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Agriculture.

NOTES ON TOBACCO CULTURE.

BY NICHOLAS SACHOULIS, Turkish Cigarette Tobacco Grower and Expert, Inglewood.

PLANT-BEDS.

Burn the site. Well-burned "beds" give the most satisfaction, as burning destroys the vegetable and insect life. Select for your seed-bed fresh land near the water where it is not shaded. Do not burn when the ground is wet. Close sides with brick or timber 6 to 8 in. high; allow the ashes to remain on the bed, spade up twice and cross to the depth of 9 to 12 in., so that the ashes are well mixed with the soil; rake until the ground is well pulverised.

Sow seed with ashes. Do not make beds too narrow—3 ft. by 30 in.; sow two teaspoonfuls of seed to 100 square feet, and then take a board and press the surface so the seed is well covered with soil. After sowing, the beds should be covered with grass laid flat on the ground. Water the beds at once, using 15 gallons of water to every 100 square feet. When the plants begin to grow, water then twice a week, removing the coverings, and after rain take the grass off altogether. Cover the beds with open calico to make them insect proof. When the plants have four to six leaves, do not water them too much—only use just enough to keep them healthy. Thin out the plants and pull up any weeds, but these latter are not likely to be troublesome on "burnt" beds.

SELECTION OF SOIL.

For the production of bright pipe tobacco or Turkish cigarette-leaf, the soil must contain a large percentage of sand. The sandy bank areas of the Inglewood district includes some excellent soils for Turkish, and, when the rainfall is sufficient, for cigar and Virginia types as well. Many of the granite soils will grow good Turkish. Among our best soils for all types are the reddish sandy loams created by the blending of granitic and gold belt soils; these often have both the texture and the fertility. Volcanic, heavy black, or red soils grow a leaf too coarse and heavy for market requirements, and soils containing "Brack" or alkali should always be avoided.

All tobacco soils should have good natural drainage, and it is of particular moment to note whether granitic soils are underlaid with an impervous subsoil. New land or those freshly broken up from grass produce the brightest-coloured leaf, but their use is conditional on their being worked up to a perfect tilth before planting time.

PREPARING LAND.

The preparation of the land should not be left until the planting season, but should be done as early as possible. Two ploughings, cross-furrowing, and two harrowings will be sufficient. Work the fields up to garden tilth and keep them so by harrowing soon after every rain. Cultivation is one of the secrets of success in tobacco culture as well as any other crop culture, and it is just as important before planting as afterwards.

Tobacco plants that have been raised under cover should now be planted out as early as possible this month.

TRANSPLANTING.

Use strong, healthy plants only. Water bed before drawing plants; do not draw much ahead of planting requirements. Do not mix varieties. Give each variety the correct distance. Set the plants firmly; do not leave them dangling in a hole. Do not plant in a depression where soil can be washed over them. Define rows with a home-made marker.

For heavy pipe-tobacco, the plants should be set in straight rows 3½ ft. apart; for cigar-leaf, the rows should be 3½ ft. by 20 in. apart in the row; for cigarette-leaf, 3 ft. by 15 in.

The plants should be about 6 in. high when they are ready for transplanting and should be removed very carefully, and should not be allowed to get broken or dirty. Hollow out the place they are to be set in with a dibble—a pointed piece of wood. See that the hole is made large enough to allow the fibres of the roots to go straight down, and not allowed to double up or get twisted. Do not splash the water on the plants, but pour it in a hole beside them. Transplanting must be done at 4 o'clock in the afternoon after rain or in cloudy weather. Next morning the plants should be carefully covered over with light grass, to protect them from the heat of the sun till they have started growing. If dry weather prevails, each plant should be liberally supplied with

water. Do not remove the grass when watering. Healthy plants take root in a week's time. After rain remove the grass altogether.

Remarks:—Better to plant out 300 to 500 a day, and look well after them, than 5,000 and leave them alone. Covering the plants in the field is the best means of ensuring success for the tobacco-grower. Replace misses as soon as convenient, and thus secure an even stand.

INSECTS.

Flocks of turkeys, ducks, and fowls will hold these in check. Poison is the best thing. For grasshoppers and beetles, spray field and border with Paris green or arsenate of lead, 1 lb. making up to 50 gallons of spray.

CULTIVATION OF THE CROP.

When the plants have taken root, keep the soil thoroughly stirred by means of hand and horse propelled implements. Do not permit earth to cake around the plants. Weeds are a breeding-place for fungoid diseases and insects. Good leaf depends upon rapid and constant growth. The growth is in a large measure dependent upon the degree of cultivation. With a hoe lighten the ground and remove all the weeds from the plants, giving them a chance to start with their growth.

When the plants are 8 to 10 in. high, if it is possible, after rain the horse hoe should be run between the rows. Nothing can be better than this tool; it is an ideal implement for hoeing between the rows, earthing up tobacco plants, and keeping the field clean for growing crops.

Topping, pruning, and suckering will be dealt with in a future article in the Journal.

MARKETING FARM PRODUCE.

From the earliest days of farming in Queensland to the present time, the carelessness of some farmers in preparing their produce for market, whether oversea or by rail, has been proverbial. Anything in the shape of old, patched bags, or old disease-germ-carrying fruit-cases, was good enough, provided they were cheap and that they could be sent away from the farm before they burst or broke. Time and again, advice has been given as to the great benefit of getting up grain, hay, or fruit in an attractive manner, by which means a constant demand for well-got-up produce is always assured. Too often has this advice fallen upon deaf ears, notwithstanding clear evidence that the "shopping" as it may be called, of the goods—that is, presenting it in a marketable condition—invariably results in better prices and a certain demand. The baling of hay in an attractive style is an instance in point, and it must be confessed that much Queensland hay is not always marketed in a manner most likely to attract buyers. A little time ago some chaff was offered for sale in Brisbane, when the average price was £5 5s. per ton, and this particular consignment had to be sold for £3 10s. per ton, mainly on account of its clumsy make-up. Fruit, again, is often shipped

ungraded. A customer who finds cases containing fruit of all sizes is not likely to prefer this to cases of evenly-sized fruit.

Then, take the case of maize, wheat, and millet. Patched bags containing such produce are frequently in evidence. That this statement is correct, we can show by the fact that a merchant in Melbourne, who imports Japanese millet largely from Brisbane, makes complaints of the wretched condition of the bags the grain is shipped in. At the end of October, he received a consignment of 130 bags of Japanese millet. Of these, fully 120 were not fit for resale purposes. Each lot had to be rebagged on arrival; some of the bags were sewn with haybands, whilst a good proportion of the bags had huge holes that were partially sewn up with hayband. The merchant stated that in all his thirty years' experience he had never seen such inferior bags shipped, and he would not offer them for sale. During this season, he had purchased from Brisbane 2,000 bags of Japanese millet seed. To show the extent of loss owing to bad bagging, it is pointed out in this particular case that it is very difficult to secure a claim after weighbridge tickets have been produced, and this will mean that New South Wales will benefit by this merchant's orders for further shipments of Japanese millet, unless departmental action can prevent the exportation of valuable seed in inferior sacks. The South African law in relation to the export of grain and seeds is: New sacks—just as the Queensland law applies to new fruit-cases. This matter has seriously been considered by the Department of Agriculture, and we understand that action is being taken to prevent the shipping of farm produce unless in such a condition and in such packages as are approved by the Department.

In England, the various railway companies, as public carriers, provide bags for their clients, as well as trucks; so that, when a farmer wants bags, he has simply to tell the nearest station-master that he wants so many bags on a certain day. He receives them and has the use of them for three days, for which he pays one-halfpenny each. Within the three days, he fills the bags, and loads them on to the trucks, and his responsibility ceases. No charge is made for the bags during transit. The consigner has the same privilege as the sender.

PURE SEEDS ACT.

Following are the new regulations in connection with the Pure Seeds Acts of 1913 and 1914:—

1. " Kind " shall mean the variety of the order of a plant, grown from the seed, as known in the seed trade, at a place where the seed was grown.

2. " Foreign ingredients " shall include stalks, husks, shells (other than those normally adhering to seeds), earthy matter (including sand and gravel), seeds of weeds (detailed in Schedule C), and seeds other than those specified in the invoice.

3. " Low-grade seed or seeds " shall mean the kind of seeds in which the amount of foreign ingredients, including weed seeds, does not exceed

the proportion or amount set forth in Schedule B, but in which the amount of non-germinable seed may be not more than 50 per cent. in excess of the amount set forth in Schedule B.

4. The regulations shall not apply to—(*a*) Seed that is sold direct to seed merchants, to be cleaned and graded before being offered for sale; (*b*) seed that is held in storage for the purpose of being cleaned or recleaned, and which has not been offered, exposed, or held in possession for sale; (*c*) seeds indented from countries beyond Australia for planting for green manure.

5. The weights of seeds to be taken as samples for purposes of examination shall not be less than as mentioned and set forth in Schedule A.

6. The proportion or amount of "foreign ingredients," including dead, diseased, insect-infested, and non-germinable seeds, which may be contained in any quantity of any kind of seed shall not exceed the proportion or amount set forth in Schedule B, except in the case of low-grade seeds; (*d*) all invoices and labels relating to these regulations.

7. No seeds shall be sold as low-grade seeds unless—(*a*) Contained in bags or packages, which must be branded on the outside, on both sides of the bag from top to bottom, with a red stripe at least two inches wide; (*b*) Inside each bag or package containing such low-grade seeds there is enclosed and displayed on top of the opened bag or package a red label (measuring at least six inches by four inches), and bearing in heavy type, black letters, the words "Low-grade seeds"; (*c*) all invoices and labels relating to such seeds are distinctly marked with "Low-grade seeds" in red type, following the name of the seed.

8. The fee for a copy of the result of any examination of any sample of seed, payable under subsection (2) of section 9 of the Act, shall be two shillings and sixpence.

9. Any person guilty of any contravention of these regulations shall be liable to a penalty not exceeding £10.

Schedules are appended setting forth the maximum amount of foreign ingredients permitted in seeds and the percentage of dead non-germinable seeds allowed while another schedule contains a list of weeds.

POTATO-GROWING IN THE CENTRAL AND NORTHERN DISTRICTS.

BY G. B. BROOKS, Instructor in Agriculture.

In regard to potatoes, Queensland has to depend upon the Southern States for a large share of her requirements. During the last year, statistics show that some 400,000 bags were imported into our State from outside sources.

When we consider that good prices have been ruling for this product for some considerable time, that there are extensive areas of soil suitable for potato culture, and that the climatic conditions over a large portion of the State are such that they permit the growing of two crops during the year—instances not being rare where three have been secured off

the same land during the twelve months—the question is forced upon us: "Why cannot we supply our own requirements?"

It must be admitted that in several of our older agricultural districts in the Southern portion of the State, the potato is being largely grown and the methods adopted in the raising of such are fairly well understood.

In the Central and Northern areas this indispensable article of diet is not cultivated to any extent, although around Townsville some consideration is being given to the question of supplying local requirements.

CLIMATIC CONDITIONS.

Unfortunately, many of the settlers in these districts look upon this product as being essentially a temperate climate one, and give little attention to its culture. The low yields thereby obtained are therefore credited to unsuitable climatic conditions rather than to the mistakes made in the raising of the crop.

The fact must not be lost sight of that conditions of climate, temperature, moisture, &c., determine, to a very large extent, the class of crop that can be profitably raised in a given district. For example, it would be absurd to advise farmers to engage in wheatgrowing on the tropical coast, and it would be equally foolish to recommend those in the Darling Downs to take up cane culture.

The potato is a plant, however, that, although usually grown in cool districts, can adapt itself to a very wide range of climate, being successfully raised in Iceland as well as in Central Australia.

Although capable of production under both arctic and tropical climes, the farmer who is out after high yields has to recognise that temperature is the controlling factor in the securing of such. To be successful, extremes of temperature have to be avoided. The advent of very hot weather while the crop is maturing results in largely decreasd yields and a poor-quality tuber, while a fairly heavy frost invariably means total destruction. It is therefore apparent that the growing season lies between those two points—high temperature and frost.

Every effort should be made to mature the crop during the cool months—of course, avoiding frost.

In districts free from such, the growing period is fairly lengthy, thus allowing a good deal of latitude in regard to planting, but in localities where there is a danger from low temperatures, two crops are grown; these are known as the summer and winter crops, one maturing before the advent of frost, the other being planted immediately after. The period favourable for the production of high yields and quality is, by this division, considerably shortened—so reduced in fact, that there is not a scrap of margin left for the farmer to work on. To ensure a full crop everything must be in order at the right time. Land in best of tilth, the necessary moisture conserved to ensure immediate germination, together with well-sprouted seed of a variety suitable to local conditions.

