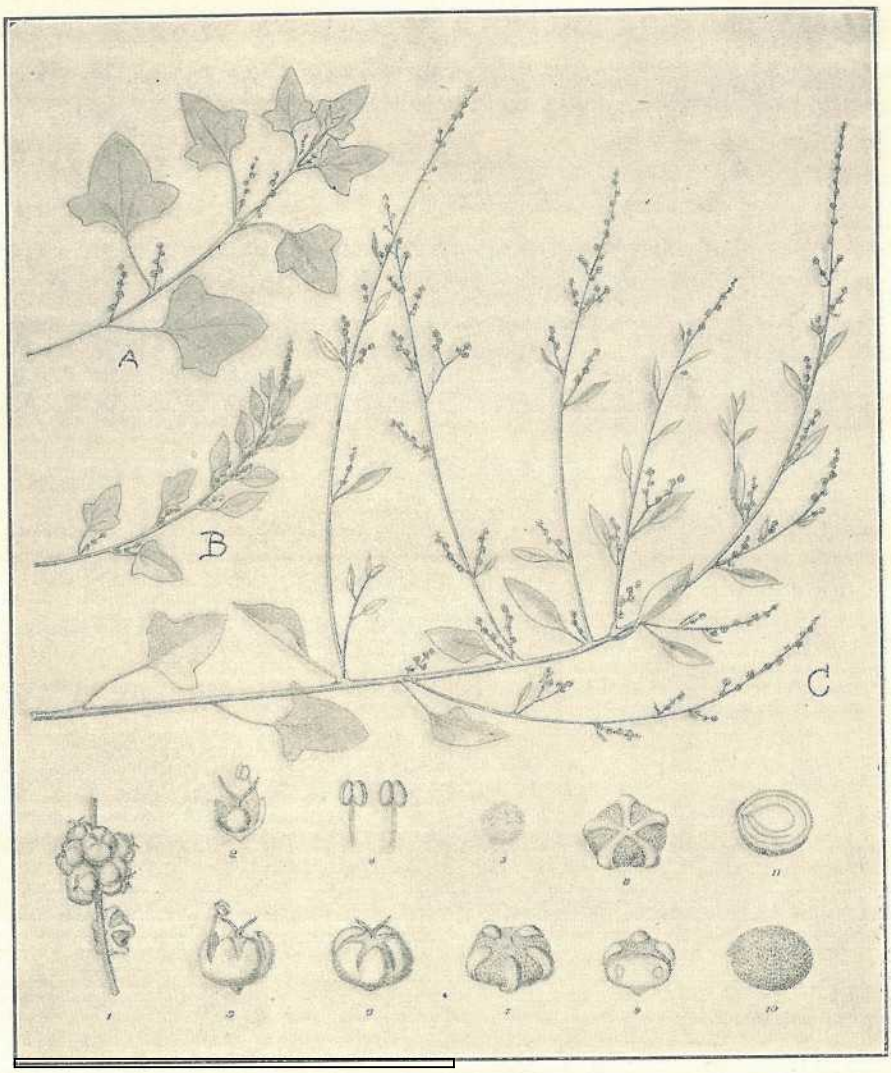


PLATE 19.—GOOSEFOOT (*Chenopodium triangulare*), R. Brown.

A, B, and C.—Shoots somewhat reduced.
1.—Portion of branchlet bearing flowers.
2.—A flower, part of the calyx removed.
3.—A flower.
4.—Back and front view of a stamen.
5.—Pollen grain.
6.—A young fruit.
7 and 8.—Mature fruits (seeds).
9.—Longitudinal section of a fruit.
10.—A seed.
11.—Transverse section of seed.
1-11.—Variously enlarged.

(After Mueller in "Iconography of Australian Salsolaceous Plants.")

Forestry.

QUEENSLAND TREES.*

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS, Assistant Government Botanist.

No. 1.

SCRUB IRONBARK (Bridelia exaltata).

Common Name.—Scrub Ironbark.

Derivation.—*Bridelia*, after Professor Bridel, an early worker on mosses; *exaltata*, Latin, lofty.

Description.—A tree attaining a height of about 100 ft. and a barrel diameter of about 2 ft. Barrel not prominently flanged. Bark dark brown in colour and prominently furrowed or fissured; when cut it is seen to be red internally, and measures about ½ in. in thickness on a tree with a barrel of 2 ft. diameter. Sapwood, white; heartwood, light brown. Leaf stalks, ⅛ to ¼ in. long. Leaves, alternate, narrowly egg-shaped in outline, narrowed at the apex, with prominent lateral nerves and net veins especially on the underside, upper face somewhat glossy, under surface paler and duller; measurement of leaf blade, 1½ to 2½ in. long, twice to three times as long as broad; the leaves on coppice ("sucker") shoots and young trees are often much larger. Flowers small, in small clusters of about 6 or less in the forks of the leaves or at the scars of fallen leaves. Fertile male and female organs in separate flowers; the two sorts of flowers often on the same tree and in the same cluster. Stalks of individual flowers one-twelfth of an inch or less in length. Individual flowers about a-quarter of an inch or less in diameter when expanded, consisting of 5 triangular calyx lobes, 5 small petals inserted between the calyx lobes and shorter than them; and in male flowers, 5 stamens about one-tenth of an inch long surrounding an abortive ovary; in female flowers an ovary, which generally develops into the fruit. Fruit, globular, yellow when fresh, turning brown, about one-third of an inch in diameter, with a fleshy outer coat surrounding a "stone," which is generally 2-celled, and when ripe contains one seed in each cell.