In some of our potato-growing districts, experience has taught the farmer the detrimental effect of hot weather on a late-maturing summer crop.

I have seen whole fields that, although looking the picture of health, failed to produce a single potato worth digging. The forcing effect of heat, together with a plentiful supply of moisture coming before the tubers set, caused the plants to run to top or haulms.

The effect of this has been that many growers have shifted the planting season for the summer crops forward by about a fortnight, taking the risk of having their crop cut down by a late frost, knowing that if they escape a largely increased yield will be secured.

It will be seen by the above remarks that, for the summer crops, planting must be undertaken immediately all danger of heavy frost is over, while for the winter crop this operation should be deferred until the hot weather has passed—just leaving sufficient time for the crop to mature before a cold snap, severe enough to check growth, is likely to be experienced.

PREPARATION OF THE LAND.

From what has already been said, it will be observed that successful potato culture largely depends upon the getting of the crop into quick growth. This end cannot be secured altogether by early planting even with well-sprouted seed. The necessary moisture must be present, together with a supply of readily available plant food. The means by which these essentials can best be secured is by adapting a system of early preparation of the land. This point is of such importance in potato-growing that I think it could be laid down as an axiom that "the man who prepares his land three months ahead of planting has cultivated for a 5 to 7-ton crop in a good season and a 2-ton crop in a bad, while the man who prepares his land a few weeks ahead of planting has cultivated for a 30-cwt. crop in a good season and a total failure in a bad."

Incidentally, it may be mentioned that this applies to other crops as well, and if put into effect would undoubtedly be the means of doubling the returns.

In potato culture the soil should be put into thorough tilth. Deep cultivation should be practised—8 in. at least; 10 in. if the soil will permit.

SOIL.

A potato soil consists of a well-drained friable loam. Soils inclined to bake should be avoided, but these can be vastly improved by the ploughing under of green manure, such as cowpea or beans. Heavy, stiff soils should be treated to an application of lime.

SEED.

In the warm portions of the State great care should be exercised in the selection of varieties suitable for local conditions as well as securing sets that have commenced to sprout. Unquestionably, the planting of unsuitable sorts, together with backward seed, has been the cause of many failures and poor returns.

For the summer crop, at least, preference should be given to early and medium varieties. Late-maturing sorts are invariably liable—if

growth is at all retarded—to make second growth, giving a badly shaped, unprofitable tuber of poor quality.

" Up to Date " and " Brownell's " are varieties that do particularly well in the North, while " Circular Head " (also known as " Blue Skins ") are of the type that develop second growth.

PLANTING.

In localities where heavy rainfall is at all likely to occur during growth, planting in ridges or hills is recommended. In drier situations, raising the crop on the " flat " is more desirable; the plants to be slightly hilled up as a protection from heat and insect pests.

The ridges or hills should not be pointed, but set up with a V depression on top, as illustrated.

The advantages of the V-shaped hill are: It better conserves the moisture; germination is much quicker, there being a less depth of soil to penetrate; and the crop can be harrowed after showing through, without harm.

When water is available at a reasonable depth and land suitable, profitable potato-growing can be practically assured. Two waterings are invariably sufficient to ensure a crop, even without any rainfall; the second to be applied just when the tubers are beginning to form.

Information in regard to manures, diseases, &c., are dealt with in the pamphlet, " The Potato," which can be procured by making application for same to the Department of Agriculture.

EXTENDING THE AREA UNDER FOOD CROPS IN QUEENSLAND.

The Royal Commission on Food Supplies and on Trade and Industry during the war has reported to His Excellency the Governor-General that, if the war is prolonged for a year or more, the pressure on food supplies is likely to become acute.

The full effect will be felt of the destruction of and failure to reap some crops in France, Belgium, Austria, and partly Russia, and there is an expected shortage in the Canadian and Australian wheat crops.

The feeding of Great Britain and of the Allies is of the utmost importance, and the Minister for Agriculture hopes that the farmers of Queensland will so far help, even if it be in but a small way, by extending the area under cultivation, particularly with wheat, maize, and potatoes. By adding to the quantity for export or by preventing the increase in price through the need for the importation of any crop or produce, a grower is giving more to the community generally than by a direct contribution to this or that fund.

EXTENSION OF THE AREA UNDER WHEAT.

Whilst the dairying industry has been progressing in an almost phenomenal manner in Queensland of late years, the purely agricultural prospects and possibilities have been to some extent not properly realised. For instance, although very large areas of Queensland are eminently adapted to wheat culture, the State only produces about one-half of its requirements of this cereal, yet Queensland, in spite of the capriciousness of the seasons, has maintained her position among the States as producing a greater average to the area of all the States excepting Tasmania. In view of our dependence upon other States for wheat supplies, the Minister for Agriculture has decided upon a course of action with a view to inducing farmers to put in larger areas of wheat during the coming season, and to that end, to assist them, at this critical period of the wheat industry, to make Queensland at least for one year self-supporting insofar as regards this essential cereal. The following are the proposals of the Minister, and they are so very liberal that we shall be surprised if farmers who have sufficient suitable land not absolutely required for other purposes, such as lucerne-growing, do not avail themselves of the opportunity to utilise it for wheat-growing:—

EXTENSION OF AREA UNDER WHEAT FOR SEASON OF 1915.

The Minister for Agriculture will receive applications from farmers, who, for the extension of the area under wheat during 1915, require financial assistance. Each application will be subject to inquiry and will be decided by the Minister upon the merits of the case.

Financial assistance will be given for the following purposes, and will be a first charge upon the crop, and is to be repaid by 31st December, 1915:—

1. For increasing the area under wheat, over and above the area planted upon a farm during 1914. Assistance in this respect will only be given where the land has been or can be cleared and ploughed by the 28th February, 1915.
2. For planting new land upon a farm which wheat has not before been grown.
3. For the supply of seed for planting.
4. To obtain implements for the cultivation of new land and for harvesting in cases where the farmer does not possess such implements.
5. For the hire of horses or motor power.
6. For the payment of portion of extra labour required.

All farmers who wish to make application should be particular in furnishing the information concerning the assistance required, so that there may be no delay in making the necessary inquiries.

Applications are to be addressed to, and must be received by, the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than the 10th December, 1914.

ERNEST G. E. SCRIVEN,
Under Secretary.

Department of Agriculture and Stock,
Brisbane, 16th November, 1914.

MARKET GARDENING.

GROWING RHUBARB IN THE TROPICS.

By J. NEWMAN, Rockhampton.

Rhubarb can be grown in the tropical parts of Queensland as easily as in the more temperate districts, or Southern States.

The chief difference in its cultivation and treatment lies in the fact that it must here, in Central Queensland, be grown as an annual.

I have in one season grown 500 bundles of good marketable rhubarb on one and a-half chains of land, and anyone can do the same by observing the following hints on its cultivation from the sowing of the seed to maturity of the crops.

Sow in February, in boxes of rich soil, and as this is the wet season, and the young plants are liable to damp off with excessive heat and moisture, place the boxes under the shelter of a veranda and water when necessary.

Sow again in March, in the open ground, in beds richly prepared, and raised at least 6 in. above the surrounding land. Shelter from sun with dry boughs, and from excessive wet with boards.

It is now only necessary to say—treat them as you would cabbage plants, transplant when they are the size of cabbage plants, and plant them the same distance apart in permanent beds as you would cabbage plants, but do not plant with a dibble as their long tap roots (they often have three or four) might become twisted together in the hole. It is best to make a straight cut down with a trowel, and spread out the roots against side fanwise and then close in firmly.

It must be remembered that rhubarb, like all the Brassicas, is a gross feeder, perhaps even more so, and although botanically belonging to an entirely different class of plants, it requires the same liberal treatment—deeply trenched and heavily-manured land, a heavy surface mulch of manure, and an abundance of water.

Four months after sowing the stalks should be fit to pull. Take one from each plant at first, and never at any time leave less than three strong stalks, or the plant will suffer.

From May to November is the rhubarb season in tropical Queensland; after that the intense heat will kill them off. I have always grown my own seed by allowing selected stalks to flower, and I find it equal to that obtained in the South.

Pastoral.

SHRINKAGE OF WOOL WEIGHTS IN STORE.

This question has cropped up since the war began, and I have frequently been asked questions on this very important matter. I therefore think it well to put my views on it before the public through the "Queensland Agricultural Journal."

Prior to my appointment in the service of the State I was a scouring contractor, sheep and wool classer, handling from 4,000 to 5,000 bales of wool per annum.

At Coongoola Station, Cunnamulla, in 1894, I was asked to refund on an average of 8 lb. per bale in 2,100 bales of wool classed and scoured by me in 1893. This was the difference between the station weights and the London weights—shrinkage between Coongoola and England. For the first time, I believe, the wool had gone round by Torres Straits and the Red Sea in an iron steamer. I had never seen such a shrinkage before. The wool was properly weighed here by the station storekeeper on new scales, and these weights were checked in Brisbane, and I am sure that the London weights were correct.

For several years after 1894 I watched the weights carefully at each end, having access to the London weights when the account sales came forward. This, not only on Coongoola, but on other large stations whose wool I handled. I also made inquiries in other directions.

I mention the above to show that I speak with a certain experience, and can speak with authority.

The results of my observations and inquiries are as follows:—

It is known by exact experiment that wool, like sugar, salt, &c., has the power of absorbing moisture from the atmosphere. Professor Bowman, in his work, "The Structure of the Wool Fibre," p. 249, states:—"With regard to the water of hydration, this is an important matter commercially as well as chemically, because no one can afford to pay for water in place of wool, and it is well known that water is not infrequently added in order to increase weight. As the wool is obtained from the farmer, it differs very widely in different classes and seasons, as might be expected."

The author made a series of experiments with well-washed wool to endeavour to decide how much water was really associated with the fibre as water of hydration—that is to say, water which really belongs to the fibre in its natural condition—moisture which it will take up from the air when it is left exposed at ordinary temperatures. He found that after drying a number of samples of wool at 100 degrees Fahr., and then

exposing them to the air in an ordinary warehouse, unheated in any way, with a temperature of from 50 to 60 degrees Fahr., the following was the result:—

Lincoln hogs	7 per cent. gain
Lincoln wethers	9 „ „ „
Leicester hogs	6 „ „ „
Leicester wethers	10 „ „ „
Irish hogs	7 „ „ „
South down	9 „ „ „
Skin wool	10 „ „ „

The average gain thus was 8·28 per cent.

A number of other experiments were carried out, to which I must refer those interested. This property of wool (hygroscopic) was recognised as far back as 1875, and at the International Congress held in Turin in that year, the standards of moisture were fixed for (amongst other textiles) worsted yarns at 18¼ per cent. Since then, conditioning houses have been established in every wool manufacturing centre in the world, and now, as Profesor Bowman states, " the following tables (p. 253) show the standard allowance of moisture adopted for cotton and other materials at these testing-houses. Taking wool alone—

TABLE OF WATER ALLOWANCE.

	Manchester.	Bradford.
Worsted yarn	18¼ per cent.	18¼ per cent.
Carded woollen yarn	17 „ „	17 „ „
Tops combed with oil	19 „ „	19 „ „
Tops combed without oil	18¼ „ „	18¼ „ „
Noils	14 „ „	14 „ „
Scoured wools	16 „ „	16 „ „
Shoddy yarns	13 „ „	13 „ „

It has been found by a number of experiments conducted in these places that if wool be subjected to the highest temperature it can sustain without scorching, it will regain from 18 to 18½ per centum of moisture, and we may, therefore, regard this as its normal condition under the usual atmospheric conditions.

" Of course, this loss in washed wool would probably indicate a much larger one on the wool as it comes from the farmers' hands, but there is always difficulty in measuring it, because of the large quantity of grease, earthy matter, and other substances which are mechanically associated with the wool." Thus Professor Bowman.

Well, as sheep are shorn in Australia under climatic conditions varying from extremely dry to extremely wet, it follows that a hard-and-fast average of gain or loss in storage cannot be determined.

If seasonal conditions be dry when the wool is pressed on the station, and it has been properly dried from the scour, it is likely that there will be a gain in weight of the wool stored on the coast. This because the average humidity of the coastal areas is much greater than that of the Western country.

On the other hand, if the sheep be shorn in a wet season in the West, and the wool consequently carries a percentage of atmospheric moisture or water through not being properly dried from the scour, then there is a likelihood of considerable shrinkage in the store.

This shrinkage cannot be determined any more than can atmospheric conditions be determined months in advance by the meteorologists.