Flowering period (?); in fruit from March to June.

Distribution.—Confined to Australia. Coastal scrubs of Southern Queensland and Northern New South Wales. Our northermost locality record at present is the Gympie district. It is common in the remnants of "scrub" (rain forest) about Brisbane, in the Goodna scrubs, and in the drier "scrubs" of the Beaudesert and Canungra districts.

Uses.—R. T. Baker ("Hardwoods of Australia," page 356) states that the timber is not uncommon on the Sydney market, and that it is suitable for carriage and coach parts, shipbuilding, and general constructional work.

Notes.—The tree is very common in some localities as secondary undergrowth in paddocks and as the leaves, like those of young sorghum and some other well-known plants, contain a prussic-acid yielding glucoside, they may, if eaten in quantity by stock, produce death, though no actual losses due to the plant have been recorded.

The ripe berries, which are generally produced in great abundance, are greedily sought after by fruit-eating birds.

References.—*Bridelia exaltata*, F. v. Mueller, in "Fragmenta Phytographiæ Australiæ," Vol. III. (862); Bentham, "Flora Australiensis," Vol. VI., page 119; F. M. Bailey, "Queensland Flora," Part V., page 1410; R. T. Baker, "Hardwoods of Australia," page 356, pl. 116, and fig. lxxviii. (The generic name is sometimes spelt *Briedelia*.)

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* Under this heading it is decided to give from month to month popular descriptions of some of our native trees. After a number have been published, it is hoped, should opportunity permit, to issue the matter along with illustrations and descriptions of other species in book form.

The descriptions are as void of pure technicalities as possible, and have been drawn up from fresh material or from specimens preserved in the herbarium collections of the Department.

PLATE 20.—SCRUB IRONBARK (*Bridelia exaltata*), GOODNA SCRUB.

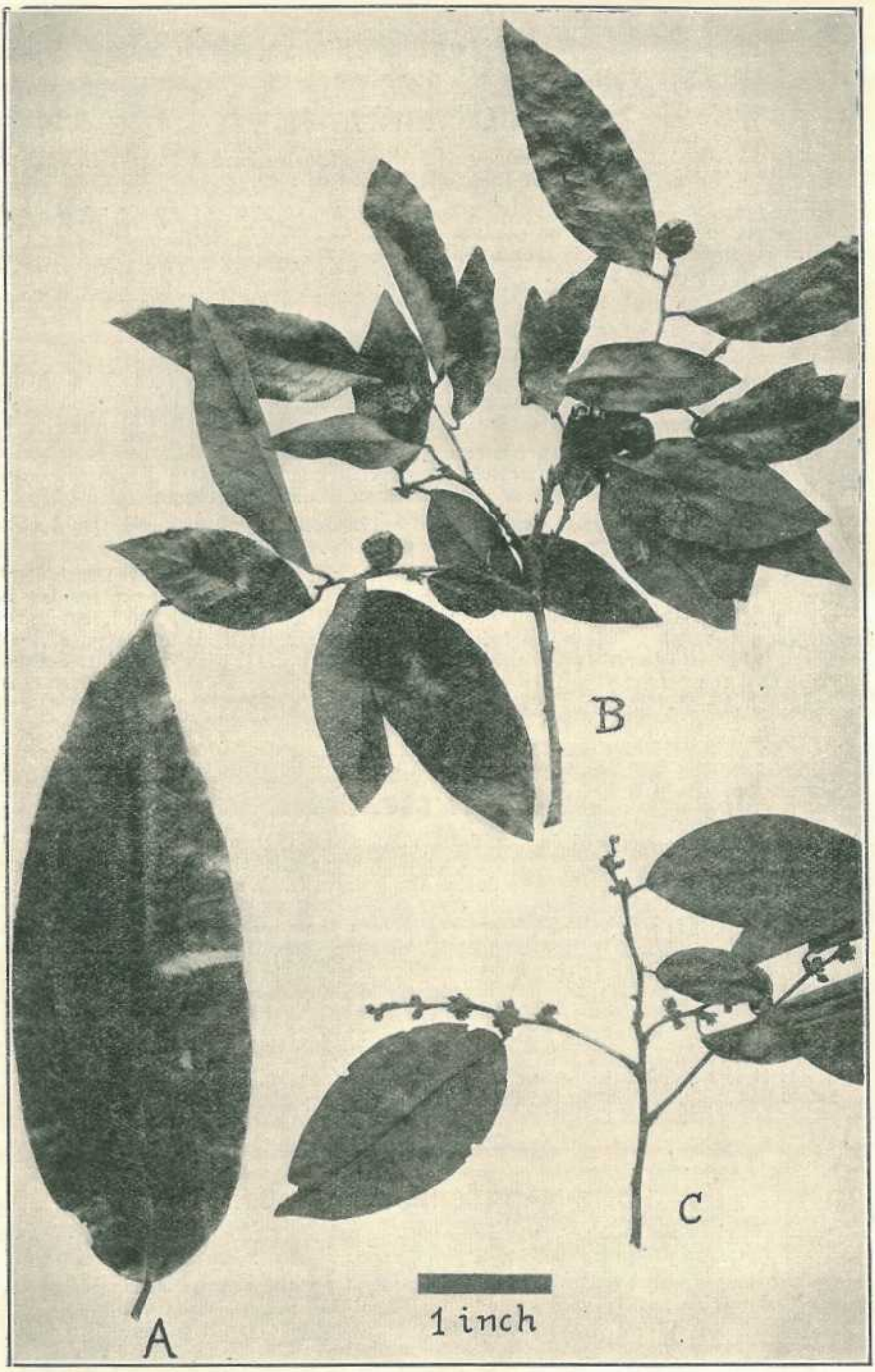

PLATE 21.—SCRUB IRONBARK (*Bridelia exaltata*).

A.—Large leaf from young coppice growth.
B.—Fruiting twig.
C.—Flowering twig.

Science.

SEED ELECTRIFICATION.

Experiments that may be accepted as fairly conclusive have been carried out in Great Britain to test the effect of the electrification of seed.

This process consists in immersing the seeds in a solution of common salt and water (4 oz. to the gallon), or calcium chloride and water (8 oz. to the gallon), to which an electric current is then applied. The seeds are dried 100 degrees Fahr., and are then ready for sowing.

The tests were made with seeds of mangold, swede, cattle cabbage, and carrot; and two distinct series were arranged—a germination test and a field test.

The conclusions arrived at are:—

"*Germination.*—Notwithstanding the one or two points which seem to be slightly in favour of the electrified seed, the results obtained by this series of tests can only be regarded as inconclusive.

"*Field Test.*—The outdoor tests, as a whole, would appear to be no more conclusive than were the tests for germination, the returns from the electrified seed showing no advantage over the other sections, except to a small extent in the case of mangold.

"It will be seen that the results are of an inconclusive nature, and would not seem to justify the employment of the process.

"The failure of electrified seed to give any increase in yield under the carefully controlled conditions of an experimental station trial shows that the process lacks certainty. It cannot be compared in effectiveness with manuring, which succeeds nearly every time when properly done. The writer (Dr. Russell) is not prepared, on present evidence, to say that the process will succeed, but the risk of failure seems so great that the farmer should look upon it as an adventure which may or may not be profitable."—"New Zealand Farmer."

WHAT IS COBALT?

It was lately announced in the daily newspapers that a valuable outcrop of cobalt had been discovered near Cloncurry, and it was stated that the value of cobalt was higher than that of molybdenite during the great war. We have been asked by a correspondent to give some information concerning cobalt and its uses. Metallurgists tell us that cobalt is a metal, and is one of the only three metals which are attracted by the magnet, and can become magnets themselves—viz., iron, nickel, and cobalt; but they cannot retain their magnetism as does the compound metal "steel." The colour of cobalt is reddish grey; it is brittle and difficult of fusion. Generally, it occurs combined with arsenic, and associated with nickel and iron. Its oxides, on account of their brilliance and permanent colour, are of importance in the arts, such as in the manufacture of glass, to produce the beautiful blue varieties called "smalt." At times it is a substitute for nickel in plating goods, and as an enamel, and in pigments generally. The reported discovery at Cloncurry should be a valuable one.

HOME-MADE SHEEPSKIN RUG.

With the approach of winter come inquiries as to the preparation of fur and wool skins for mats and rugs. To prepare a sheepskin is not very difficult. Take a fresh skin, clear it of any dirt and wash the wool in slightly warm soap suds, to which you have added a tablespoonful of kerosine oil. Then wash in fresh suds until the wool looks white and clean. Put it in sufficient cold water to cover it and dissolve ½-lb. each of salt and alum in three pints of boiling water. Pour this over the skin side, and rinse it up and down. Let it soak in this for 12 hours, then hang up to drain. When nearly dry, tack it, wool side in, on the wall of the barn to dry. Now rub into the skin 1 oz. each of pulverised alum and saltpetre, or double this if the skin is large. Rub for an hour or two. Fold the skin sides together, and hang away for three days, rubbing every day, or till perfectly dry. Then, with a blunt knife, clear the skin of impurities, rub it with pumice, or rotten stone, trim into shape, and you have a warm rug which should last a life time.

General Notes.

TO TAN A HIDE FOR WHIP-MAKING.

To make a stock whip of kangaroo hide, the hide must be tanned; but if of calf or bullock hide, tanning is not necessary. To tan a skin, the general principle is to trim off the useless parts of the skin, and remove all fat from the inside. Then soak the skin in warm water for about an hour, after which apply a coating of borax, saltpetre, and Glauber's salts—1 oz. of each dissolved in sufficient water to make a thin paste. On the following day give a coating of a mixture of 1 oz. of sal. soda, ½ oz. of borax, and 2 oz. of hard soap. This mixture should be slightly heated without allowing it to boil. After this, fold the skin together and leave in a warm place for twenty-four hours. Then take 4 oz. alum, 8 oz. salt, and 2 oz. saleratus; dissolve in hot water, and when cool soak the skin in it for twelve hours. Wring out and hang up to dry. If the skin is not sufficiently soft after this, the soaking and drying must be repeated two or three times. Another method is to wash the skin in a solution of sal. soda and water. Then take 4 oz. powdered alum, 8 oz. salt, 1 quart new milk to 4 gallons salt water, and 1 pint prepared starch; stir well, then put in the skins, and air them often by hanging them over a stick laid across the tan tub. Handle them occasionally until they have been in the solution a day or two. Then remove the skins and add to the liquor a half teaspoonful of sulphuric acid. Stir this well in. Put the skins back, and steam them well for about an hour. Then wring out the skins in lukewarm water, and hang them up in a cool place. When they begin to get white, work and stretch them till dry. Hides of animals larger than kangaroos should remain longer in the solution.