The conclusion of the matter then, is:—*First*—Hard-scoured and hard-dried wool from the West, in a dry season there, sent to the coast and stored for months where the average humidity is always greater, should gain in *weight of water not* in weight of wool. Wool itself cannot gain in weight. *Second*—Wool pressed under damp atmospheric conditions in the West, or imperfectly dried from the scour, will lose in the store, or at least, will not gain in weight. Wool itself cannot lose weight. *Third*—Without knowing exactly the conditions of humidity, amount of moisture left in wool in drying, and degree of humidity on the coast during the period between shearing and shipping abroad, it is impossible to give even an approximate estimate of loss or gain in wool weights for Western clips in store.

As a corollary to the above, it is certain that no machine will ever be invented to settle the " Wet Sheep " question in shearing sheds.

For instance: A flock of sheep is being shorn under dry conditions. Just before rain falls the shed is filled with sheep. Then the wool of these last, which has not been rained upon, will show a percentage of moisture greater than those shorn under the dry conditions. The wool has absorbed moisture in the same way as sugar or salt. Ask the wool-pressers when is the easier time to get the scheduled weight into the bales —before or after a wet spell?

The machine, whatever it may be, must show moisture in wool, in greater proportion after than before rain, even if the sheep had not been rained upon for weeks before the test.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF OCTOBER, 1914.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Nellie II. ...	Shorthorn... ...	20 July, 1914	1,133	3·8	50·48	
Rosebud ...	Ayrshire	20 Sept. ,,	1,069	3·3	41·20	
Lark ...	,, ...	27 July ,,	838	3·9	38·29	
Madam Melba	Holstein	8 Sept. ,,	1,175	2·8	38·21	
Miss Bell ...	Jersey	25 Sept., 1913	583	5·0	34 39	
Honeycombe	Shorthorn... ...	23 Sept., 1914	9·6	3 1	33 12	
Miss Edition	Jersey	10 July ,,	721	3·9	32·95	
Countess of Brunswick	Shorthorn... ...	26 July ,,	746	3·6	31·40	
Burton's Lady	,, ...	23 July ,,	774	3·4	30 72	
Sweet Meadows	Jersey	28 July ,,	538	4·6	29·18	
Lady Margaret	Ayrshire	19 June ,,	685	3 6	28·84	
Silver Nell...	Shorthorn ...	5 Oct. ,,	705	3·5	28·83	
Auntie ...	Ayrshire	26 June ,,	680	3·6	28·63	
Lady Melba	Holstein	6 Mar. ,,	698	3·5	28·54	
Lady Dorset	Ayrshire	20 Sept. ,,	719	3·3	27·64	
Lady Athol	Shorthorn ...	10 July ,,	613	3·6	25·80	
Davidina ...	Ayrshire	17 July ,,	726	2·9	24·46	
Bluebelle ...	Jersey	27 Mar. ,,	612	3·4	24·29	
Lowla II. ..	Shorth'rn-Ayrshire	23 Sept. ,,	728	2·8	23·66	
Sylvia II. ...	Shorthorn ...	21 Sept. ,,	699	2 9	23·55	
Lady Lil ...	Jersey	22 Aug. ,,	611	3·3	23·52	
Lennie ...	Ayrshire	15 Aug. ,,	552	3·6	23·23	
Lucinda ...	,, ...	20 Sept. ,,	672	2·9	23·64	
Cocoatina ...	Jersey	20 April ,,	387	4·9	22·36	
Gretchen ...	Holstein	6 May ,,	589	3·2	21 96	
Lady Maid...	Shorthorn... ...	17 Mar. ,,	427	4 3	21 60	
Lady Lark...	Ayrshire	23 Sept. ,,	442	4·0	20·72	

Ration fed: 20 lb. of sorghum ensilage and 2 lb. of bran per cow.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1914.

Five thousand eight hundred and seventy-nine eggs were laid during the month (up to evening of 30th), an average of 147 per pen. The Derrylin Poultry Farm White Leghorns win the monthly prize with 163 eggs. The following are the individual records:—

Competitors.	Breed.	Oct.	Total.
T. Fanning	White Leghorns ...	142	896
A. T. Coomber	Do.	158	891
Kelvin Poultry Farm	Do.	131	842
Moritz Bros., S.A.	Do.	152	829
Loloma Poultry Farm, N.S.W.	Do.	157	826
Loloma Poultry Farm, N.S.W.	Rhode Island Reds ..	156	820
R. Burns	Black Orpingtons (No. 1)	146	801
Geo. Tomlinson	White Leghorns ...	158	798
Cowan Bros., N.S.W.	Do.	159	788
J. T. Coates	Black Orpingtons ...	135	768
E. Le Breton	White Leghorns ...	161	765
R. Burns	S. L. Wyandottes ..	148	763
A. F. Camkin, N.S.W.	White Leghorns ...	153	751
A. H. Padman, S.A.	Do. ...	159	743
R. Burns	Black Orpingtons (No. 2)	147	743
Mrs. Bieber	Brown Leghorns ...	152	742
J. R. Wilson	Do.	126	739
Mrs. Munro	White Leghorns ...	160	728
T. Fanning	Black Orpingtons ...	150	727
Marville Poultry Farm, Victoria ...	White Leghorns ...	160	723
E. V. Bennett, S.A.	Do.	147	720
R. Jobling, N.S.W.	Do.	138	718
J. Franklin	Do.	147	718
Derrylin Poultry Farm	Do.	163	718
J. Gosley	Do.	132	716
J. T. Coates	Do.	147	714
Geo. Austin	Do.	138	711
F. McCauley	Do.	154	707
J. D. Nicholson, N.S.W.	Do.	135	699
J. Manson	Do. (No. 1)	140	699
J. Kilroe	Do. (No. 2)	145	681
Mrs. Bradburne, N.S.W.	Do.	151	671
Range Poultry Farm	Do.	148	670
Douglas Moreton, N.S.W.	Do. ...	138	667
J. Kilroe	Do. (No. 1)	121	664
J. Zahl	Do.	143	654
C. M. Jones	Do.	147	640
J. N. Waugh, N.S.W.	Do.	139	634
J. Murchie	Brown Leghorns ...	149	613
J. M. Manson	White Leghorns (No. 2)	140	607
Total	...	5,879	23,904

In regard to the 1915-16 competition, we desire to state that, in spite of the fact that the number of pens is to be increased to 52, the whole of the accommodation has been allotted, and no further entries can be received.

A SIMPLE METHOD OF PRESERVING EGGS.

At this time of the year many poultry-keepers would benefit by saving eggs for the Christmas demand. There are two methods of accomplishing this, both of them cheap and effective. One is the limewater solution, the other the water-glass solution.

For the first, 16 oz. of quicklime are thoroughly slaked in 1 gallon of cold, previously boiled, water. This is to be well stirred, allowed to settle, and the clear solution drawn off. Place the eggs in a clean kerosene tin (preferably an earthenware jar). Pour the clear limewater over them, and allow the upper layer of eggs to be 3 in. below the surface. Close the vessel tightly and place in a cool, dark pantry or cellar. Water-glass is silicate of sodium, a thick liquid, almost transparent, colourless, and devoid of any odour. For use, every quart of water-glass should be thoroughly mixed with 9 quarts of boiling water. As soon as it is cold it is ready for use. Pour the solution over the eggs in the same way as in the limewater method. Cover tightly, and keep in a cool place. When the eggs are to be removed, draw off the solution and wash them.

Now we come to a still more simple and inexpensive but equally effective method of egg-preservation. The main object of preservatives is to prevent the air from penetrating to the inside of the egg. But this alone will not entirely avert putrefaction because the elements of putridity already exist in the pores of the shell. Consequently, to obtain a perfect preservation, it is necessary not only to prevent the atmospheric air from entering the egg but to retain the life-power of the organisms in it.

The eggs to be preserved by the following process must first be carefully examined to see if any are cracked or split. Such eggs must be rejected. Then the eggs are placed in a bath of lukewarm water (95 degrees Fahr.), in which they must remain for 15 minutes. When taken out they must be well rubbed with a soft rag to remove all dirt particles from the shell. When they are clean, they are placed in a sieve and plunged for exactly 4 to 5 seconds in boiling water, and at the expiration of that time they are to be taken out and cooled off in cold water and laid on a cloth to dry in the air. Care must now be taken that they are not rubbed by the cloth. As soon as dry, they must be placed in boxes, and packed in chaff, chopped straw, oakum, or suchlike material and put away in a dry, cool place. The packing material must be perfectly dry. By the immersion in boiling water for 5 seconds, the fungi and bacteria in the egg are all destroyed. At the same time, owing to the high temperature, a coagulation of the inner tissue which unites the shell to the skin of the egg takes place, by which the pores of the shell are closed, thus preventing any further infection. The main difficulty of the operations lies in the exact duration of the 5 seconds during which time the eggs are plunged into the boiling water and the care required to see that the packing material is absolutely dry. If the eggs are kept in longer than 5 seconds, it results that, especially in thin-shelled eggs, a portion of the albumen under the skin coagulates, and that no destruction of the fungus germ takes place. Hence the whole result depends entirely upon the immersion of the eggs from 3 to 5 seconds—preferably 4 seconds—in the boiling water. This method, owing to its simplicity and cheapness, is adapted not only to the householder or farmer but also for those dealing largely with eggs in their business. Eggs preserved in this manner have been proved to be perfectly fresh and good, and could not be distinguished either in taste or smell from fresh-laid eggs.

State Farms.

NOTES FROM KAMERUNGA STATE NURSERY FOR SEPTEMBER, 1914.

Rainfall for the month, 3·44 in.; number of days on which rain fell, 12; maximum solar thermometer on the 22nd, 153°; minimum terrestrial thermometer on the 2nd instant, 51°. It is now some years since such good rains have fallen during the month of September, and being spread over some days the ground was given a chance of getting nicely wet through without any water running away. Rows of various cereals and cowpeas planted in August are now looking up; on the other hand, weeds which are generally easy to keep in check at this time are growing fast.

The Nursery exhibit was taken to the Ingham Show during the month, and caused a good deal of interest.

Vanilla.—The first few flowers are just beginning to open, and hand-pollinating has started.

Algaroba.—Owing to notices and accounts of this tree which have appeared from time to time, applications for seeds have been coming to this nursery, I would therefore like to point out that although this tree grew, and fruited here many years ago, we have none here at present, as it was destroyed by a cyclone, and although others have been planted they have not so far been successful. Some months ago I obtained a little seed from California, but this has been distributed.

WARREN.

The Manager, Mr. Thos. Jones, in his report of the work, &c., on the farm for November, gives particulars of the experimental plots planted, of maize, sorghum, millets, buckwheat, sunflower, gram, Soja beans, Horse-bean, field-pea, all of which are looking well, thanks to good cultivation and a few showers of rain during the month. Lucerne, owing to the effects of strong drying winds, only gave a small cutting. New land is being cleared in the hope of having an extended area under maize this year. All cleared land is also being prepared for the same purpose. The manager wishes to remind readers of the Journal that the stallion-fee has been reduced this year to £2 2s. per mare. All stock is in splendid order and condition. The district as a whole is in need of rain. Referring to the planting of larger areas of maize, he has spoken to several farmers on the subject, and has been assured that, given a good rainfall, they will probably plant a larger area this year.

Horticulture.

IMPORTANT TO SHOW COMMITTEES.

The Rev. W. Wilks, writing to the "Royal Horticultural Society Journal," draws attention to a paper read in 1911 on

"DIFFICULTIES IN FLOWER SHOW SCHEDULES,"

in which he pointed out errors of frequent occurrence and their remedy. He says:—

"That this paper met a need and has been of some assistance to horticultural societies is, I think, proved by the fact that whereas formerly I used always to have a very heavy correspondence, during the months of July and August especially, relating to disputes on points of disagreement in schedules, I now receive such letters comparatively rarely. During the last two years I have collected a few further errors which have occurred and to which I think it worth while to call attention of other societies.

"1. *A dish of fruit—four varieties.*

"An exhibitor staged two varieties of apples, one of tomatoes, and one of pears.

"It was contended that four varieties of *one kind* of fruit were meant, but the schedule did not say so. Any four varieties of fruit, either of the same or of different kinds, were probably eligible.

"I say 'probably,' for it is doubtful whether such an exhibit should not be disqualified, as it would consist of four dishes of fruit, and the schedule only asks for 'a' dish—*i.e.*, one dish containing four varieties.

"1A. Another example of the same error was as follows:—

Fruit—Collection of six varieties; white and black grapes allowed.

An exhibit of one bunch each of black and white grapes, one dish of figs, one of peaches, one of nectarine ('Pine Apple'), and one of nectarine ('Humboldt') was disputed on the ground that only one nectarine variety was eligible. As a matter of fact, four or even six varieties of nectarines would not have disqualified the exhibit. *Varieties* were asked for. The schedule should have asked for six kinds.

"2. *Six stems of different varieties of Sweet Peas.*

"The exhibitors were, one and all, staging one stem each of six varieties. To do so was quite within the wording of the schedule; or they might have staged six stems of each of an unlimited number of different varieties, without disqualification. What the Show Committee really intended to ask for was 'six vases of different varieties of Sweet Peas, six stems in a vase.'

"3. *The best collection of Hardy Flowers. No duplicate bunches or mixed bunches allowed.*

"The question arose—Were *Phlox decussata*, vars. 'Tapis blanc,' 'Etna,' and 'Sheriff Ivory' to be considered as 'duplicate bunches?'

"No, certainly not. The schedule did not specify one variety of each kind, and different varieties of one kind cannot be considered duplicates of each other.

"4. *Nine Hardy and Half-hardy Annuals—dissimilar.*

"A dispute arose because one exhibit contained two annual chrysanthemums of different colours.

"The term 'dissimilar' is one which should have no place in horticulture, and it is not recognised by the Royal Horticultural Society. To put the case thus: Two men are walking along the road—one wears a green hat and the other a brown. Are they similar or dissimilar? As men they are similar, and different hats cannot make them otherwise; but as specimens of colour or varieties of clothing they are dissimilar.

"The word is a very bad one to use, and will give endless trouble in a schedule. 'Distinct kinds' or 'distinct varieties' restrict to narrow limits the latitude for misunderstanding.

"5. *A class for Sweet Peas 'shown with own foliage.'*

"It was contended that the foliage meant was that actually belonging to the individual plant from which the flowers themselves were gathered.

"This is not the interpretation for flower-show purposes. So long as the foliage is that of the Sweet Pea (*Lathyrus odoratus*), and not of any other *Lathyrus* or *Pisum*, the intention of the schedule is met."—"Royal Horticultural Society Journal."

ADVICE TO THE FARM DYNAMITER.

Mr. J. F. Keane, of Carbeen, writes:—

Among all that appeared in the Journal concerning dynamite on the farm, one piece of knowledge I have always found of great value, so far as I saw, escaped mention.

The ordinary miner's hammer and drill is the best set of tools with which to sink shot-holes in any earth at any angle. I have always used a 2 ft. 6 in. length of 1¼-in. octagonal steel and a 4-lb. hammer, the drill done up or sharpened as for rock.

Anyone, not a miner, beginning with the tools may be given a little instruction, such as the following:—

Clean off turf or rubbish down to the firm earth at the spot you intend to enter the drill. Lift the drill an inch or two and turn it about a quadrant after every blow of the hammer. In loose soil do not strike too hard for the first 6 in., as the drill may have a tendency to bog. After the first foot of its descent the drill cannot be struck too hard in the softest loam. For any greater depth than 2 ft. 6 in. it is advisable to use a 6-ft. length of steel and "jump" the rest of your hole down. No scraper to withdraw "drilling" is required in alluvia as the displaced earth imbeds in the surroundings. Stones are either turned aside or shattered, giving no trouble. If a root is encountered, pull out and start another hole; the drill goes down so quickly the time lost is immaterial. I always stump and split with powder, but that is only because I am used to it. Had I started with dynamite and been at it for more than thirty years, I have no doubt I should prefer it. Smaller drill, lighter hammer, quicker work, and, as experience was gained, probably much better work.

Vegetable Pathology.

SMUT DISEASE IN MAIZE.

A preliminary and exhaustive report on the occurrence of a maize disease in certain parts of the Toowoomba district was made to the Department of Agriculture in February, 1895, by Mr. H. Tryon, Government Entomologist and Vegetable Pathologist. The disease was known as "Smut of Indian Corn," and was of the variety caused by the invasion of a parasitic fungus named *Ustilago maydis*. The advice given then was acted upon, and since then the disease has never been a subject of complaint (*vide* Mr. Tryon's letter of 29th June, 1914) until the matter was brought to the Department's notice by Mr. A. Reid, Kingaroy, Coolabunia, on 12th June, 1914. On the 12th October, 1914, Mr. Reid sent to the Department a box full of fungus-smut, and Mr. Tryon wrote, on the 24th, on the subject as follows:—

" The disease on the evidence of this material, then, is doubtless the maize-smut that I have earlier written about, under the term *Ustilage maydis Corda*, and which was investigated by this Office in February, 1896.

" In its case the originating cause has doubtless been some of the fine black material that constitutes the smut whence the affection derives its name, and that derived from an instance of the malady elsewhere has been conveyed to the Coolabunia district in seed or has been transported thereto by the wind from a maize-field smitten with it outside, for there are good grounds for concluding that this variety of smut is a speciality of the plant whereupon it occurs. Without entering into the technicalities regarding the connection between the smut-fungus and its host plant, that results in the enormous growth filled with black powder that is its predominant symptom; it may, however, be pointed out that this powder, who appearance suggests the term ' smut,' is really composed of enormous numbers of particles, each of which is a seed. Now, these seeds have certain peculiarities that should claim the attention of the farmer. In the first place, they are very small, and so may be transported through the air as dust is borne along. 2. They are rough exteriorly, and so adhere to objects they may have come in contact with. 3. They have a very persistent vitality, enduring alive for years should circumstances favourable to their growth not be encountered; indeed, it is a fact that it is with difficulty that they can be made to germinate at all when fresh, even in water. 4. Further, they can pass through the system of an animal without being injured; but, on the other hand, rather invigorated, for after this has happened they germinate more readily; thus, when land has received stable manure derived in part from animals that have fed on maize-smut-tainted material, this will become infective to healthy

maize grown thereon. Finally, it may be added that the smut-seed (smut) does not immediately establish its connection with the maize when it germinates, but the germ-sprout first produces smaller seeds, the secondary spores or conidia, and that these seeds that grow and multiply in the soil after the manner of yeast are actually the bodies that, gaining access to the plant, cause it to be smut-smitten. For—as it must be added—the maize acquires the disease when it is only a diminutive seedling, the delicate parts within the earth being first assailed, although really it cannot be recognised that such has happened.

"It follows from these considerations that in coping with this serious enemy of maize that—

"1. Little or no benefit will accrue from 'treating' the seed contrary to what happens in the case of other smut diseases, except the farmer has no maize-smut on his land or in his neighbourhood and is procuring seed from some questionable and remote source. In the latter case he might advantageously pickle it as he would do wheat, say, in order to kill any adherent spores or seeds.

"2. If he has the disease on his land he should cut out and destroy all affected maize-stalks. He should do this carefully and thoroughly, since one smutted cob or tassel will mean billions of billions of seeds of the disease. For the same reason he should perform the work on the very earliest opportunity whilst the smut-tumour is still intact and no spores of smut have as yet escaped. The disease-affected maize so removed he should burn or deeply bury, and not feed it to stock or even use it as bedding for stock.

"3. If, under any circumstances, this action has been postponed, and the time for harvesting the crop has arrived, he should first gather the latter in, meanwhile leaving the affected stalks standing in the field These he should then deal with by burning.

"4. In land on which 'smut' has shown itself he should not plant maize in succession to maize, but alternate the ground with other crops, even for a season or two, before setting it with corn again.

"5. If he has smut-affected maize and he is, under any circumstances, induced to grow a further crop of this plant on new land, he should avoid such as is situated immediately to the leeward of the crop already smut-affected or in the line of the prevailing winds, since the soil of this is almost certain to have received a full charge of smut and will, if so, be in a condition to communicate a fresh outbreak of the trouble, so with land situated in the direction of the drainage flow from disease-affected field. These simple measures will assist very materially in helping the farmer to subdue the disease, and, if neglected, may lead to its becoming more and more prevalent. No application to the seed or plant in any stage of its growth, if a smut-spore-laden soil is selected for the growing crop, will be of any avail. It should have been added also, of course, that smut-contaminated stable manure or pen manure should under no circumstances be put on land destined at any time for maize cultivation."

Entomology.

CANE GRUB AND MUSCARDINE FUNGUS AT CAIRNS.

BY H. TRYON, Government Entomologist and Vegetable Pathologist.

With reference to the introduction of the Green Muscardine fungus from Samoa, in view of its possible use in cane grub destruction, I may state that this organism already occurred in the Cairns district in association with the insects in question when last I was pursuing my inquiries there; and, since it is indigenous to Queensland, has probably always done so. It is, however, local in its distribution there—a feature consistent with its nature and habits.

The Muscardine fungus is named *Metarrhizium anisopliæ* (Metschnikoff),* Sorokin, and for some years past has engaged our attention. Thus, as early as 1893, the following pronouncement was made:—

"There are a host of insects which, by their depredations, largely militate against the success of other enterprises, especially the ones connected with agriculture, and it would be largely to the interest of those concerned with these pursuits if these fungi might be made available in combating with insect-pests. Thus, the celebrated Russian scientist, Metschnikoff, having become aware that the fungus *Isaria destructor* (one of the names under which he had described the above organism and its habits) preyed upon the White Grub of the scarabæid beetle—*Anisoplia austriaca,* which, in the south of Russia, ravaged the wheat-fields, and knowing that it could be transferred from grub to grub, conceived the idea of cultivating this fungus apart from its host in some artificial medium, and so arming himself with a powerful instrument for contending with this destructive beetle in the many regions where the Isaria fungus did not already occur. This savant, then, aided by Cienkowsky, as early as 1879, accomplished the result at which he had aimed, empolying as a nutrient medium a fluid composed of the fermented juice of the maize. A correspondent, Professor Alfred Giard, charge d'cours in connection with the faculty of science at the Sorbonne, to whom I am indebted for much of the information contained in this paper, ... was subsequently successful with *Isara densa,* which lives on the 'Ver Blanc' (White Grub), another destructive scarabæid larva (of France); and this fungus, which was found to be capable of being artificially cultivated, was also discovered to be available for the direct infestation of no less than twenty-four different kinds of other insects." (Tryon, H.: "Insects as Fungus Hosts," 20th July, 1893; "Transactions, Natiural History Society of Queensland"; and "Queenslander," August, 1893.)

* *Metarrhizium anisopliæ* (Metschn.) Sorokin, according to J. B. Rorer, is identical with *Entomophthora anisopliæ,* Metschn.; *Isaria* destructor, Metschn.; *Cospora* destructor, Delacroix; *Penicillium anisopliæ,* Vuillemin; and *Septocylia drium suspectum,* n. sp., of Kew.

In this paper it was further pointed out that the *Isaria* was merely a form of a second fungus named *Cordyceps,* found associated with scarabæid grubs and other insects, and their respective characters were assigned; and a scarabæid larva attacked by the latter, and of Queensland origin, was referred to as being " One of the redoubtable ' White Grubs ' which sugar-planters know so well," and as being on exhibition.

In 1896, in writing regarding the " Grub Pest of Sugar Cane " (*Lepidiota squamulata* = *L. albohirta*), it was remarked that " the natural enemies calculated to exert the greatest influence in holding the grub pest in check are undoubtedly the plant (*i.e.,* fungus) parasites " (p. 35).

I also referred to the discovery at Goondi, Johnstone River, by Mr. Freeman, an officer of the Colonial Sugar Refining Company, of grubs of *Lepidiota albohirta* " infested with a parasite belonging to the genus *Cordyceps,* the alternate form of the Muscardine fungus," and further remarked: " To utilise, however, the discovery of the existence in Queensland of a *Cordyceps* preying upon the insect under consideration for practical ends, it is necessary in the first instance to discover the conidial condition (*Isaria*) of that organism; under which state alone it is available for use as a source of communicating the disease associated with its presence. This has not yet been done." (Tryon, H.: " Grub Pest of Sugar-cane," July, 1893, Department of Agriculture, Queensland, Brisbane, 1896.)

In 190 , whilst on a visit to the Mulgrave district, I discovered two or three examples of the larvæ of the Cane Beetle that occurred on Mr. Blackwell's farm, at a depth of 1 ft. 6 in. from the surface, dead, and covered with the Green Muscardine fungus.

Next it happened that dead cane-beetle grubs, exhibiting the Cordyceps phase of the fungus, were encountered in the Highleigh Estate, Mulgrave River, and that experiments were undertaken at the Mulgrave Central Mill by its chemist, Mr. L. Nott, to utilise (if possible) this discovery, but with negative results.

Again, when in the Cairns district in June-July, 1908, prosecuting similar inquiries regarding the " Grub Pest of Sugar Cane " (*Lepidiota albohirta*), I not only repeated this discovery by finding a large number of grubs, dead and exhibiting both the *Cordyceps* and *Isaria* (Metarrhizium) stages of the fungus, but I initiated experiments both in the field and laboratory, having its propagation and utilisation in view.

This latter discovery was made on the farm of one of the canegrowers connected with the Hambledon Mill, and was only realised after arduous field labour, the soil to the depth of 2 ft. having to be lifted and carefully examined throughout an area of several square yards.