When making a whip of calf-skin or bullock hide, use the hide green. Soak it well, shave off the hair and underside with a sharp knife, and stretch well after cutting into strips of the required size.

To Remove the Hair or Wool before Tanning.—First wash the skins thoroughly in water; then place them one above the other with the flesh side up. Then saturate each skin on the flesh side with a thick cream of lime, after which double them with the hairy side out. Let them remain thus for twenty-four hours, when the wool or hair should be loose; remove them and leave them to soak in weak lime and water. Remove them twice a day, and stir up the liquor before replacing them. Continue this treatment for three days, after which place them in a stronger lime liquor, and draw daily as before. In seven days, whatever hair has been left on should be easily removed. The next step is unhairing and fleshing—that is, the scarf skin and remaining hair are removed with a blunt knife, and all fat and flesh is taken off with a sharp one. Lastly, soak the skins well in some preparation of ammonia to convert the lime in the pores into soluble salts, which may then be removed by washing and scraping.

RATS EATING MATCHES A CAUSE OF FIRE.

Commenting on a paragraph in last issue of the Journal, Mr. Daniel Jones contributes the following interesting notes on this subject:—

"As bearing on the statement in your March issue *re* fires caused by rates, may I be allowed to tender my own experience on this question? Some years since, while engaged in fruit-growing not far from Brisbane, I had occasion one morning to open a drawer in my writing desk and, to my surprise, found much of the contents singed and some documents burned up. On closer search as to the then unexplained cause of the fire, I found a dead rat among my papers. As there were loose matches in the drawer, no other conclusion could be come to but that the rodent had squeezed itself into the closed drawer and, in the act of eating matches, ignited some and caused its own death.

"Previous to this, I had often regarded the possibility of rats causing fires with some doubt; but having direct evidence as in my own case, I am quite ready to credit some fires at any rate to the activity of rats or mice. Fortunately, the confined space in which the fire started, precluded further spread; hence, instead of having a conflagration involving loss my luck saved the situation."

FOOT-AND-MOUTH DISEASE.

INTRODUCTION FROM ABROAD.

The way by which foot-and-mouth disease is brought into Great Britain and similarly situated countries from time to time, notwithstanding the fact that into the former in particular the importation of susceptible live stock is prohibited, is as mysterious as it is interesting. The subject has given rise to spasmodic discussions, but the possibilities do not seem to have been methodically debated in relation to the actual facts, so far as they are known.

It may be accepted as established that Great Britain freed from the disease in enzootic form is only invaded when the disease is prevalent on the Continent, particularly when it prevails in the north of France, Belgium, and Holland. In the light of recent experience, it would also appear that the greater the prevalence, the more frequent are the invasions.

Live stock being excluded as a factor, it is not unnatural that suspicion should have fallen upon human beings coming from the Continent where the disease is raging, and on imported feeding stuffs and litter. It may be mentioned, however, to save further discussion, that the importation of hay and straw, except for exceptional purposes, has been prohibited since 1908, and that the position as regards foot-and-mouth disease has not apparently been modified in consequence.

Whether Disease is Communicated by Feeding Stuffs, Packing Materials, and Human Beings.—These represent the communications between animals of the farm and the outside world, and it is not unnatural that they should have fallen under a sustained suspicion. The object of the inquiries which have been made over a period of years was to find whether any credible factor repeated itself in a number of outbreaks, or whether any lines of evidence from a series of initial outbreaks would converge on one point, for example, on a cargo or consignment of feeding stuffs, &c. It may be said at once that it has not been possible to establish anything of the kind. It is true grave suspicion has sometimes rested on a certain article, mainly on account of its advent synchronising with the appearance of disease on the premises, but in almost every case further inquiry has shown that the same consignment has been distributed to many other premises where no disease has occurred. It is also correct that an occasional outbreak arose near camps in which soldiers from the Continent had been concentrated. On the other hand no actual communication was established between the soldiers and the premises which became infected. Moreover, initial outbreaks had been known to occur in the past in the same locality when there were no soldiers or other persons to suspect, and in the vast majority of cases no outbreaks arose near camps of the kind.

The most that can be said of the above evidence is that it is not in favour of the view that infection is generally brought to this country by men and such articles as have been mentioned, but in addition there is the fact that many initial outbreaks have occurred on premises far removed from others, the animals of which having received only foodstuffs grown on the place, and the attendants not having been off the place for weeks before disease appeared. The weightiest evidence, however, against men, foodstuffs, &c., being responsible for the importation of initial infection has arisen in the last year or so, during which the invasions have been exceptionally frequent. It will be shown later that invasions have repeated themselves during the last twenty years in more or less defined areas of the country, though not on the same premises, large parts of England and Wales, and the whole of Scotland and Ireland having escaped entirely or almost so (there has been one initial outbreak in Scotland, at Edinburgh, in the last twenty years). These immune areas receive the same class of foodstuffs, &c., and are visited by the same class of human beings, and it is almost inconceivable that over a period of twenty years certain areas could receive all the infected persons and things which came into the country, and others escape entirely, if persons and foodstuffs are generally responsible for the importation of infection. This is all the more remarkable when it is remembered that in over 80 per cent. of the outbreaks of anthrax, infection is conclusively shown to arise from imported feeding stuffs and manures, and that the outbreaks follow the lines of distribution, sparing no parts of the part of the country in which they are used, Scotland for example, being as heavily hit in proportion as England.