Reference is made to this work in the " Annual Report of the Entomologist and Vegetable Pathologist " for 1908-9, in the following words:—

" On this occasion allusion need only be made (1) to the discovery of a special disease-producing fungus—a species of *Isaria* (Metarrhizium)

locally destructive to the grubs which, as the outcome of investigations conducted at Hambledon (by courtesy of the Colonial Sugar Refining Company, Limited), and that, unfortunately, had to be suspended almost as soon as entered upon, it was found possible, under laboratory conditions, to utilise in conveying fatality from grub to grub." (*Op. cit.*, p. 118.)

UTILISATION.

In 1896, the writer pointed out that, even after the discovery of the *Isaria* or *Metarrhizium* phase of the grub-destroying fungus above alluded to, and that is known under Robinet's name, "Muscardine," there would be considerable technical difficulties in using it in subduing the Cane Beetles. "When this (*i.e.*, the discovery) has been made known it may be added," to quote the words of S. A. Forbes of Illinois, in reference to this subject, "the whole matter is (still) involved in difficulties such as make absolutely necessary the strictest methods of experimental science" ("Grub Pest of Sugar Cane," p. 37).

Fortunately, since this was written, we have several important methods devised and made known for using "Muscardine" in the destruction of insects for our guidance.

(1) Metschinikoff's method alluded to herein as being made known by the present writer in 1893, has been followed by (2) methods devised in Honolulu in using the Muscardine fungus, imported from Japan by Albert Koebele in contending with the ground-frequenting grubs of the introduced beetle, *Adoretus umbrosus*. (col. Scarabæidæ); by (3) that devised by J. B. Rorer, in utilising it in coping with the Sugar-cane Froghopper insect (*Tomaspis* spp. *Cercopidæ*), in Jamaica; and that by (4) Dr. K. Friedericks in contending with the Rhinoceros Beetle of the Cocoanut (*Oryctes rhinoceros, L.*) in Samoa. These methods of procedure having been described, accounts of them are fortunately available for reference.

In the Cairns investigations alluded to, and when this information was not yet available, it was proposed to first cultivate this fungus on the grubs themselves, and then infect soil rich in organic matter with the organism, and thus use this soil as an indirect medium for propagating the disease in the field, distributing it by special means for this purpose. With this object in view, then, both a (1) field experiment and a (2) laboratory one were inaugurated.

In the field experiment healthy and Muscardine-infested grubs were intermixed at the bottom of a rectangular excavation, so that they might come in contact one with another, and then covered with scrub soil rich in humus to a depth of 18 in. By this crude method, based on the observation that the disease-affected grubs occurred in well-defined

areas in the canefields where they were discovered, it was expected that spore-laden soil would be obtainable.

In the laboratory experiment, it having been observed that the spores formed by the *Metarrhizium* fungus, although very numerous, were also very small, falling into the interstices of the surface of paper when placed upon it, and were with difficulty only moistened, resting in masses on the surface of water, a soil both extremely fine and also unusually rich in organic matter was employed. This had been discovered under peculiar circumstances by the writer, at Bahana Creek, and conveyed some miles to the laboratory for the purpose. In this soil, when dry, it was found practicable to mix the spores, so as to have a relative large quantity of infective material available, and it was noted that it served to originate the disease in Cane-grubs confined in vessels containing it—as was found at the expiration of nearly six months, when on revisiting the district the results of a few of the laboratory experiments could still be appraised. It is conceived that it would be quite possible to produce this material in large quantities and distribute it in the drills whilst planting.

As pointed out by me, in my report on the "Grub Pest in the Mackay District," in 1896, and in lectures on the subject since, and notably in the one delivered at Nelson-Cairns, in June, 1908, there are grounds for concluding—with but little doubt—that the fungus enemy of Cane Beetle Grubs has, in the past, had considerable influence in locally controlling the numbers and destructiveness of these marauders of our principal tropical agricultural industry, and that it will continue to do so. It appears within the possibilities of scientifically devised methods to assist nature by distributing to a larger extent than is spontaneously realised this destructive agent through which it works.

In conclusion, with regard to the incident that has prompted these remarks, it may be added that the Samoan fungus (*Metarrhizium anisopliæ*) of the Rhinoceros Beetle and its habits and employment are described by Dr. K. Friederichs in the "Tropenpflanzer, Zeitschrift fur Tropische Landwirtschaft" for December, 1913, in the concluding portion of his article "Uber den gegenwartigen Stand der Bekämpfung des Nashornkäfers (*Oryctes rhinoceros, L.*) in Samoa." A translation can be made available for reference.

Chemistry.

WATER FOR IRRIGATION AND STOCK.

By J. C. BRÜNNICH, Agricultural Chemist.

Every now and then reports are received from the country according to which crops have failed, soils have become unworkable and sterile, on using certain waters for irrigation, and again heavy mortality among stock has been caused by being forced to drink brackish water.

Analysis in such cases always demonstrates that the water was unfit for the use it was put to.

Numerous **analyses of waters** are carried out every year in our Agricultural Laboratory and many samples have to be condemned, and it is therefore of the greatest importance that pastoralists and farmers should make use of the Department's services in all doubtful cases.

As it is quite impossible to give with each analysis full explanations of the terms used, and more particularly the reasons why certain waters are not suitable, and why it is practically impossible to improve or purify such waters by simple means, it will be of general interest to give here a few **notes** on **water in general,** and on the conditions under which **waters** are **suitable for irrigation,** or **watering of stock** in particular.

Water is one of the simplest chemical compounds, and consists of a combination of the two gases Oxygen and Hydrogen. It is very widely distributed, and nearly four-fifths of the surface of our earth is covered with water, to an average depth of about 12,000 ft.

Water is one of the most wonderful gifts of nature, and has been recognised as such since time immemorial. Life could not exist without it, as it enters largely in the composition of all living matter. Animal bodies contain from 40 to 70 per cent. of water, and plants even up to 90 per cent.

Chemically pure water is difficult to prepare, and is a perfectly tasteless and odourless liquid. Even **distilled water,** unless prepared with special precautions, will contain small amounts of impurities.

Water is a great **solvent,** and this property to readily dissolve gases, liquids, and solids is of great importance in the household of nature. Water left exposed to the air absorbs gases from the atmosphere, and **rain water** will therefore contain about 4 cubic inches of nitrogen, 2 cubic inches of oxygen, and 1 cubic inch of carbonic acid gas per gallon. If we compare these amounts with the composition of the atmosphere, it will be found that the ratio of composition has been completely changed, as in the atmospheric air we find 4 volumes of

nitrogen to 1 volume of oxygen, and only small traces of carbonic acid. This fact that the air dissolved in water is much richer in oxygen is of the greatest importance to the life of aquatic animals. The increased amount of carbonic acid increases its solvent action on soils and rocks.

Rain as it falls, not only dissolves gases, but collects other impurities, as dust, bacteria, and also small traces of salt, ammonia salts, and other nitrogenous compounds.

Next to rain water the water from melting snow and ice, as found in mountain streams and lakes, and having passed only over hard crystalline rocks, is the purest water. As soon as rain water, or other water, passes through the soil, or layers of more soluble rocks, many mineral matters are dissolved, and change the character and taste of the water, which reappears again in form of springs, or is found in wells and bores. The water originally **fresh water,** containing only small amounts of mineral salts in solution, may have changed into a **mineral water,** containing large amounts of mineral matter.

Of such **mineral substances dissolved** the most important are:—

Lime salts, as calcium carbonate (*chalk or marble*) and calcium sulphate (*gypsum or copi*).

Magnesium salts, as magnesium carbonate (*common magnesia*), magnesium sulphate (*Epsom salt or salts*), and magnesium chloride.

Sodium salts, as sodium chloride (*common salt*), sodium sulphate (*Glauber's salt*), and sodium carbonate (*washing soda*).

The behaviour of water when using it washing with soap gives a fair indication of the amounts of mineral substances dissolved. Comparatively pure water, like rain water, readily produces a lather with soap, and is therefore called **soft water.** On the other hand, water containing lime and magnesium salts in solution, as frequently found in springs, wells, &c., are **hard waters,** and when rubbed with soap appear to produce a curdy or flaky precipitate, and only after considerable time a lather can be obtained. This action is a purely chemical one, caused by the mineral salts in the water decomposing the soap.

As a rule, a water of medium hardness, containing mineral salts and gases in solution, is more palatable and better for drinking **purposes** than a very soft water. For household purposes and factory use soft waters are generally to be preferred, as hard waters, besides leading to great waste of soap, on boiling and evaporation give cause to formation of boiler-scale; and some have a corroding action on metals.

One of the most pronounced mineral waters of nature is **sea water,** which contains about 3½ per cent. of solid matter in solution, three-fourths of which is common salt, or expressed in terms more generally used, sea water contains about 2,500 grains of total solids per gallon, of which 1,890 grains are sodium chloride or salt.

Water fit for drinking can be obtained from sea water by a process of distillation, as practised frequently at sea.

Salt, used in excessive amounts, acts like a poison, and therefore animals could not drink strongly **saline** or **brackish water** for any length of time.

Many of our well waters, and waters from shallow bores are saline, but fortunately the **water from artesian bores** are comparatively free from salt. Among about 180 analyses of bore waters, recorded in Dunstan's "Queensland Mineral Index," only ten contained more than 100 grains of salt per gallon, and only six of these more than 300 grains.

The **toleration** of various domestic animals for **salt** has not been accurately determined, and will depend naturally on many circumstances.

We have records that water containing from **600 to 700 grains of salt per gallon caused heavy mortality** among sheep, after using such water for a few months.

Water containing up to **300 grains of salt** per gallon may apparently be **used safely**, although many animals will refuse to drink the water with even this amount. Should water contain from 300 to 600 grains of salt per gallon it should be used for watering stock, in case of absolute necessity, for short periods. Water with still higher amounts is absolutely unfit for stock.

With regard to the **alkali carbonates,** chiefly soda carbonate, very little is known of its effect on animals, and in the quantities usually found in artesian bore waters no harm appears to be done. Among 180 samples of bore water, already referred to, 109 contained up to 20 grains of sodium carbonate per gallon, the remainder containing more than 20 grains.

The maximum amount of salt recorded is 1,200 grains per gallon, and the maximum amount of sodium carbonate 576 grains per gallon.

The fact of our artesian bore waters being more or less alkaline is of greatest importance when such waters are intended to be used for **irrigation,** as **alkali carbonates** (sometimes called "**Black alkali**") have a very bad action on soil and destroy plant life at certain concentration. Such alkali acts on the humus and the clay in the soil, and often renders it unfit for cultivation, by making it puddle in wet weather, and causing it to dry up into hard cement-like masses after dry spells.

The amount of **alkali carbonate** to be **tolerated** in **irrigation water** depends largely on the quality of the soil, methods of cultivation, and frequency of the use of water.

Professor Hilgard reports a case from California, where orange trees were killed within three years, by irrigating them with a water containing 21 grains sodium carbonate and 63 grains salt per gallon.

At the Moree Experiment Farm, in New South Wales, opened in 1899 and closed in 1910, bore water containing about 45 grains total solids, of which 34 grains sodium carbonate, per gallon, was used, and even after eight years' continual use excellent crops of oaten hay, wheat, sorghum, and maize were grown. In this case the soil, a heavy black loam, contained about 1½ per cent. of lime. On lighter classes of soil the effect of irrigating with such alkaline water might not have been so successful.

No hard-and-fast rule can be laid down to judge the **suitability of water** for **irrigation,** but it may be accepted that a brackish or saline water containing about **100 grains total solids,** chiefly consisting of **sodium chloride,** per gallon, is the limit for safe use under favourable conditions. The maximum amount of **soda carbonate** can be taken between **15 and 30 grains per gallon,** according to the nature of the soil to be irrigated and amounts of water to be used.

The injurious action of soda or black alkali may be counteracted to a large extent by heavy applications of **gypsum** to the soil.

The neutralisation of the alkali in the water with strong **nitric acid** has also been advocated, but will on account of expense be never of practical value. On a small scale, to grow a few flowers and vegetables with alkaline bore water irrigation, no other water being available, this treatment of water with nitric acid has proved successful in a few places. But even this treatment has its limits, as continual applications of water containing nitrates (saltpetre), although a great fertiliser, will similarly act on the soil as the alkali carbonate.

In all cases where alkaline bore waters are used for irrigation, the effects on soil and crops should be carefully watched, and the water should never be applied in excessive amounts. The ill-effects of mineral waters on plant life are chiefly due to concentration of the solutions in the soil, and even from waters containing only small amounts of mineral salts, dangerously high quantities may be left in the soil after repeated irrigation in hot, dry weather, which would not be removed until some heavy showers of rain have fallen and the ground is well drained and porous.

With regard to **analysis of water,** the results are generally stated in **grains per gallon**, and the first value given is the "**total solid matter,**" left on evaporation of water. This solid matter may contain besides mineral salts organic matter and small amounts of combined moisture, which are driven off, on heating the residue to dull red heat. The difference in weight before and after heating is recorded as "**loss on ignition.**"

The amount of "**chlorine**" in the water is given as such, and also calculated as **sodium chloride** or **salt,** although not necessarily all the chlorine is combined with soda, but may be present partially in form of magnesium chloride or calcium chloride. The "**hardness of water**" is expressed as lime carbonate, and when water is supposed to be used for boiler purposes the amount of **temporary hardness,** due to

mineral matters being removed on boiling the water, and the **permanent hardness,** due to more soluble lime and magnesia salts, remaining after boiling, are given. Any other alkalinity is recorded as sodium carbonate. When samples of water, intended for irrigation or watering of stock only, are taken for analysis, no special precautions, as recommended for drinking water, are necessary, and any ordinary clean bottle may be used, about a quart of water being required for analysis.

It would be of great interest to **collect evidence** throughout the State with regard to the **use of alkaline and saline waters** for irrigation and watering of stock. Any signs of disease in crops, or stock, should be carefully observed and reported to an inspector, who then could submit samples of the water in use for analysis, which would be made free of charge. In order to ascertain the tolerated amounts of salt and alkali, inspectors should inquire into cases, where such waters are successfully used, and submit such samples of water for analysis from time to time. In many cases the salinity of well water diminishes after the well has been in use for some time, and all such facts are well worth recording and reporting.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1914.

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

PHASES OF THE MOON.

			H.	M.	
5 Sept.	○	Full Moon	12	1	a.m.
13 „	☽	Last Quarter	3	48	„
20 „	●	New Moon	7	33	„
26 „	☾	First Quarter	10	3	p.m.
4 Oct.	○	Full Moon	3	59	p.m.
12 „	☽	Last Quarter	7	33	„
19 „	●	New Moon	4	33	„
26 „	☾	First Quarter	8	44	a.m.
3 Nov.	○	Full Moon	9	49	a.m.
11 „	☽	Last Quarter	9	37	„
18 „	●	New Moon	2	2	„
24 „	☾	First Quarter	11	39	p.m.
3 Dec.	○	Full Moon	4	21	a.m.
10 „	☽	Last Quarter	9	32	p.m.
17 „	●	New Moon	12	35	„
24 „	☾	First Quarter	6	25	„

General Notes.

TO OWNERS OF TEAMS AND MOTOR AND STEAM ENGINES.

At this critical time, when it is the duty of all to help in whatever way we can, and incidentally to as far as possible increase the area under wheat so as to make Queensland independent of the other States and thus set free a corresponding quantity for use elsewhere, the Minister for Agriculture draws attention to the fact that there must be many teams and steam and motor engines that, owing to the restriction in the transport of wool and other material, are probably not finding as much work as they need.

No doubt there are many farmers who are hampered in their desire to help in adding to the area under wheat by the want of additional motive and horse power, and it is suggested that here lies an opportunity for those whose teams or engines are idle to obtain employment. One of the conditions under which financial assistance will be given by the Minister towards increasing the area under wheat is for the hire of horses or motor power, and if any owner who desires employment of this nature cannot find it, he should communicate with the Under Secretary, Department of Agriculture, stating the conditions under which he is prepared to accept work—contract or otherwise; whereupon assistance will be given in arranging matters for him.

NATIVE BIRDS PROTECTION ACTS.

DESTRUCTION OF NATIVE BIRDS.

Notwithstanding the many insect pests which damage or destroy crops of all descriptions, it seems impossible to impress upon the holiday-maker's mind that, were it not for insectivorous birds, these pests would increase to such an extent as to make the raising of field crops, vegetables, and fruit too expensive a business to be profitable. Even a gun tax, to include the mischievous pea-rifle, would be powerless to protect the birds, in consequence of the practical impossibility of enforcing it in country districts. Whilst the legitimate sportsman carefully observes the close season for game birds, the boy with the pea-rifle is troubled with no conscientious scruples on that score. He looks upon every member of the feathered tribe which comes within reach of his weapon as the legitimate object of his nefarious sport. If the attention of these shooters were directed only towards the fruit or leaf eating birds, no objection could be raised towards their sacrificing thousands of them. Unfortunately, they cannot discriminate between

useful and destructive birds; and who is there to teach them? If every State and private school were supplied with well-executed coloured plates of both classes, the teachers would be able to do a great deal towards minimising the evil. We proposed at one time to issue with every Journal one or two such coloured plates, but, unfortunately, these are expensive, and the times have of late been too bad to enable us to carry out the idea. But we shall by no means lose sight of it. Take a few of our insectivorous birds, such as crows, ibis, curlews, owls, night-jars (otherwise moreporks), &c. The crow is generally cunning enough to distinguish between a stick and a gun, and less frequently falls a victim to the gunner. Crows, although they are notorious for destroying chickens, young birds, hares, &c., yet render signal service to the farmer by destroying mice, cutworms, wireworms, &c. It has been calculated in Germany by Herr Rörig that "a field mouse and its progeny will destroy 1,000 plants of grain whilst the latter are developing." We know what tremendous losses the plague of mice inflicted on farmers last year. He also stated that "About 3,000 crows, by destroying mice and other vermin, benefit farmers to the amount of £2,500 per annum. In other words, what is commonly but erroneously known as the carrion crow benefits him to the amount of 11d. per bird per annum over and above the loss it causes him by the destruction of chickens, eggs," &c. Anyone who has watched the flocks of ibis on newly-ploughed land, thrusting their long curved bills deep into the soil, and devouring thousands of worms, grubs, beetles, and larvæ, must be impressed with the great value of these birds; yet how often are they shot in mere wantonness and left to rot on the ground? The number of mice consumed by owls is something incredible.

In 1905 we were indebted to Mr. Hy. Tryon, Government Entomologist and Vegetable Pathologist, for the following information on the food of various birds. He has closely studied their habits and examined their stomachs. This scientific phase of the question we do not attempt to deal with; the object of this article is to draw attention to the indiscriminate shooting of birds, destructive or useful, for no other purpose but sport, or "to keep one's hand in," as swallow and marten shooters express it:—

INSECTIVOROUS AND PARTLY INSECTIVOROUS BIRDS.

Ibis.—The food of the birds comprised by this name consists of frogs, especially in the tadpole state, grasshoppers, grass-eating caterpillars, ground-frequenting caterpillars, soil-frequenting "grubs" generally, young fish, &c.

Carrion Crow.—No bird in Australia bears this name that may be erroneously bestowed on the common crow or raven, or on the white-eyed crow, both of which possess feeding habits distinct from those of the European "carrion crow." The food of the bird of coastal Queensland, the former of the two kinds mentioned, includes grasshoppers, locusts, cicadas, moths, grass-eating caterpillars, soil-frequenting grubs, and large insects generally. Ticks, rats and mice, eggs of poultry and

wild birds, young chickens and ducks (exceptionally); seeds of cereals when broadcasted, plantlets of cereals, maize from the cob (exceptionally), lambs, the eyes of cast ewes and of bogged sheep and cattle; fruit, *e.g.*, pineapples and watermelons; carrion and offal generally.

Pied Crow (*Shrike*).—Insects of various kinds, especially the larger ones—*e.g.*, grasshoppers, locusts, &c.; seeds, berries of wild and cultivated trees, coffee berries, fruit generally—oranges, figs, grapes, strawberries, to most kinds of which it is highly destructive; carrion, including dead birds, &c.

Morepork (Ninix).—The smaller kinds feed on various nocturnal insects, on rodents, on small birds, on young domesticated pigeons. The largest kinds the same, and on birds as large as a laughing jackass—*Decelo sp.* (Brennan).

Night-jar.—On various nocturnal flying insects, and especially on moths.

Laughing Jackass.—On large insects, grasshoppers, locusts, &c., lizards, iguanas (small), snakes, small rodents (rats and mice), chickens, young birds.

Kingfishers (1. *Halcyon*).—Feed on grasshoppers, mantidæ, noctuid caterpillars, lizards (small), tree frogs, spiders, tipulid flies, beetles, white-ants.

Kingfishers (2. *Alcyone*).—Small fish, aquatic insects, flying insects hovering over water.

Butcher Birds (*Cracticus spp.*).—Feed on large insects (grasshoppers, &c.), small lizards and other reptiles, small snakes, caterpillars, soil-frequenting "grubs," small rodents (mice, &c.), nestling birds, small birds both wild and domesticated, very young chickens, hive bees (exceptionally).

Dollar Birds.—Insects (especially beetles) occurring on the wing and in tree-tops; hive bees (exceptionally).

The whole of the State is now under the operation of the Acts, and Queensland is divided into two districts, for which two distinct close seasons are provided. New names have been included in the lists of protected birds. Schedule A contains the names of those totally protected, while in Schedule B will be found those to which partial protection only is afforded. Considering the valuable asset insectivorous birds are to the State, and especially to those people whose occupation is connected with the land, there should be ready assistance given to the Department in the protection of our native birds. It should be noted that any person can prosecute under the Acts.

Reserves can be proclaimed with the consent of the owner or occupier of private lands, and rangers (honorary) appointed when a reserve has been created.

The following particulars—showing the birds which are subject to the operation of the Native Birds Protection Acts, the periods of the year during which the Acts are in operation, and the reserves set apart for the preservation and protection of such birds—are published for general information:—

BIRDS ABSOLUTELY PROTECTED THROUGHOUT QUEENSLAND.

SCHEDULE A.

Common Name.	Technical Designation.
Australian Bee-eaters	Merops
Babblers	Timeliidæ
Bell Birds	Oreoica
Bitterns	Ardeiformes
Black Cockatoos of all species	Calyptorhynchus
Black Swans	Anatidæ
Bower Birds of all species	Ptilonorhynchidæ
Bush Chats of all species	Ephthianurinæ
Cassowaries	Casuariidæ
Caterpillar-eaters	Campophagidæ
Coachwhip Birds	Timeliidæ
Coucals or Swamp Pheasants	Centropodinæ
Cuckoo Shrikes	Campophagidæ
Cuckoos of all species	Cuculidæ
Diamond Birds (Pardalotes)	Dicæidæ
Dollar Birds (Rollers)	Eurystomus
Egrets of all species	Ardeiformes
Fantails	Muscicapidæ
Field Wrens	Timeliidæ
Flower-peckers	Dicæidæ
Fly-catchers (Wagtails)	Muscicapidæ
Fly-eaters	Muscicapidæ
Frogmouths	Podargidæ
Grebes	Podicipediæ
Herons	Ardeiformes
Honey-eaters (except Miners, Wattle Birds, Friar Birds)	Meliphagidæ
Ibises	Ardeiformes
Jabirus	Ardeiformes
Kingfishers (all species)	Alcedinidæ
Kites	Elanus
Land Curlews or Stone Plovers	Œdicnemidæ
Larks of all species	Motacillidæ, Alaudidæ
Laughing Jackasses	Alcedinidæ
Lyre Birds	Menuridæ
Magpies	Gymnorhina
Magpie Larks	Grallina
Martins	Hirundinidæ
Nightjars or Goat-suckers	Caprimulgidæ
Nuthatches or Tree-runners (Woodpeckers)	Sittidæ
Owls	Strigidæ
Parras	Parridæ, Glareolidæ
Parrots (Ground or Swamp)	Pezoporus
Pipits	Motacillidæ, Alaudidæ
Pittas of all species	Pittidæ
Pratincoles	Parridæ, Glareolidæ
Regent Birds	Genus Sericulus (Ptilonorhynchidæ)
Rifle Birds	Paradiseidæ
Robins of all Species	Muscicapidæ
Satin Birds	Genus Ptilonorhynchus (Ptilonorhynchidæ)
Shining Starlings (Calornis)	Eulabetidæ
Shrike Tits	Muscicapidæ
Song Larks	Timeliidæ
Spoonbills	Ardeiformes
Storks	Ardeiformes
Swallows	Hirundinidæ
Swamp Pheasants	Centropodinæ
Swifts	Cypselidæ
Thickheads (Whistlers)	Muscicapidæ
Thrushes of all species	Turdidæ, Prionopidæ
Tit Warblers (Tree Tits)	Sylviidæ
Tree-creepers	Climacteris
Tree-runners	Sittidæ
Warblers	Sylviidæ
White-eyes or Silver-eyes	Zosteropidæ
Wood Swallows	Artamidæ
Wren Warblers	Sylviidæ
Wrens of all species	Sylviidæ

BIRDS PARTIALLY PROTECTED THROUGHOUT QUEENSLAND.

SCHEDULE B.