If, then, the usual communications between the animals of the farm and the outer world do not account for the conveyance of something—virus of foot-and-mouth disease in this case—which arrives on farms with a certain amount of frequency, other possible methods of communication must be considered, even if they appear at first sight fanciful.

Air-borne Virus.—No support having been found for the ordinary methods of conveyance of virus, it seems justifiable to explore the possibility of the virus being air-borne for long distances, either by air currents or birds, or otherwise. As regards

air currents, when affected cattle are allowed to remain alive on open pastures or at work, as is customary on the Continent for example, it is no uncommon thing to see strings of viscous slobber from the mouth whirled up into the air and dispersed into minute parts which disappear from sight. This material is known to be infective in infinitesimal doses, and it can therefore stand a high dilution. What becomes of it after it gets into the air is obviously a question which cannot be answered definitely. It is a fact, however, that even in this country where the official method of handling diseased animals—housing and almost immediate slaughter—gives few opportunities for virus to spread, ramifications in the direction of a strong prevailing wind have been occasionally observed to a distance of a few miles, and no ordinary communication could be traced by the minutest inquiry. Having regard to the distance which volcanic dust can be borne in the air it seems reasonable to believe that very small particles of infected mucus could be carried long distances by air currents, even in clouds, and be washed down in rain. The experiments of Blackley which showed that the air may be heavily charged with grass pollen, and that it might be carried thus as far as from Norway to this country, are of some interest, and it may be remarked that pollen from pastures in infected countries might be contaminated.

Accepting air-borne virus as possible, the next question which arises is, whether there exists more frequently anything in the form of air pockets of negative pressure in the areas mostly invaded, which could account for the suspended virus descending to earth or water. These are problems which obviously should be discussed with those who are now exploring the air. As regards birds, it immediately suggests itself that if birds in general are responsible, there should be definite periods of invasion, given prevalence of disease in other countries, which synchronise with those of the migration of birds inwards. There are two migratory seasons, during both of which birds arrive in or leave this country. In the autumn certain birds leave to winter elsewhere. These can be disregarded as importers. Others arrive to winter in this country. These can probably be disregarded, as most of them come from the North where the disease seldom prevails. In the Spring months birds come in mainly from the South for breeding purposes, and might be carriers whilst others depart for the North.

In going back over the outbreaks in the period of twenty years, however, it appears that the lowest records of invasion are March—4, April—1, May—0; July, in which there is no migration, shows 8. September, October, and November, when birds may be expected from the north and north-east, which are not the lands of prevalence as regards foot-and-mouth disease, show respectively 7, 7, and 4, while December, during which there is practically no migration inwards, shows 9.

These data are against the suggestion that there is any general relation between migration and invasion by foot-and-mouth disease. They do not, however, exclude the agency of those birds, such as ducks, geese, and gulls, which may, outside the migratory seasons, travel long distances for food. For purposes of closer investigation it might be assumed:—(*a*) that such birds might in their travels frequent contaminated pastures or drinking places and afterwards deposit virus in this country from their feet or plumage; (*b*) that they might swallow infected material, such as water and food contaminated by slobber and pieces of membrane from the mouths of cattle, and afterwards excrete the virus in a still active state. It is hoped that experiments which are to be conducted on the viability of the virus may determine the possibilities as regards (*a*) and that as regards (*b*) feeding experiments with the virus, using birds, may at least show whether the virus can pass through their intestines unchanged, and render their excretions infective for lengthy periods.

As the matter stands at present, however, the evidence, such as it is, is most in favour of particles of virus being carried by the air.

A NEW VARIETY OF CORN.

By the process of hybridisation (writes the "Queensland Times" of 18th March), Mr. A. W. Morris, teacher at Tipperary Public School, Young (N.S.W.), has produced a variety of maize which he believes will go a long way towards solving the problem of maize growing in comparatively dry districts such as Young (says the "Chronicle"). It will also be of value in districts like the coast, because it ripens as early as the Ninety Day, but has the advantage of giving a much better yield. First of all, Mr. Morris crossed Early Dent with Silvermine, and then the result of that cross with Ninety Day. In this way he produced a variety which has a small stalk like the Ninety Day, but cobs fully 1 ft. long and grain ½ in. deep. The cobs are thin, thus having more room for grain, and the grain is very closely packed. This corn was sown on 14th October and harvested on the 14th of last month; so that it had practically no rain during the whole period. Mr. Morris had about a quarter of an acre of it this season.

THE TOBACCO-GROWING INDUSTRY.

Since the departure of the late W. Neville in 1913, who for some time supervised the cultivation of tobacco at Texas (Q.), Bowen, and Cardwell, and the preparation of the crops for market, the industry languished, and for the past few years the area under this crop has much diminished. The drop in that time has been from 731 acres to 321 acres in 1919. At Bowen the tobacco industry is mostly in the hands of Chinese, and the decline there has not been so marked as at Texas. For this year, however, the area under tobacco at Texas has been largely increased, and it is anticipated that the season's crop will yield fully 100 tons, the rains having been very beneficial to the plants. The main difficulty in overcoming the hesitation of Europeans to cultivate this crop appears to lie in the close attention needed during the growing season and in the curing.

JOURNAL OF SCIENCE AND INDUSTRY, MELBOURNE.

We much regret to learn that it has been decided by the Executive Committee to suspend publication of the Official Journal of the Commonwealth Institute of Science and Industry. We have read with much pleasure and profit the several well-written scientific articles appearing in it monthly, some of them having been republished in the "Queensland Agricultural Journal." We note that the suspension of its publication is preliminary to an expansion of the work of the Institute, when a Director will be appointed, pending which the interim reports of various committees of inquiry will be communicated to the daily and technical press of Australia, and, when necessary, special statements will be prepared and circulated among persons particularly interested in the work in hand.

HOW TO KEEP LEMON JUICE FRESH.

Lemon juice may be bottled and kept indefinitely if it is strained into small bottles that have been sterilised and allowed to become perfectly dry. Fill nearly full with juice, put a teaspoonful of olive oil on the top, and cork tightly. Keep in a cool dark place. When ready to use, run a piece of clean cotton into the bottle to absorb the oil. The juice will be found to be as fresh as if it had just been pressed from the lemon.—"Garden and Field."

POULTRY AND EGGS DURING EASTER.

According to reports in the daily Press, it is anticipated that there will be a fall in the price of poultry, and an advance in the price of eggs with the advent of the Easter holidays. Towards the middle of March reports from various country centres indicated that large numbers of poultry would be on the market in the near future. There is already a limited demand for turkeys, but prices will in all probability advance for these. Some agents consider it would be advisable for poultry-breeders to take advantage of a bare market and sell while prices are good.

SOCIETIES, SHOW DATES, ETC.

BORORENN.—Bororen and Miriam Vale Agricultural and Pastoral Society. Secretary, James Crawford. Show dates: 14th and 25th May, 1921.

INGHAM.—The show dates of the Herbert River Pastoral and Agricultural Association have been altered to 26th and 27th August, 1921.

GOONDIWINDI.—MacIntyre Pastoral and Agricultural Association. Secretary, J. S. Hall. Show dates: 26th to 28th April, 1921.

UBOBO.—Ubobo Farmers' Progress Association.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MARCH, 1921.

Article.		MARCH. Prices.
Bacon	lb.	1s. 4½d.
Barley	bush.	...
Bran	ton	£10 10s.
Broom Millet	"	£25 to £29
Broom Millet (Sydney)	"	£20 to £40
Butter (First Grade)	cwt.	238s.
Chaff, Lucerne	ton	£10 15s. to £11
Chaff, Mixed	"	£8 to £8 5s.
Chaff, Oaten (Imported)	"	£8 to £9
Chaff, Oaten (Local)	"	£6 to £7
Chaff, Panicum	"	...
Chaff, Wheaten	"	£6 to £7
Cheese	lb.	1s. 2d. to 1s. 3d.
Flour	ton	£19 17s. 6d,
Hams	lb.	1s. 8d. to 2s.
Hay, Lucerne	ton	£7 to £8
Hay, Oaten	"	...
Honey	lb.	4d. to 4½d.
Maize	bush.	4s. 8d. to 4s. 11d.
Oats	"	3s. 6d.
Onions	ton	£4 to £8
Peanuts	lb.	5d. to 6d.
Pollard	ton	£10 10s.
Potatoes (English)	"	£3 to £9
Potatoes (Sweet)	"	2s. 6d. to 5s.
Pumpkins (Cattle)	"	£5 to £6
Eggs	doz.	1s. 1d. to 2s. 9½d.
Fowls	per pair	3s. 6d. to 9s.
Ducks, English	"	5s. 6d. to 6s.
Ducks, Muscovy	"	6s. 6d. to 9s.
Geese	"	9s. to 11s.
Turkeys (Hens)	"	12s. to 15s.
Turkeys (Gobblers)	"	25s. to 40s.
Wheat	bush.	6s. to 7s. 8d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	...
Beans, per sugar bag	2s. 6d. to 4s.
Beetroot, per dozen bunches	...
Cabbages, per dozen	4s. 6d. to 8s. 6d.
Carrots, per dozen bunches	1s. to 2s.
Cucumbers, per dozen	3d. to 1s. 6d.
Lettuce, per dozen	...
Marrows, per dozen	1s. 6d. to 3s. 6d.
Peas, per sugar bag	8s. to 14s.
Pumpkins (table), per doz.	2s. 6d. to 6s.
Rhubarb, per bundle	...
Sweet Potatoes, per sugar bag	1s. 6d. to 2s. 6d.
Tomatoes, per quarter case	2s. 3d. to 3s. 6d.
Tomatoes (inferior), per quarter case	...

SOUTHERN FRUIT MARKETS.

Article.	MARCH. Prices.
Bananas (Tweed River), per double case	7s. to 28s.
Bananas (Queensland), per double case	10s. to 23s.
Lemons, per bushel case	10s. to 14s.
Mandarins, per case	...
Oranges, per bushel case	10s. to 15s. 6d.
Oranges (Navel), per bushel case	...
Passion Fruit, per half bushel case	10s. to 11s.
Peaches	2s. 6d. to 6s.
Pineapples (Queens), per double case	6s. to 18s.
Pineapples (common), per double case	5s. to 7s.
Pineapples (Ripleys), per double case	5s. to 7s.
Quinces, per bushel case	3s. to 4s.
Tomatoes, per case	5s. to 7s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per case	5s. to 6s.
Apples, Cooking, per case	3s. 6d. to 6s.
Bananas (Cavendish), per dozen	3d. to 6½d.
Bananas (Sugar), per dozen	5d. to 7d.
Bananas (Lady's Finger), second quality, per dozen	...
Citrons, per cwt.	8s. to 9s.
Cocoanuts, per sack	£1 5s.
Grapes, per case	5s. 6d. to 10s.
Lemons (Lisbon), per quarter case	4s. to 5s. 6d.
Mangoes, per bushel case	...
Oranges, per case	...
Papaw Apples, per tray	3s. 6d. to 7s. 6d.
Passion Fruit, per quarter case	7s. 5d. to 13s.
Pears, per half-bushel case	...
Peaches, per quarter case	1s. 6d. to 4s. 6d.
Persimmons, per quarter case	3s. 5d. to 5s. 6d.
Pineapples (Queens), per dozen	3s. 6d. to 5s.
Pineapples (Ripleys), per dozen	4s. 5d. to 7s.
Pineapples (common), per dozen	3s. 6d. to 6s.
Plums, per quarter case	5s. 6d. to 8s.
Quinces, per case	4s. 5d. to 7s.
Tomatoes, per quarter case	...

TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1921.

Animal.	FEBRUARY. Prices.
Bullocks	£16 to £17 10s.
Bullocks (Single)	£20 5s.
Cows	£10 15s. to £11 2s. 6d.
Merino Wethers	26s.
Crossbred Wethers	27s. 6d.
Merino Ewes	20s. 6d.
Crossbred Ewes	27s. 9d.
Lambs	28s.
Pigs (Backfatters)	...
Pigs (Bacon)	...
Pigs (Porkers)	...

LONDON QUOTATIONS FOR TROPICAL PRODUCE.

Sisal hemp, per ton, £46. Rubber—Para, per lb., 11½d.; Plantation, per lb, 1s. 1⅛d. Copra, per ton, £33.

Farm and Garden Notes for May.

FIELD.—During this month, the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now at this work. Potatoes should be hilled up. Cut tobacco. The bulk of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Cotton-growers are notified that cotton-ginning and baling machinery has been installed on the premises of the Department of Agriculture and Stock in William street, where seed cotton will be received by the department from the growers, to whom an advance of 5½d. per lb. will be paid. The cotton will then be ginned, baled, and marketed in the best market, and whatever balance to credit is shown when account sales are received will be distributed amongst the suppliers according to the amount of cotton supplied by them. Only bare expenses of preparing the shipments and freight, if the cotton is exported, will be deducted. Thus it will be seen that cotton-growers will have a sure market for their produce. Every effort should be made to ensure feed for stock during the winter by utilising all kinds of green fodder in the form of silage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to their particular district and soil. A few acres of artificial grass, notably Rhodes grass, will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West will carry ten to twelve sheep to the acre. Coffee-picking should now be in full swing, and the berries should be pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Annetta, Phenomenal, Hautbois, and Trollope's Victoria. Aurie and Marguerite are the earliest. In some localities, strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

KITCHEN GARDEN.—Onions which have been planted in seed beds may now be transplanted. The ground should long since have been thoroughly cleaned, pulverised, and should be rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these as well as of peas, broad beans, kohl-rabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for asparagus.

FLOWER GARDEN.—Planting and transplanting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted; also such soft-wooded plants as verbenas, petunias, pentstemons, heliotrope, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs such as anemones, ranunculus, snowflakes, freesias, ixias, watsonias, iris, narcissus, daffodils, &c. Tulips will not suit the Queensland climate, but hyacinths may be tried, although success is doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip hedges and edgings.

Orchard Notes for May.

THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this Journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to speeking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this be done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil, keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting, but should there have been a dry spell, then, when the hole has been dug and the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free, sandy loams that are naturally scrub soils, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost —as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—may be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

THE TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild —viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the Southern Coast Districts being aqually applicable here.

THE SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district the growing of a crop of blue or grey field peas, or a crop of vetches between the trees in the older orchards, is recommended as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas phosphate, or fine bonedust, per acre. The crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen, as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months, and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; scaly fruit, scabby, warty, or otherwise unsightly fruit is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruits and the work of the orchard generally, made when dealing with the coast districts, apply equally well here, especially as regards handling the crop and keeping down pests.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING FEBRUARY, 1921 AND 1920, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of Years' Records.	Feb., 1921.	Feb., 1920.		Feb.	No. of Years' Records.	Feb., 1921.	Feb., 1920.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	9·29	19	6·42	7·11					
Cairns	14·83	38	18·34	18·73	Nambour	8·66	24	3·93	5·05
Cardwell	16·87	48	10·34	9·60	Nanango	4·45	38	0·86	0·60
Cooktown	13·53	44	7·28	14·62	Rockhampton ...	7·70	33	3·58	1·55
Herberton	7·42	33	3·08	5·12	Woodford	9·11	33	1·34	1·73
Ingham	15·44	28	13·35	11·97					
Innisfail	19·64	39	20·29	13·81					
Mossman	14·84	12	14·25	18·95	*Darling Downs.*				
Townsville	11·98	49	1·38	4·00					
					Dalby	2·97	50	0·26	0·68
					Emu Vale	2·36	24	1·69	0·55
Central Coast.					Jimbour	2·98	32	0·14	0·73
					Miles	2·72	35	1·17	1·15
Ayr	9·20	33	0·99	4·16	Stanthorpe ...	3·38	47	1·97	1·57
Bowen	8·80	49	3·88	0·77	Toowoomba ...	4·44	48	1·71	0·70
Charters Towers ...	4·52	38	2·15	0·78	Warwick	3·01	33	1·71	0·80
Mackay	11·61	49	15·81	3·54					
Proserpine	10·75	17	15·25	3·07					
St. Lawrence ...	8·11	49	4·86	2·15	*Maranoa.*				
					Roma	3·11	46	0·36	4·08
South Coast.									
Biggenden	3·84	21	1·29	0·73	*State Farms, &c.*				
Bundaberg	6·34	37	0·72	0·32					
Brisbane	6·33	70	1·07	1·04					
Childers	6·19	25	0·62	0·55	Bungeworgorai ...	2·95	6	0·53	3·30
Crohamhurst ...	15·03	25	3·82	3·85	Gatton College ...	3·05	21	1·07	0·18
Esk	5·66	33	0·42	0·79	Gindie	2·88	21	0·44	0·73
Gayndah	4·23	49	0·88	0·25	Hermitage ...	2·52	14	1·50	0·80
Gympie	6·68	50	2·59	1·85	Kairi	6·47	6	Nil	8·10
Glasshouse M'tains	8·90	12	2·16	2·56	Sugar Experiment Station, Mackay	10·27	23	16·41	3·06
Kilkivan	5·13	41	2·04	0·18	Warren	4·86	6	0·93	1·40
Maryborough ...	6·60	49	2·00	1·22					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for February, 1921, and for the same period of 1920, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.
AT BRISBANE.