Common Name.	Technical Designation.
Bronzewing Pigeons	Columbæ
Brown Hawks	Falconidæ
Bustards or Plain Turkeys	Otididæ
Coots	Rallidæ
Cranes	Gruidæ
Crakes	Rallidæ
Curlews	Charadriidæ
Dottrels	Charadriidæ
Doves	Columbæ
Ducks, Wild, of all species	Anatidæ (excepting Black Swans)
Emus	Dromæidæ
Fig Birds	Oriolidæ
Finches (including Plumhead, Banded, Painted, Zebra, and Redheaded Finches, &c.)	Ploceidæ
Geese, Wild	Anatidæ (excepting Black Swans)
Land Rails	Rallidæ
Mallee Fowls	Megapodiidæ
Moor Hens	Rallidæ
Native Companions	Gruidæ
Native Hens	Rallidæ
Orioles	Oriolidæ
Pigeons, all Wild	Columbæ
Plovers	Charadriidæ
Quails	Phasianidæ, Turnicidæ
Rails, Land and Water	Rallidæ
Scrub or Brush Turkeys	Megapodiidæ
Scrub Fowls	Megapodiidæ
Sea Birds, all	
Turkeys, Plain and Scrub or Brush	Otididæ and Megapodiidæ
Waders	Charadriidæ
Water Rails	Rallidæ

Close Seasons.

In District No. 1, from the first day of September in each year to the thirty-first day of March in the following year, inclusive.

In District No. 2, from the first day of November in each year to the thirty-first day of May in the following year, inclusive.

(With the exception of emus on prickly-pear infested lands, where the close season shall be from the first to the seventh day of July in each year.)

For districts, *see* map.

PENALTIES.

If any person shall wilfully kill or destroy any protected native bird, or shall use any instrument whatever, net, or other means for the purpose of killing or destroying any native birds, within the periods hereinbefore mentioned, such person shall, upon conviction, **pay a fine of not less than one pound or more than five pounds.**

If any person shall buy, sell, or knowingly have in his possession, house, or control any native bird at any time within the period hereinbefore mentioned, he shall **pay a penalty not less than one pound or more than five pounds for every bird.**

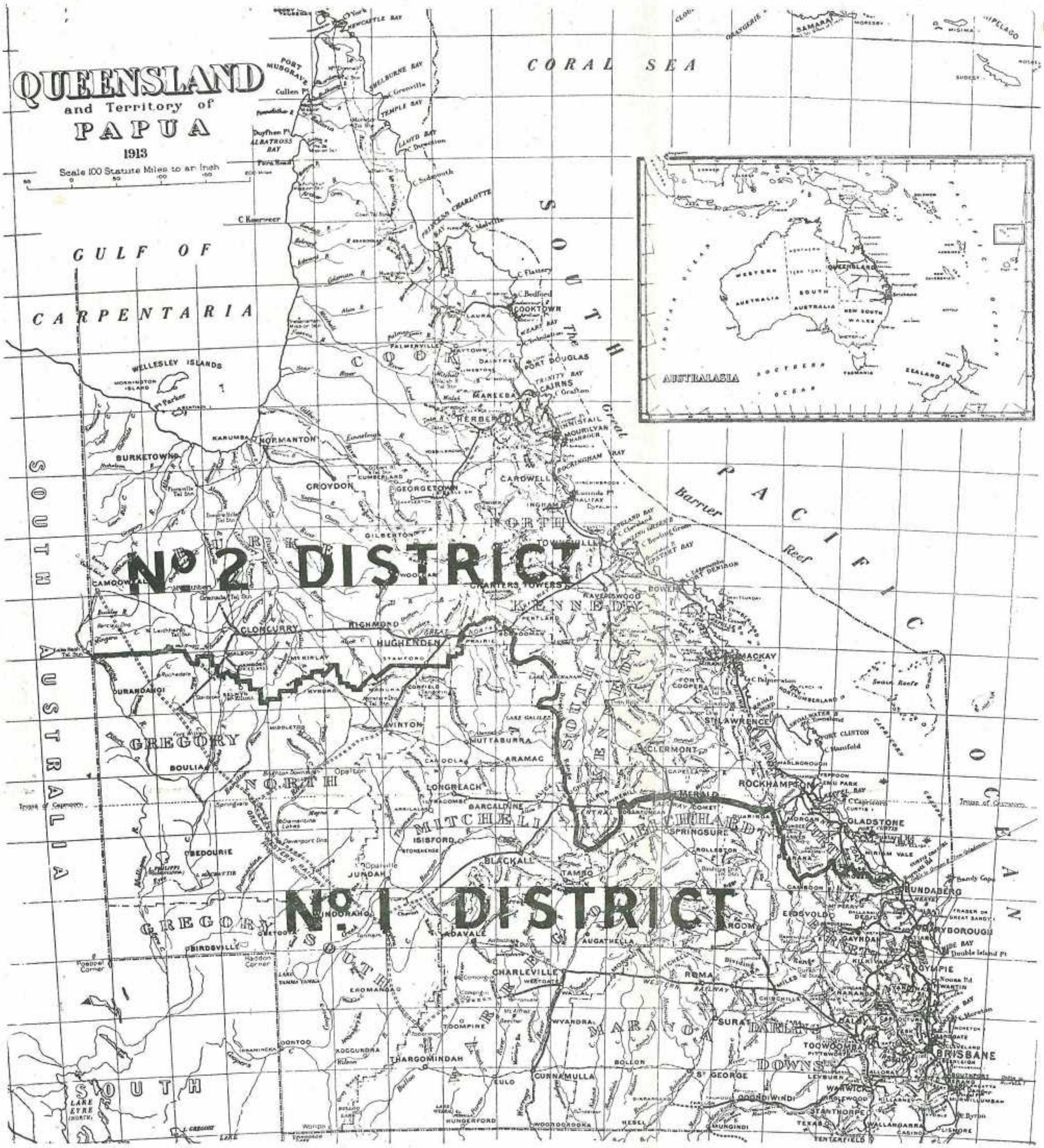
If any person wilfully kills, destroys, or captures any native bird, or uses any instrument, net, or any other means whatever for the purpose of killing, destroying, or capturing any such bird, while it is within or flying over a reserve, he shall be liable upon conviction to pay a **fine of not less than one pound or more than five pounds.**

A moiety of every penalty recovered under the Act shall be paid to the person or persons laying the information.

LIST OF RESERVES WITHIN WHICH THE DESTRUCTION OF NATIVE BIRDS IS PROHIBITED DURING THE WHOLE YEAR.

Situation of Reserve.	For Proclamation and Boundaries *see Government Gazette.*		
	Date.	Part.	Page.
Parish of Enoggera, county of Stanley (Enoggera Reservoir and Catchment Area)	29 Aug., 1885	II.	769
Parish of Gracemere, county of Livingstone	29 Aug., 1885	II.	769
Parishes of Toorbul, Beerwah, and Bribie, county of Canning (Pumice Stone Channels and the shores thereof)	12 Sep., 1885	II.	897
**Parishes of Crow's Nest and Douglas, counties of Cavendish and Aubigny*	10 Oct., 1885	II.	1253
**Parish of Emu Creek, county of Cavendish ... ...*			
**Parish of Douglas, county of Aubigny ... ...*			
Parish of Nerang, county of Ward, Southport	5 June, 1886	I.	1946
Parishes of Moggill and Indooroopilly, county of Stanley (Gold Creek and Moggill Creek Drainage Areas)	13 July, 1889	II.	797
Parish of Boonara, county of Mackenzie (on the leased part of Boonara Run)	14 Sep., 1889	III.	99
Parishes of Enoggera and Indooroopilly, county of Stanley (Mount Coot-tha Reserve)	20 Dec., 1890	III.	1403
Parish of Oxley, county of Stanley (Chelmer Recreation and Water Reserve)	4 Mar., 1893	I.	670
Parish of Hewittville, county of Livingstone (Reserve for Water, Emu Park)	18 July, 1893	II.	583
Parish of Ossa, county of Carlisle, Seaforth	1 Jan., 1898	I.	21
Parishes of Cressbrook, Bowman, and Neara, county of Canning	11 June, 1898	I.	1596
Lake Clarendon	24 Mar., 1900	I.	961
England and Clarendon	25 June, 1900	I.	1650
Fitzroy, Nicholson, Faraday, Calioran	6 July, 1901	II.	564
Gavial and Gracemere (The Duck Pond)	13 July, 1901	II.	633
Horseshoe Lagoon, parish of Selkirk	16 Aug., 1902	II.	421
Cloyna	28 Dec., 1901	III.	990
Parishes of Antill and Jarvisfield	30 July, 1904	II.	249
Parish of Jarvisfield (Church Lagoon)			
Ditto (Red Lily Lagoon)			
Parish of Rockhampton (Murray's and Jardine's Lagoons)	27 Aug., 1904	II.	493
Parish of Charters Towers (Burdekin Weir)	29 Oct., 1904	II.	901
Dunk, Kumboola Island, and Mount Islet, the Family Islands (comprising Thorpe, Richards, Wheeler, Coombe, Bowden, Smith, and Hodson Islands), and Brooks Islands	13 May, 1905	I.	1546
Parish of Yeerongpilly (Russell Wilkins)	16 Dec., 1905	II.	1273
Ditto (Water Reserve)			
Parish of Enoggera (Private lands on Toowong Creek)	11 Aug., 1906	II.	274
Parish of Yaamba (P. F. MacDonald's property) ...	8 Sep., 1906	II.	514
Parish of Noogoon (Mud Island)	8 Dec., 1906	II.	1195
Parish of Broadmere (Lake Murphy	13 Feb., 1909	I.	341
County of Stanley (The Redcliffe Shire)	20 Mar., 1909	I.	738
Parishes of Wyseby and Aubrey (Stud Farm for Breeding Police Horses)	10 July, 1909	II.	70
Parish of Pentland (Pentland Dam and Swamp)	24 July, 1909	II.	220
Parish of Dugandan (A. J. McConnell's property) ...	4 Sep., 1909	II.	587
County of Nares (The Douglas Shire)	16 April, 1910	I.	1002
County of Elphinstone (Abattoir Reserve, Townsville) ...	21 May, 1910	I.	1326
Parish of Taylor, Toowoomba District (Jubilee Park), Redwood Park, Picnic Point, and One-tree Hill)	8 Oct., 1910	II.	1010
Parish of Tingalpa (Shire of Wynnum)	18 Feb., 1911	I.	930
Gladstone Land Agent's District (Capricorn Group of Islands)	5 Aug., 1911	II.	422
Mackay Land Agent's District (Orphanage Swamp and Denman's Water Hole)	23 Sep., 1911	II.	820
Parishes of Rockybar and Eumara (Reeves Lake, &c., on Eumara and Gainsford Holdings)	29 June, 1912	I.	1711
Shire of Widgee	20 Dec., 1913	II.	1741
Parish of Stradbroke (Myora)	11 April, 1914	I.	1036
Shire of Maroochy	2 May, 1914	I.	1173
County of Ward, area on coast from Southport to Pt. Danger	4 July, 1914	II.	78

* Note.—These reserves are for the protection of the following birds only:—Tallegallas or Scrub Turkeys, Bronzewing and all Wild Pigeons, Emus, Regent Birds, Quails.


QUEENSLAND
and Territory of
PAPUA
1913
Scale 100 Statute Miles to an Inch
CORAL SEA
GULF OF CARPENTARIA
SOUTH PACIFIC OCEAN
SOUTH AUSTRALIA
AUSTRALASIA
No. 2 DISTRICT
No. 1 DISTRICT
COOK
NORTH KENNEDY
SOUTH KENNEDY
BURKE
GREGORY NORTH
GREGORY SOUTH
MITCHELL
LEICHHARDT
WARREGO
MARANOA
DARLING DOWNS
BURNETT
PORT CURTIS
WELLESLEY ISLANDS
COOKTOWN
CAIRNS
NORMANTON
BURKETOWN
CROYDON
GEORGETOWN
CHARTERS TOWERS
CLONCURRY
RICHMOND
HUGHENDEN
MACKAY
ROCKHAMPTON
GLADSTONE
BUNDABERG
MARYBOROUGH
GYMPIE
BRISBANE
TOOWOOMBA
WARWICK
STANTHORPE
LONGREACH
BARCALDINE
WINTON
BOULIA
BIRDSVILLE
CHARLEVILLE
ROMA
CUNNAMULLA
THARGOMINDAH
BLACKALL
TAMBO
ISISFORD
EMERALD
CLERMONT
ST GEORGE
GOONDIWINDI
Tropic of Capricorn
Great Barrier Reef

Answers to Correspondents.

TO REMOVE A SPLINT IN A HORSE'S LEG.

The following blister has been found beneficial in removing splints:—Bicloride of mercury 1 drachm, iodine 1 drachm, methylated spirit 1 drachm. The splint should be painted with the above blister once every week. A little lard should be placed beneath the affected part, so as to prevent the blister affecting the healthy bone.