1921.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·22	6·42	5·41	6·20	5·58	5·46
2	4·58	6·45	5·22	6·41	5·41	6·19	5·58	5·45
3	4·59	6·45	5·23	6·41	5·42	6·18	5·59	5·44
4	4·59	6·46	5·24	6·40	5·43	6·17	5·59	5·43
5	5·0	6·46	5·24	6·40	5·43	6·16	6·0	5·42
6	5·1	6·46	5·25	6·39	5·44	6·15	6·0	5·41
7	5·2	6·47	5·26	6·38	5·45	6·14	6·1	5·40
8	5·2	6·47	5·27	6·38	5·45	6·13	6·1	5·39
9	5·3	6·47	5·27	6·37	5·46	6·12	6·2	5·38
10	5·4	6·47	5·28	6·36	5·46	6·10	6·2	5·37
11	5·5	6·47	5·29	6·36	5·47	6·9	6·3	5·35
12	5·5	6·47	5·30	6·35	5·47	6·8	6·3	5·34
13	5·6	6·47	5·30	6·34	5·48	6·7	6·4	5·33
14	5·7	6·47	5·31	6·33	5·48	6·6	6·4	5·32
15	5·8	6·47	5·32	6·33	5·49	6·5	6·5	5·31
16	5·9	6·47	5·32	6·32	5·49	6·4	6·5	5·30
17	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·30
18	5·10	6·47	5·34	6·30	5·50	6·2	6·6	5·29
19	5·11	6·47	5·34	6·30	5·51	6·1	6·7	5·28
20	5·12	6·46	5·35	6·29	5·51	6·0	6·7	5·27
21	5·12	6·46	5·36	6·28	5·52	5·59	6·8	5·23
22	5·13	6·46	5·36	6·27	5·52	5·58	6·8	5·25
23	5·14	6·45	5·37	6·26	5·53	5·57	6·9	5·24
24	5·15	6·45	5·38	6·25	5·53	5·56	6·9	5·23
25	5·15	6·45	5·38	6·24	5·54	5·55	6·10	5·22
26	5·16	6·44	5·39	6·23	5·54	5·53	6·10	5·21
27	5·17	6·44	5·40	6·22	5·55	5·52	6·11	5·20
28	5·18	6·44	5·40	6·21	5·55	5·51	6·11	5·20
29	5·19	6·43	...	...	5·56	5·50	6·12	5·19
30	5·20	6·43	...	...	5·56	5·49	6·12	5·18
31	5·21	6·43	...	...	5·57	5·48	...	...

PHASES OF THE MOON, ECLIPSES, &c.

(The times stated are for Queensland, New South Wales, and Victoria, where the clock time is identical).

			H.	M.	
9 Jan.	●	New Moon	3	27	p.m.
17 „	☾	First Quarter	4	31	p.m.
24 „	○	Full Moon	9	8	a.m.
31 „	☽	Last Quarter	6	2	a.m.

Apogee on 9th. Perigee on 23rd.

8 Feb.	●	New Moon	10	37	p.m.
16 „	☾	First Quarter	4	53	a.m.
22 „	○	Full Moon	7	33	p.m.

Apogee on 5th. Perigee on 21st.

1 Mar.	☽	Last Quarter	abt. m'night		
10 „	●	New Moon	4	9	a.m.
17 „	☾	First Quarter	1	49	p.m.
24 „	○	Full Moon	6	19	a.m.
31 „	☽	Last Quarter	7	13	p.m.

Apogee on 5th. Perigee 21st.

8 Apr.	●	New Moon	7	5	p.m.
15 „	☾	First Quarter	8	12	p.m.
22 „	○	Full Moon	5	50	p.m.
30 „	☽	Last Quarter	2	9	p.m.

Apogee on 2nd and 30th. Perigee on 17th at 3 p.m.

ECLIPSES.

An Annular Eclipse of the Sun visible in North of Scotland but not in Australia will occur on April 8th.

An Eclipse of the Moon will occur on April 22nd, when the Moon will rise totally eclipsed.

The Planets Venus, Mars, and Uranus will be remarkably close together apparently on January 9th, and will form a fine celestial picture with the Moon on the 13th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

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 somewhere 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.