STRANGLES IN HORSES.

When the disease appears, the animal should be isolated from other horses. He should be made as comfortable as possible, having plenty of fresh air and a liberal supply of cold water. As the disease progresses give soft nourishing food—*e.g.*, bran mashes. Boiled linseed should be given. When the cough appears the throat should be well rubbed with a mixture of mustard and water, and the following powder given twice daily in drinking water—chlorate of potash, nitrate of potash, each 2 dr. If a discharge appears at the nostrils, the animal's food should be placed on the ground. In the case of the nine-year-old horse mentioned, it seems that he is suffering from Irregular Strangles, in which case tonics, such as 1 oz. Liquor arsenicalis, should be given in drinking water daily.

DESTRUCTION OF HOUSE-FLIES.

H. K., Ingham—

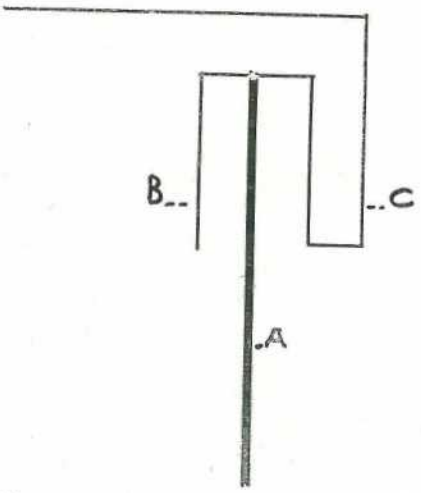
With reference to your inquiry *re* house-flies, Mr. H. Tryon, Government Entomologist and Vegetable Pathologist, replies:—

"By the term 'Flies,' it is assumed that he is referring to ordinary 'house-flies,' but this is uncertain. However, as there are other kinds of these insects than house-flies proper (*Musca domestica*) that frequent houses and, although generally resembling them, are specifically distinct, he should therefore remit specimens.

"The subjugation of house-flies proper is greatly assisted if their breeding habits are taken into consideration. They are, it may be stated, much addicted to laying their eggs and developing as maggots in stable manure, but affect for this purpose also horse-droppings and, to a less extent, those derived from cattle and pigs. Again, a favourite nidus for them is the contents of privies and night-soil promiscuously deposited, but almost any rubbish, especially if moist and undergoing fermentation, will yield sustenance for the maggots—their young.

"In dealing with them, the foregoing facts should receive careful attention, and the matters referred to should be secured, as far as possible, against their access by being kept in bins or other receptacles, or, where this is not practicable, should be poisoned or rendered repugnant to them by being well dressed with kerosene or crude oil or carbolic acid (soluble phenyl). The matters found in outhouses, and referred to

above as serving also as breeding-places for the flies, should be always kept covered with dry earth or sand, freely impregnated with one or other of the hydrocarbons mentioned. Nightsoil, moreover, and kitchen refuse, if simply burned, should be well covered with earth, largely composed of loose sand, to a depth of over 2 ft., but any covering assists house-fly repression. Flies also can be trapped in various ways. Outside the house by a modified rubbish tin—it having a space of about ¼ in. between the rim of the cover and the receptacle, held in position by three metal loops, and having in the top of the cover a round hole that admits the light and into which is fixed a wide-gauze receptacle. Flies gaining access to this through the space are attracted by light to the hole and so enter the gauze cage.



Trap in Section.

a. Side of tin.

b. Metal loop for supporting cover.

c. Side of cover or rim ¼ in. beyond side of tin and top of cover, also above sides.

"In using this, the tin itself is partially filled with food substances that the flies are known to affect.

"Within the house, the flies may be captured by the use of fly-papers or fly-traps, of which there are several in the market. Again, they may be poisoned in one way or another. For example, with a mixture composed of—Formalin, 2 oz.; sugar, 2 oz.; and water, 10 oz. This to be used in saucers or other shallow vessels, in each of which also is placed a small piece of bread (crust) to serve as an alighting ground for the insects. Milk may be substituted for the sugar and water. The success of this poison will, of course, be dependent on the fact that the flies are debarred from access to other fluids in the dwelling-rooms whence they might derive their liquid aliment."

LICE ON DOGS AND CATS.

A correspondent asks for a remedy. Mr. A. McGown, M.R.C.V.S., advises that the dog be washed with a solution of Scares acre 1 part, water 20 parts, and on the following day again washed with carbolic soap and rape oil. With reference to dog losing flesh and faltering in the hindquarters, Mr. McGown advises that from the symptoms given, the animal appears to be suffering from worms. If so, 1 oz. of castor oil should be given on an empty stomach. When this has operated, 2 drachms of freshly-powdered Areca nut should be placed on the back of the tongue, and the animal made to swallow it. This should be followed by another dose of castor oil.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1913 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1914.	Oct., 1913.		Oct.	No. of Years' Records.	Oct., 1914.	Oct., 1913.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·74	13	1·50	0·48	Mount Larcom ...	...	...	5·33	...
Cairns	1·60	27	2·32	2·83	Nanango	2·28	27	3·12	0·27
Cardwell	1·74	27	3·14	1·46	Rockhampton ...	1·65	27	5·69	Nil
Cooktown	0·94	27	0·86	2·54	Woodford	2·74	27	3·92	1·09
Herberton	0·96	27	0·95	0·66	Yandina	3·28	21	6·25	0·07
Ingham	1·39	22	3·39	1·32					
Innisfail	2·45	27	7·33	3·13	*Darling Downs.*				
Mossman	3·31	5	4·22	4·17					
Townsville	1·18	30	0·38	0·31	Dalby	2·27	27	1·45	0·65
					Emu Vale	2·60	17	2·16	2·26
Central Coast.					Jimbour	2·01	24	0·99	1·37
					Miles	2·09	27	2·73	1·12
Ayr	0·88	27	0·08	0·12	Stanthorpe ...	2·48	27	2·46	3·03
Bowen	0·88	27	0·54	Nil	Toowoomba ...	2·56	27	3·96	2·33
Charters Towers ...	0·75	27	0·01	Nil	Warwick	2·42	27	2·70	2·04
Mackay	1·69	27	3·86	0·03					
Proserpine	1·48	11	3·18	0·05					
St. Lawrence ...	1·69	27	5·77	Nil	*Maranoa.*				
South Coast.					Roma	1·84	25	0·82	1·19
Crohamhurst ...	3·71	20	6·42	0·33	*State Farms, &c.*				
Biggenden	2·23	14	4·05	1·04					
Bundaberg	1·97	27	6·36	0·18	Gatton College ...	2·56	14	3·96	1·87
Brisbane	2·75	63	2·47	0·78	Gindie	1·17	13	4·43	Nil
Childers	2·02	19	4·95	0·30	Kamerunga Nurs'y	1·53	23	3·71	1·38
Esk	2·45	27	3·66	0·95	Kairi	...	...	0·84	0·60
Gayndah	2·24	27	2·94	0·47	Sugar Experiment Station, Mackay	1·60	16	4·75	Nil
Gympie	2·42	27	4·94	0·15					
Glasshouse M'tains	3·40	6	3·45	0·27	Bungeworgorai ...	...	...	1·36	1·84
Kilkivan	2·59	27	1·19	0.53	Warren	...	...	2·85	Nil
Maryborough ...	2·11	27	5·00	3·51	Hermitage ...	2·15	7	1·90	3·45

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year and for the same period of 1913, having been compiled from telegraphic reports, are subject to revision.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1914.

Article.		NOVEMBER. Prices.
Bacon	lb.	9d. to 10½d.
Bran	ton	£7 15s.
Butter	cwt.	106s.
Chaff, Mixed	ton	£6 to £7
Chaff, Oaten (Victorian)	,,	£7 10s. to £8
Chaff, Lucerne	,,	£7 to £7 10s.
Chaff, Wheaten	,,	£6 to £6 5s.
Cheese	lb.	6¾d. to 7d.
Flour (Official Price)	ton	£9 10s.
Hams	lb.	1s. 2½d. to 1s. 3½d.
Hay, Oaten (Victorian)	ton	£7 to £7 10s.
Hay, Lucerne (Prime)	,,	£6 5s. to £6 15s.
Honey	lb.	2½d.
Maize	bush.	3s. 5d.
Oats	,,	3s. 11d. to 4s.
Onions (Victorian, Japanese, American)	ton	£14 to £17
Peanuts	,,	3½d.
Pollard	lb.	£7 15s.
Potatoes (Old)	ton	£5
Potatoes (New)	,,	£6 to £7 10s.
Potatoes (Sweet)	cwt.	1s. 6d. to 2s. 6d.
Pumpkins	ton	£1 10s. to £2
Wheat, Milling	bush.	4s. 6d.
Eggs	doz.	8d. to 9d.
Fowls	pair	3s. to 6s. 6d.
Geese	,,	6s. 6d. to 7s.
Ducks, English	,,	3s. 6d. to 4s.
Ducks, Muscovy	,,	4s. to 5s. 6d.
Turkeys (Hens)	,,	7s. 6d. to 8s. 6d.
Turkeys (Gobblers)	,,	14s. to 16s.

SOUTHERN FRUIT MARKETS.

Article.	NOVEMBER. Prices.
Bananas (G.M.), per case	22s. 6d. to 23s.
Bananas (Tweed River, Cavendish), per case	9s. to 12s.
Bananas (Fiji), per case	19s. to 20s.
Mandarins (Queensland), per case	10s. to 15s.
Oranges (Navel), per case	10s. to 15s.
Oranges (Seville), per case	6s. to 7s.
Oranges (other), per case	9s. to 12s.
Passion Fruit, per half-case	2s. to 11s.
Papaw Apples, per half-case	1s. 6d. to 3s.
Pineapples (Queens), per case	13s. to 15s.
Pineapples (Ripleys), per case	10s. to 14s.
Pineapples (Common), per case	10s. to 13s.
Tomatoes, per quarter-case	4s. to 5s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	NOVEMBER. Prices.
Apples, Eating, per case	15s. to 17s.
Apples Cooking, per case	15s. to 17s.
Apricots, per quarter-case	4s. to 8s.
Bananas (Cavendish), per dozen	2d. to 4½d.
Bananas (Sugar), per dozen	2½d. to 3½d.
Cape Gooseberries, per quarter-case	4s. 6d. to 7s.
Cherries, per quarter-case	7s. 6d. to 15s.
Citrons, per cwt.	...
Cocoanuts, per sack	12s. to 15s.
Cumquats, per case	...
Custard Apples, per quarter-case	...
Lemons, per case	5s. to 7s. 6d.
Lemons (Italian), per case	12s. to 15s.
Limes, per case	...
Mandarins, per case	6s. to 10s.
Mangoes, per case	4s.
Oranges (Navel), per case	8s. to 12s.
Oranges (other), per case	7s. to 10s.
Papaw Apples, per quarter-case	1s. 6d. to 3s. 6d.
Passion Fruit, per case	9s. to 11s.
Peaches, per quarter-case	5s. to 10s.
Peanuts, per pound	3½d.
Pears, per quarter-case	...
Persimmons, per quarter-case	...
Pineapples (Ripley), per dozen	6s. to 9s. 6d.
Pineapples (Rough), per dozen	4s. 6d. to 6s.
Pineapples (Smooth), per dozen	4s. to 7s.
Plums, per case	...
Rockmelons, per dozen	2s. 6d. to 7s. 6d.
Rosellas, per sugar bag	...
Strawberries, per tray	...
Strawberries, per dozen boxes	4s. to 10s.
Tomatoes, per quarter-case	1s. to 5s.
Watermelons, per dozen	10s. to 18s.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1914.

Animal.	OCTOBER. Prices.
Bullocks	£12 15s. to £15 15s.
Cows	£9 15s. to £11
Merino Wethers	23s. 3d.
Crossbred Wethers	22s.
Merino Ewes	17s. 3d.
Crossbred Ewes	21s.
Lambs	18s. 6d.
Pigs (Porkers)	...

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean.* Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish Blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflowers, mustard, cabbage, celery, radish, for Autumn and Winter use. Sow celery in shallow, well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed, except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the early worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

* See article in this issue by G. B. Brooks, Instructor in Agriculture, on Potato-growing.

FLOWER GARDEN.—To make the flower beds gay and attractive during the Autumn and Winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost, then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand,* as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to overwater at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather proves dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work. The flower garden in Autumn and Winter will present a charming sight and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on " Flower Gardening for Amateurs " has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so they are apt to become fly-infested.

Watermelons and rockmelons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit fly, and gather and destroy all infested fruit, or, better still grub the trees out and burn them as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori, with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the Autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district; apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, and grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth, examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market,—not before. If sent down green, they will sell for cooking and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.